SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

(Mark one)

[X] ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(D) OF THE SECURITIES EXCHANGE ACT OF 1934
FOR THE FISCAL YEAR ENDED DECEMBER 31, 1999

or

[ ] TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(D) OF THE SECURITIES EXCHANGE ACT OF 1934

COMMISSION FILE NUMBER 0-15006

AVANT IMMUNOTHERAPEUTICS, INC.
(F/K/A T CELL SCIENCES, INC.)
(Exact name of registrant as specified in its charter)

DELAWARE	13-3191702
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)

119 FOURTH AVENUE, NEEDHAM, MASSACHUSETTS 02494
(Address of principal executive offices)(Zip Code)

Registrant's telephone number, including area code: (781) 433-0771

Securities registered pursuant to Section 12(b) of the Act: NONE

Securities registered pursuant to Section 12(g) of the Act:
COMMON STOCK, PAR VALUE $.001

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes X No
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Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of Registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. [ ]

The aggregate market value of common stock held by non-affiliates as of March 10, 2000 was $657,749,278 (excludes shares held by directors and executive officers). Exclusion of shares held by any person should not be construed to indicate that such person possesses the power, direct or indirect, to direct or cause the actions of the management or policies of the Registrant, or that such person is controlled by or under common control with the Registrant. The number of shares of common stock outstanding at March 10, 2000 was: 50,012,800 shares.

SAFE HARBOR STATEMENT UNDER THE PRIVATE SECURITIES LITIGATION REFORM ACT OF 1995: STATEMENTS CONTAINED IN THIS REPORT, INCLUDING PART II, ITEM 5: MARKET FOR REGISTRANT'S COMMON EQUITY AND RELATED STOCKHOLDER MATTERS, THAT ARE NOT HISTORICAL FACTS MAY BE FORWARD-LOOKING STATEMENTS THAT ARE SUBJECT TO A VARIETY OF RISKS AND UNCERTAINTIES. THERE ARE A NUMBER OF IMPORTANT FACTORS THAT COULD CAUSE THE ACTUAL RESULTS TO DIFFER MATERIALLY FROM THOSE EXPRESSED IN ANY FORWARD-LOOKING STATEMENTS MADE BY THE REGISTRANT. THESE FACTORS INCLUDE, BUT ARE NOT LIMITED TO: (I) THE REGISTRANT'S ABILITY TO SUCCESSFULLY COMPLETE PRODUCT RESEARCH AND DEVELOPMENT, INCLUDING PRE-CLINICAL AND CLINICAL STUDIES, AND COMMERCIALIZATION; (II) THE REGISTRANT'S ABILITY TO OBTAIN SUBSTANTIAL ADDITIONAL FUNDING; (III) THE REGISTRANT'S ABILITY TO OBTAIN REQUIRED GOVERNMENTAL APPROVALS; (IV) THE REGISTRANT'S ABILITY TO ATTRACT MANUFACTURING, SALES, DISTRIBUTION AND MARKETING PARTNERS AND OTHER STRATEGIC ALLIANCES; AND (V) THE REGISTRANT'S ABILITY TO DEVELOP AND COMMERCIALIZE ITS PRODUCTS BEFORE ITS COMPETITORS.

PART I

ITEM 1. BUSINESS

A. GENERAL

AVANT Immunotherapeutics, Inc. (f/k/a "T Cell Sciences, Inc.," herein referred to as "AVANT") is a biopharmaceutical company that uses novel applications of immunology to prevent and treat diseases caused by both the enemy within (autoimmune diseases, cardiovascular diseases, cancer and inflammation) and the enemy without (infectious diseases and organ transplant rejection). Each of our products address large market opportunities for which current therapies are inadequate or non-existent.

We were incorporated in the state of Delaware in 1983. On August 21, 1998, we acquired Virus Research Institute, Inc., a Delaware corporation ("VRI"), pursuant to an Agreement and Plan of Merger dated as of May 12, 1998 by and among AVANT, TC Merger Corp., a Delaware corporation and our wholly-owned subsidiary, and VRI.

Our products derive from a broad set of complementary technologies with the ability to inhibit the complement system, regulate T and B cell activity, and enable the creation and delivery of preventative and therapeutic vaccines. We are using these technologies to develop vaccines and immunotherapeutics that prevent or treat disease caused by infectious organisms, and drugs and treatment vaccines that modify undesirable activity by the body's own proteins or cells. All of our products are in various stages of research and development. Below is a table of our currently active programs:

CURRENT PROGRAMS AND PARTNERSHIPS

TECHNOLOGY	PRODUCT	INDICATION/FIELD	PARTNER	STATUS
Complement Inhibition	TP10	Transplantation	Novartis Pharma	Phase II
		Cardiac Surgery	--	Phase I/II
		Heart Attacks	--	Phase I
	TP20	Stroke	--	Preclinical
Therapeutic Vaccines	CETi-1 Vaccine	Atherosclerosis	--	Phase I
Protective Vaccines	Rotavirus Vaccine	Rotavirus	SmithKline Beecham	Phase II
	Cholera Vaccine	Cholera	US Army & NIH	Phase IIb
Vaccines and Immunotherapeutic Delivery Systems	Adjumer(R)-RSV Vaccine	Respiratory Syncytial Virus	Aventis Pasteur	Phase I/II
	-Cat Scratch	Cat Scratch Disease	Heska Corporation	Clinical testing
	-Lyme Disease	Lyme Disease	Aventis Pasteur	Preclinical
	Therapore(TM)	Viral Infection -HIV	US Army	Preclinical
		-Hepatitis	--	Preclinical
		Cancer	--	Preclinical

B. STRATEGY

AVANT'S strategy is to utilize our expertise to design and develop vaccine and therapeutic products that have significant and growing market potential; to establish governmental and corporate alliances to fund development; and to commercialize our products either through corporate partners or, in appropriate circumstances, by our own direct selling efforts. Implementation of this strategy is exemplified by the following lead programs:

COMPLEMENT INHIBITORS: We are developing a new class of therapeutics that inhibits the complement system, a key triggering mechanism for the inflammatory response. Medical problems that result from excessive complement activation represent multi-billion dollar market opportunities. These include reperfusion injury, the vascular and tissue damage that occurs following a heart attack, stroke or surgical procedure where the patient's blood supply is shut off and then restored; hyperacute or chronic organ rejection following transplantation; acute inflammatory injury to the lungs and autoimmune diseases. We have developed a lead compound, TP10, through to early clinical trials before licensing rights for organ transplant surgery to Novartis Pharma AG ("Novartis"), the world leader in organ transplant drugs. We have elected to independently develop and commercialize TP10 for pediatric cardiac surgery, initiating a Phase I/II trial in 1999 and aiming to commence a Phase III pivotal trial in late 2000. We believe that this is an appropriate indication for a small company to pursue for the following reasons:

- Orphan drug status has been sought because only 30,000 pediatric cardiac surgeries are performed each year;

- Because the surgery is life-threatening, the TP10 compound may qualify for priority review at the FDA; and

- Because such surgery is performed at a limited number of medical centers, a targeted direct sales and marketing effort should be manageable and effective.

We plan to initiate Phase II trials for adult cardiac surgery in 2000, with an eye to partnering that program when additional clinical data are available.

ATHEROSCLEROSIS TREATMENT VACCINE: Atherosclerosis, the leading cause of morbidity and mortality in the United States and most of the Western world, is the accumulation of fatty deposits in the walls of blood vessels. Low blood levels of high-density lipoprotein (HDL, the so-called "good" cholesterol) are associated with increased risk of atherosclerosis, which in turn leads to heart disease and stroke. We are developing a novel, treatment vaccine (CETi-1) aimed at increasing levels of HDL. The vaccine stimulates the production of antibodies to cholesteryl ester transfer protein ("CETP"), which mediates the balance between HDL and LDL (low-density lipoprotein, or "bad" cholesterol). While billions of dollars of drugs that lower LDL are sold each year, the few drugs that increase HDL have failed to achieve market acceptance, largely due to undesirable side effects. Thus, we believe that a therapeutic vaccine that increases HDL with one or two injections a year would present a substantial market opportunity. In preclinical studies in rabbits, the CETi-1 vaccine increased HDL levels and significantly reduced atherosclerotic lesions in blood vessels as compared to an untreated control group. Our preclinical work on the vaccine was partially funded by almost $1 million in Small Business Innovation Research ("SBIR") grants. The Company initiated a Phase I clinical trial in 1999 and plans to initiate a Phase II trial in 2000. As clinical data becomes available, the Company plans to seek a corporate partner to complete development and to commercialize the vaccine.

ROTAVIRUS VACCINE: Rotavirus is a major cause of diarrhea and vomiting in infants and children. No vaccine against rotavirus is currently on the market. We licensed from a non-profit institution an oral vaccine for rotavirus, and initiated a Phase I clinical trial with the goal of licensing the vaccine to a major vaccine company. After completing Phase I studies and commencing a Phase II study, we licensed the vaccine to SmithKline Beecham plc ("SmithKline"); the initial license fee from SmithKline partially funded the Phase II study. In 1999, after the study demonstrated 89% protection in a study involving 215 infants, SmithKline paid us an additional license fee and assumed full responsibility for funding and performing all remaining clinical development. Assuming product development and commercialization continues satisfactorily, SmithKline will pay us additional milestones and a royalty based on sales.

CHOLERA VACCINE: We are developing a single dose, oral cholera vaccine using a live, genetically attenuated cholera strain. Based on this technology, developed in academia, we have developed the vaccine through early Phase II trials. We then negotiated a collaboration agreement under which a Phase IIb trial will be performed and funded by the Walter Reed Army Institute of Research ("WRAIR") and the National Institutes of Health (the "NIH"). This trial, set to begin in 2000, will test the safety, immunogenecity and protective capacity of the vaccine against a challenge with live virulent

cholera. We will then determine our commercialization strategy with respect to the cholera vaccine based on clinical data from the trial.

VACCINE DELIVERY SYSTEMS: The vaccine industry is changing, with increased emphasis on recombinant antigens, sophisticated attenuation strategies and use of vaccines therapeutically to treat patients who are already infected. AVANT is a leader in developing delivery systems that support these new approaches, including:

- Adjumer(R), a water soluble polymer intended as an adjuvant to enhance systemic immune response with fewer injections and lower antigen doses;

- Micromer(R), a polymer microsphere adjuvant designed to enhance systemic and mucosal immune responses to oral or nasal administration;

- Therapore(TM), a genetically engineered bacterial protein vector designed to induce cell-mediated immunity, believed to be particularly important for therapeutic vaccines; and

- VibrioVec(TM), the attenuated bacterial strain used in the cholera vaccine which we believe can be used to deliver other, non-cholera bacterial antigens.

We expect to commercialize these vaccine delivery systems primarily through commercial partners that have antigens in need of improved delivery, thereby gaining us potential access to a wide range of antigens and shifting clinical development expense to the partner. For example, we have licensed to Aventis Pasteur ("Aventis"), the world's leading vaccine manufacturer, use of Adjumer(R) and Micromer(R) in a variety of vaccines, including influenza, respiratory syncytial virus ("RSV") and Lyme disease. Aventis has begun clinical trials on both the influenza and RSV vaccines. In the case of Therapore(TM), the novelty of the approach is such that partnering on commercially attractive terms would best be done after the availability of clinical data. Thus, we have entered into a collaborative agreement for WRAIR to fund and perform the first clinical trial of Therapore(TM) beginning in 2000. Although we will focus on licensing vaccine delivery systems to commercial partners, we will remain alert for opportunities where we can develop complete vaccines, as was done with rotavirus.

Because AVANT's strategy ultimately depends on the commercial success of our products, we assume, among other things, that end users of our products will be able to pay for them. In the United States and other countries, in most cases, the volume of sales of products like those we are developing depends on the availability of reimbursement from third-party payors. These include national health care agencies, private health insurance plans and health maintenance organizations. Third-party payors increasingly challenge the prices charged for medical products and services. Our success in generating revenues from sales of products may depend on the availability of reimbursement from third-party payors for the products. Accordingly, if we succeed in bringing products to market, there is no means to assure their cost effectiveness or the availability of reimbursement sufficient to sell the products on a profitable basis. If reimbursement is not available or is insufficient, the level of market acceptance of our products will suffer significantly.

The health care industry in the United States and in Europe is undergoing fundamental changes as the result of political, economic and regulatory influences. Reforms proposed from time to time include mandated basic health care benefits, controls on health care spending through limitations on the growth of private health insurance premiums and Medicare and Medicaid spending, creation of large medical services and products purchasing groups and fundamental changes to the health care delivery system.

We anticipate ongoing review and assessment of alternative health care delivery systems and methods of payment in the United States and other countries. We cannot predict whether any particular reform initiatives will result or, if adopted, their impact on us. However, we expect that adoption of any reform proposed will impair our ability to market products at acceptable prices.

Additional factors that may significantly harm our commercial success, and ultimately the market price of our common stock, include announcements of technological innovations or new commercial products by our competitors, disclosure of unsuccessful results of clinical testing or regulatory proceedings and governmental approvals, adverse developments in patent or other proprietary rights, public concern about the safety of products developed by AVANT and general economic and market conditions.

C. THERAPEUTIC DRUG PROGRAMS

1. COMPLEMENT INHIBITION

We are developing a new class of therapeutics that inhibit a part of the immune system called the complement system. The complement system is a series of proteins that are important initiators of the body's acute inflammatory response against disease, infection and injury. Excessive complement activation also plays a role in some persistent inflammatory conditions. When complement is activated, it helps to identify and eliminate infectious pathogens and damaged tissue. In some situations, however, excessive complement activation may destroy viable and healthy tissue and tissue which, though damaged, might recover. This excessive response compounds the effects of the initial injury or introduces unwanted tissue destruction in clinical situations such as organ transplants, cardiovascular surgeries and treatment for heart attacks. Independent published studies have reported that our lead compound, TP10, a soluble form of naturally occurring Complement Receptor 1, effectively inhibits the activation of the complement cascade in animal models. We believe that regulating the complement system could have therapeutic and prophylactic applications in several acute and chronic conditions, including reperfusion injury from surgery or ischemic disease, organ transplant, multiple sclerosis, rheumatoid arthritis, and myasthenia gravis. In the United States, several million people are afflicted with these complement-mediated conditions.

We started the complement program in 1988. From 1989 through 1994, TP10 was under development in a joint program with SmithKline and Yamanouchi Pharmaceutical Co., Ltd. ("Yamanouchi"). During 1994, AVANT and SmithKline negotiated various amendments to the agreement and, in 1995, the two companies agreed to a mutual termination by which we regained all rights to the program except for co-marketing rights in Japan, which were retained by SmithKline and Yamanouchi. In December 1999, SmithKline and Yamanouchi returned the marketing rights for Japan to us.

Under our direction, in 1995 the first Phase I clinical trial of TP10 in 24 patients at risk for acute respiratory distress syndrome ("ARDS") was completed. Results of this trial were presented in October 1995 at The American College of Chest Physicians meeting. A second Phase I safety trial for reperfusion injury was completed in late 1995 in 25 patients with first-time myocardial infarctions. This study was presented at the American Heart Association's Joint Conference on Thrombosis, Arteriosclerosis and Vascular Biology in February 1996. In each trial, TP10 demonstrated excellent safety and pharmacokinetic profiles, had a terminal phase half-life of at least 72 hours and was able to inhibit complement activity in a dose-dependent manner.

Based on these favorable results, in early 1996, we initiated a Phase IIa trial in patients with established ARDS. This trial was an open-label, single-dose feasibility trial to determine the potential for efficacy of TP10 in reducing neutrophil accumulation in the lungs and improved clinical outcome of patients with ARDS. During the second half of 1996, we initiated a series of steps, including broadening enrollment criteria, to modify this trial to improve the rate of patient accrual. In late 1997, we completed this Phase IIa trial after it had enrolled nine patients with ARDS arising from a number of different medical conditions. The trial results showed that patients receiving TP10 tended towards improved respiratory performance and improved blood oxygenation. Because the trial included few patients and no placebo control was used, no definitive claims about efficacy could be made.

In 1996, we began enrollment in a Phase I/II clinical trial in patients undergoing lung transplantation. A goal of the trial was to determine the ability of TP10 to reduce reperfusion injury and improve lung function in patients with end-stage pulmonary disease who were undergoing lung transplant surgery. This study was a randomized, placebo-controlled, double-blind trial consisting of single dosages of 10 mg/kg of TP10 as an intravenous infusion over 30 minutes. The trial was conducted at multiple centers in North America and included a total of 59 patients. In October 1997, we presented positive preliminary results from the efficacy portion of the trial. In April 1998, we presented final trial results at the International Society of Heart and Lung Transplantation conference. The final results showed that TP10 therapy appeared safe and well tolerated and demonstrated significant efficacy. Treated patients undergoing cardiopulmonary by-pass as part of the transplantation procedure showed significantly decreased intubation time and time on ventilation and a trend toward reduced time in the intensive care unit.

In 1997, we entered into a collaborative agreement with Novartis relating to the development of TP10 for use in xenotransplantation (animal organs into humans) and allotransplantation (human to human organ transplantation). Under the agreement, we received annual option fees and supplies of TP10 for clinical trials in return for granting Novartis a two-year option to license TP10 with exclusive worldwide (except Japan) marketing rights. In July 1999, Novartis exercised its option to license TP10 for use in the field of transplantation. In December 1999, the Novartis agreement

was amended to include the marketing rights for Japan. The decision to license TP10 resulted in a $6 million equity investment and license fee payment by Novartis which was received by AVANT in January 2000. Under the agreement, we may receive additional milestone payments based upon attainment of development and regulatory goals, which have an approximate aggregate value of up to $14 million. We may also receive funding for research as well as royalty payments on eventual product sales.

In September 1999, we initiated an open-label, Phase I/II trial of TP10 in infants undergoing cardiac surgery for congenital heart defects. The trial will evaluate the ability of TP10 to mitigate the injury to the heart and other organs that occurs when patients are placed on cardiopulmonary bypass circuits. If successful, we hope to initiate a Phase III pivotal trial in late 2000.

In addition to TP10, we have identified other product candidates to inhibit activation of the complement system. The lead candidate under research evaluation is a form of sCR1 (TP10) that has been modified by the addition of sialyl Lewis x sLe(x) carbohydrate side chains yielding sCR1sLe(x) (TP20). sLe(x) is a carbohydrate which mediates binding of neutrophils to selectin proteins, which appear on the surface of activated endothelial cells and platelets as an early inflammatory event. Selectin-mediated binding of neutrophils to activated endothelial cells is a critical event in inflammation. We have confirmed the presence of the desired carbohydrate structures and confirmed the presence of both anti-complement and selectin-binding functions in IN VITRO experiments. During 1997, we produced additional TP20 material and began preclinical studies in disease-relevant animal models. Research results published in the July 1999 issue of SCIENCE showed that the TP20 molecule, which simultaneously blocks complement activation and cell-mediated inflammatory events, can significantly limit damage to cerebral tissue in a mouse model of ischemic stroke.

TP20 may create new and expanded opportunities for us in complement- and selectin-dependent indications such as stroke and myocardial infarction. We believe that TP20 has the ability to target the complement-inhibiting activity of sCR1 to the site of inflammation and, at the same time, inhibit the leukocyte/endothelial cell adhesion process.

2. ATHEROSCLEROSIS TREATMENT VACCINE

We are developing a therapeutic vaccine against endogenous cholesteryl ester transfer protein ("CETP") which may be useful in reducing risks associated with atherosclerosis. CETP is a key intermediary in the balance of HDL and LDL. We are developing a vaccine (CETi-1) to stimulate an immune response against CETP which we believe may improve the ratio of HDL to LDL cholesterol and reduce the progression of atherosclerosis. We have conducted preliminary studies of rabbits which had been administered the CETi-1 vaccine and fed a high-cholesterol, high-fat diet. In these studies, vaccine-treated rabbits exhibited reduced lesions in their blood vessels compared to a control group of untreated rabbits which developed significant blood vessel lesions. These studies have demonstrated, in animal models, the ability of CETi-1 vaccine to elevate HDL and reduce the development of blood vessel lesions.

Atherosclerosis is one of the leading causes of morbidity and mortality in the United States and most of the Western world. Current pharmacologic treatments require daily administration and can result in high costs and poor patient compliance. A vaccine directed at lowering CETP activity, such as the one we are developing, may offer several advantages over conventional approaches, including requiring less frequent dosing, lower costs, reduced side effects, and improved patient compliance.

In 1996, the NIH awarded us a $100,000, Phase I SBIR grant for the development of a novel transgenic rat atherosclerosis model, affording better comparison to human atherosclerosis. In early 1997, the NIH awarded us a second $100,000 Phase I SBIR grant to develop a novel plasmid-based vaccine to prevent or treat atherosclerosis. In late 1997, the NIH awarded us a $678,000 Phase II SBIR grant which provided funding over a two year period for the continued development of the novel transgenic rat model of atherosclerosis. In 1998, we received a $96,000 Phase I SBIR grant from the NIH for the development of a novel peptide vaccine to prevent or treat atherosclerosis.

In June 1999, we initiated a double-blinded placebo controlled, Phase I clinical trial of our CETi-1 vaccine in adult volunteers. The object of the study is to demonstrate the safety of single administrations of the vaccine at four different dosage strengths.

3. T CELL REGULATORS

In early 1992, we entered into a joint development program with AstraZeneca plc ("Astra") to develop products resulting from our proprietary TCAR technology, which utilizes T cell antigen receptor for selectively targeting T cells involved in autoimmune diseases such as multiple sclerosis and rheumatoid arthritis. The original agreement was modified in 1993 with Astra assuming all responsibility for developing the lead antibody products and AVANT retaining leadership of the first peptide product candidate. Under the original and modified agreements, we received funding of approximately $15 million in the early years with the potential of up to $17 million of additional funding based on clinical progress. By the end of 1995, we had received substantially all of the original funding payments.

In 1996, we amended the agreement with Astra to transfer some of our rights to the TCAR technology, including two therapeutic products, ATM-027 and ATP-012, to Astra, which is solely responsible for further clinical development and commercialization. Under the amended agreement, we could receive royalties from product sales, as well as milestone payments which may total up to $4 million as specific clinical milestones are achieved.

In 1997, we received a milestone payment from Astra because one of the products derived from our TCAR program entered clinical trials for the treatment of multiple sclerosis. In 1998, Astra announced that Phase I data from these trials had shown an effect on the target cells and that there had been no serious adverse effects in the study to date, and initiated a Phase II study. In 1999, we announced results of the Phase II study of the TCAR monoclonal antibody (ATM-027) being developed by Astra for the treatment of multiple sclerosis. The results showed that ATM-027 was safe and well tolerated, however, in the view of Astra the reduction of disease activity in the study population did not reach a level that would be of value for those patients. Therefore, Astra made the decision to stop further development of ATM-027 for multiple sclerosis but is reviewing development of the TCAR peptide, ATP-012, as a vaccine for multiple sclerosis under the terms of the TCAR agreement.

D. VACCINES, VACCINE DELIVERY SYSTEMS AND IMMUNOTHERAPEUTICS

1. OVERVIEW

THE VACCINE MARKET: Vaccines have long been recognized as a safe and cost-effective method to prevent infection caused by some bacteria and viruses. The Centers for Disease Control and Prevention (the "CDC") have estimated that every dollar spent on vaccination saves $16 in healthcare costs. There are currently 22 vaccines in routine use in the United States against life-threatening infectious organisms such as tetanus, diphtheria, poliovirus, hepatitis A virus, hepatitis B virus, haemophilus influenzae B, measles, mumps and rubella. From 1990 to 1999, annual worldwide vaccine sales increased from $1.6 billion to $5.9 billion and the market is growing at about 12% a year. We believe that this growth rate may accelerate as a result of advances in vaccine technologies and formulations that address the shortcomings of existing vaccines. Areas of potential improvement include enhancement of immune responses, which could lead to a reduction in the number of doses required for effective protection as well as effective immunization in a higher percentage of the population, and delivery of vaccines through methods other than injection. The vaccine market is expected to expand due to the introduction of new vaccines utilizing purified antigens, produced as a result of advances in molecular biology. We also believe that the growing awareness and incidence of infectious diseases, such as H. pylori, hepatitis C virus, HIV1 and HSV2 infection, together with the availability of new vaccines, could further expand the vaccine market.

THE IMMUNE SYSTEM AND VACCINES: The function of the human immune system is to respond to pathogens, including infectious bacteria and viruses, that enter the body. However, a pathogen may establish an infection and cause disease before it is eliminated by an immune response. Antibodies are produced as part of the immune response to antigens, which are components of the pathogen. These antibodies can continue to be present in the human body for many years, providing continued protection against reinfection by the same pathogen.

Protective antibodies can be produced in both the systemic and mucosal branches of the immune system. The systemic immune system produces IgG antibodies to protect against infection occurring in blood and deep tissue. The mucosal immune system produces IgA antibodies that protect against infection occurring in the mucosal layer lining the digestive, respiratory and genitourinary tracts. Mucosal immunity may act as a first line of defense by attacking pathogens at the

point of entry into the body, prior to systemic penetration, as well as by targeting pathogens such as H. pylori, influenza and rotavirus that propagate exclusively at the mucosal layer.

Vaccines are a pre-emptive means of generating a protective antibody response. A vaccine consists of either a weakened pathogen or pathogen-specific, non-replicating antigens which are deliberately administered to induce the production of antibodies. When weakened pathogens are used as a vaccine, they replicate in the body, extending presentation to the immune system and inducing the production of antibodies without causing the underlying disease. When non-replicating antigens are used as a vaccine, they must be delivered in sufficient quantity and remain in the body long enough to generate an effective antibody response. To achieve this goal, many vaccines require multiple administrations. Of the 22 vaccines currently in routine use, 20 are delivered by injection and stimulate only systemic immunity. Only polio and typhoid vaccines can be administered orally and induce both a mucosal and a systemic immune response. Both of these vaccines are live, weakened pathogens that localize in the intestines and do not require a separate vaccine delivery system.

There is considerable research activity in developing vaccines to treat patients already infected with the target disease. Referred to generally as immunotherapy, this effort is directed to designing vaccines that will mobilize the immune system in various ways to curtail or eliminate the pathogen. Immunotherapy may have the most promise in treating cancer and chronic disease such as HIV and HCV.

ADJUVANTS AND OTHER DELIVERY SYSTEMS: The antigens contained in many injectable vaccines alone will not produce an immune response sufficient to protect against infection and require the use of an adjuvant to sustain the presentation of the antigens to the human immune system. Aluminum-based adjuvants ("alum") are the only adjuvants currently approved by the United States Food and Drug Administration (the "FDA") for commercial use in humans. While alum has gained widespread use, it does not sufficiently enhance the immune response to permit administration of many existing injected vaccines in a single dose. In the case of some vaccines, such as influenza, alum is ineffective as an adjuvant.

We believe that alum may not be sufficiently effective for use with a number of the new purified recombinant antigens being developed. Further, alum cannot be used for mucosal delivery of vaccines. Therapeutic vaccines may require entirely different systems to enhance deliver and maximize the immune response. Accordingly, we believe that there is a significant need for new adjuvants that are safe, work with a wide variety of antigens, and induce a protective immune response with only one or two administrations. These attributes could result in benefits, including cost savings and improved patient compliance.

2. VACCINE DEVELOPMENT PROGRAMS

ROTAVIRUS VACCINE: We are developing a novel vaccine against rotavirus infection. Rotavirus, a major cause of diarrhea and vomiting in infants, affects approximately 80% of the approximately 4 million infants born each year in the United States. As a result, on an annual basis, about 500,000 infants require medical attention and 50,000 are hospitalized. The economic burden in the United States is estimated at over $1 billion in direct medical and indirect societal costs. We anticipate that in the United States a vaccine against rotavirus disease will become a universal pediatric vaccine. We have completed Phase I clinical trials of the orally delivered live human rotavirus vaccine selected to elicit a broadly protective immune response to the most prevalent strains of rotavirus. During 1997, we completed a Phase I/II clinical trial designed to define the optimal vaccine dose and optimal age for immunization. Based on the assessment of the safety and immunogenicity of the vaccine, we initiated a Phase II efficacy study in 1997. This trial, conducted at four U.S. medical centers, was designed to examine the vaccine's ability to prevent rotavirus disease and to further study the safety of the vaccine. A total of 215 infants were enrolled in the study and have been immunized with the vaccine. In 1998, we announced positive results from this trial, which were published in LANCET in July 1999. The results showed that approximately 90 percent of the vaccinated infants were protected from rotavirus disease and demonstrated a statistical significance at p LESS THAN 0.001. Examination of the safety data revealed only mild transient symptoms in a small number of infants.

AVANT and SmithKline are currently collaborating on the development and commercialization of our oral rotavirus vaccine. As discussed under "E. Collaborative Agreements", with the successful completion of the Phase II clinical trial and the development by SmithKline of a viable manufacturing process, SmithKline has assumed financial responsibility for all subsequent clinical and development activities and paid us a milestone payment of $500,000. Provided that

clinical progress continues, we will be entitled to additional milestones and royalties based on net sales of the rotavirus vaccine.

CHOLERA VACCINE: We are developing an attenuated form of the bacterium VIBRIO CHOLERAE as a potential cholera vaccine. In several Phase I/II clinical studies, single oral doses of the cholera vaccine, Peru-15, were administered to more than 100 subjects and shown to be safe, immunogenic and protective against infection with the virulent organism. In 1999, we announced the collaboration on a Phase IIb clinical trial of the Peru-15 vaccine with WRAIR and the NIH. AVANT and the National Institute of Allergy and Infectious Disease ("NIAID") of the NIH also signed a Clinical Trial Agreement that allows for the clinical evaluation of the Peru-15 vaccine formulation at Children's Hospital in Cincinnati. The Phase IIb trial will test the safety, immunogenicity and protective capacity of the vaccine against a challenge with live virulent cholera. AVANT and WRAIR have successfully manufactured clinical supplies of the vaccine at WRAIR's facility for use in the study.

OTHER VACCINE PROGRAMS: We have successfully completed early clinical studies with a single dose oral vaccine against typhoid fever and have done preclinical work in vaccines for genital herpes and anthrax infections. We have temporarily reduced resources devoted to these programs to focus on more advanced projects.

3. VACCINE AND IMMUNOTHERAPEUTIC DELIVERY SYSTEMS

AVANT is developing a portfolio of proprietary vaccine delivery systems designed to improve the efficacy of existing vaccines, and permit the development of new vaccines and immunotherapeutics for the prevention and/or treatment of infectious diseases and some forms of cancer.

The following table summarizes important characteristics of our two main vaccine delivery systems and Therapore(TM):

DELIVERY SYSTEM	COMPOSITION	DELIVERY METHOD	POTENTIAL BENEFITS (1)	STATUS (1)
Adjumer(R)	Water Soluble Polymer	Injectable	Enhanced systemic immune response; fewer injections; lower antigen doses	Phase II influenza conducted; under review at Aventis Phase I/II RSV in process Phase I HIV; analysis of results ongoing B. HENSELAE (Cat Scratch Disease); clinical testing Preclinical research in Lyme Disease and other vaccine targets
Micromer(R)	Polymer Microparticles	Intranasal or oral	Systemic and mucosal immune response; no injection	Preclinical research in influenza and other vaccine targets
Therapore(TM)	Genetically Engineered Bacterial Protein	Injectable	Induction of cell-mediated immunity	Preclinical research in hepatitis, HIV and cancer Vector

(1) The summary information included in the above table is qualified in its entirety by the detailed discussion of each of the vaccine and immunotherapeutic delivery systems that follows.

ADJUMER(R): We are developing Adjumer(R), a proprietary vaccine delivery system, as an adjuvant to enhance the immune response to injected vaccines. The water soluble nature of Adjumer(R), which utilizes a polyphosphazene polymer ("PCPP"), facilitates a simple aqueous-based manufacturing process for vaccines, thereby preserving the integrity of the antigen.

In preclinical studies conducted by AVANT, Adjumer(R) demonstrated sustained presentation of influenza, hepatitis B, HSV2, HIV1 and tetanus antigens to the immune system. In those preclinical studies, single intramuscular injections of Adjumer(R)-formulated vaccines elicited a higher immune response than both alum-formulated vaccines and non-adjuvanted vaccines as measured by resulting IgG antibody levels. In additional preclinical studies, an Adjumer(R)-formulated influenza vaccine using lower antigen doses sustained higher antibody levels over a longer time period than both alum-formulated vaccines and non-adjuvanted vaccines. In other preclinical studies Adjumer(R)-formulated vaccines produced an effective immune response in a higher percentage of animals than in animals receiving existing vaccine formulations. Furthermore, in these studies, as well as tests conducted using Adjumer(R) alone, we observed no material adverse reactions when Adjumer(R) was administered at effective levels.

Based on these preclinical results, we believe that an Adjumer(R)-formulated vaccine may provide a number of benefits over existing injected vaccines. These benefits include reducing the number of doses required for an effective immune response, thereby improving compliance; providing cost savings as a result of the reduction in the number of doses and the amount of antigen required; and increasing the time period over which immune protection can be sustained. In addition, based on the results of these preclinical studies, we believe that an Adjumer(R)-formulated vaccine may be able to induce an immune response in a number of subjects who would not otherwise respond to existing vaccines. The first human clinical trials of a vaccine using Adjumer(R) as a delivery system commenced in 1996.

AVANT and Aventis, the leading worldwide supplier of influenza vaccine, are currently collaborating on the development of an Adjumer(R)-formulated vaccine for influenza. Aventis completed Phase I human clinical trials of the Adjumer(R)-formulated influenza vaccine in France during 1997. Based on the results of the study, which showed the Adjumer(R)-formulated vaccine was well tolerated and elicited improved responses, a Phase II safety and immunogenicity study was initiated in Peru by Aventis during 1997. Preliminary results of the Phase II clinical trial confirmed that the Adjumer(R)-formulated vaccine was well tolerated. However, results of the Phase II study appear to be inconsistent in some respects with Phase I results. The degree of improvement in immune responses elicited by the Adjumer(R) influenza vaccine was less in comparison to the control group than was elicited in the Phase I study. In the Phase II study the control group receiving the unadjuvanted vaccine generated higher immune responses than observed in the Phase I study control group. AVANT and Aventis are currently analyzing and assessing the results of the Phase II study to determine the appropriate next steps to take with the clinical development of the product.

Aventis is continuing to investigate the use of Adjumer(R) in other vaccines. During the fourth quarter of 1998, Aventis initiated a Phase I/II trial of an Adjumer(R)-formulated vaccine for RSV. RSV, the major cause of lower respiratory tract infections in infants and children, hospitalizes 90,000 children and causes 4,500 deaths annually in the United States. Initiation of the trial resulted in a milestone payment by Aventis.

MICROMER(R): Micromer(R) is a proprietary vaccine delivery system designed to facilitate the mucosal (intranasal or oral) delivery of antigens and stimulate both the systemic and mucosal branches of the immune system.

In preclinical studies conducted by AVANT, several Micromer(R)-formulated antigens delivered intranasally elicited both a mucosal ("IgA") immune response and a systemic ("IgG") immune response. IgA antibodies were detected at all mucosal sites, and the level of IgG antibodies was comparable to the level obtained through Adjumer(R)-formulated injections of the same antigen. A Micromer(R)-formulated influenza vaccine required only a single, intranasal dose to provide an immune response sufficient to protect the animals against subsequent infection by the influenza virus. We have currently suspended efforts on Micromer(R) to focus on more advanced programs.

THERAPORE(TM): During 1997, we received an exclusive worldwide license to Therapore(TM) from Harvard College. In 1998, we received a non-exclusive license from the NIH to further secure our Therapore(TM) technology rights. We believe that Therapore(TM) will be the core of a novel technology for the development of immunotherapeutics. We are conducting preclinical research to evaluate this system for the treatment of persistent viral infections, such as Hepatitis B, Hepatitis C and HIV, and some forms of cancer.

Therapore(TM) is composed of two bacterial proteins that IN IN VIVO tests have delivered peptides to induce potent cell-mediated immune responses. These responses include the generation of long-lived cytotoxic T-lymphocytes ("CTL") and alterations in the amounts of cellular cytokines produced, which may lead to the effective treatment of persistent viral infections and the resolution of some forms of cancer. Potential products utilizing Therapore(TM) technology could include peptides or proteins from viruses such as Hepatitis B, Hepatitis C and HIV, all of which cause persistent infections, and

from a range of cancers, including breast, ovarian, melanoma and prostate. Each of these indications represents a large market with a need for safe and effective treatments.

Early stage preclinical research studies indicate that Therapore(TM) may be distinguished from other delivery systems. We believe that the therapeutic and preventative potential of Therapore(TM) is significant for two reasons: (i) the targeting of Therapore(TM) is highly efficient, such that IN IN VIVO tests potent cell-mediated immune responses have been induced by the delivery of minute quantities of Therapore(TM) constructs; and (ii) Therapore(TM) has the potential to deliver large peptides and proteins for processing by normal cellular mechanisms, which may permit broad immune coverage in humans. As a result of these characteristics, we believe that Therapore(TM)-delivered antigens will be capable of producing an enhanced cell-mediated response more efficiently and safely than other products currently under development by our competitors.

We plan to employ Therapore(TM) to develop novel immunotherapeutics for the treatment of chronic viral infections and cancers. We expect to initiate a human clinical trial of our first Therapore(TM)-based product, a vaccine candidate under development by the U.S. Army against the Human Immunodeficiency Virus ("HIV"), in the second half of 2000.

E. COLLABORATIVE AGREEMENTS

NOVARTIS: In 1997, we entered into a collaborative agreement with Novartis relating to the development of TP10 for use in xenotransplantation (animal organs into humans) and allotransplantation (human to human organ transplantation). Under the agreement, we received annual option fees and supplies of TP10 for clinical trials in return for granting Novartis a two-year option to license TP10 with exclusive worldwide (except Japan) marketing rights. In July 1999, Novartis exercised its option to license TP10 for use in the field of transplantation. The decision to license TP10 resulted in a $6 million equity investment and license fee payment by Novartis which was received by AVANT in January 2000. Under the agreement, we may receive additional milestone payments based upon attainment of development and regulatory goals, which has an approximate aggregate value of up to $14 million. We may also receive funding for research as well as royalty payments on eventual product sales.

YAMANOUCHI: We started our complement program in 1988. From 1989 through 1994, TP10 was under development in a joint program pursuant to an agreement with SmithKline and Yamanouchi. During 1994, AVANT and SmithKline negotiated various amendments to the agreement and, in February 1995, the two companies agreed to a mutual termination by which we regained all rights to the program except for co-marketing rights in Japan, which were retained by SmithKline and Yamanouchi. In December 1999, SmithKline and Yamanouchi returned the marketing rights for Japan to us.

AVENTIS: We are a party to two license agreements entered into in 1994 and 1995 with Aventis relating to Adjumer(R)- and Micromer(R)-formulated vaccines, respectively, for the prevention of a variety of infectious diseases. Under the agreements, Aventis has been granted the exclusive right to make, use and sell Adjumer(R)- and Micromer(R)-formulated vaccines for prevention of influenza, Lyme disease and diseases caused by meningococcus and the co-exclusive right (exclusive, except for the right of AVANT or one other person licensed by us) to make, use and sell Adjumer(R)- and Micromer(R)-formulated vaccines directed against five other pathogens, including pneumococcus and RSV. The licenses to Aventis apply to specified territories, including North and South America, Europe, Africa, Thailand and the countries of the former Soviet Union. We have retained rights to make, use, sell and license Adjumer(R)- and Micromer(R)-formulated vaccines against the subject infections in most of the Far East, including China and Japan, subject to geographical extension rights available to Aventis.

Aventis made a $3.0 million equity investment in AVANT in 1994 upon the execution of the agreement relating to Adjumer(R). In addition, in connection with this collaboration, in 1996 Aventis made milestone payments of $4.5 million and an additional equity investment of $1.0 million in AVANT. During 1998, Aventis made a further milestone payment to us upon initiation of a Phase I trial using an Adjumer(R)-formulated vaccine for RSV. Contingent upon our achieving specified milestones, Aventis has agreed to pay AVANT up to an additional $6.2 million in connection with the development of Adjumer(R)-formulated vaccines for influenza and Lyme disease and to make payments, on a product by product basis with respect to the development of other Adjumer(R)- and Micromer(R)-formulated vaccines. Aventis must fund all costs associated with the development and commercialization, including the costs of clinical trials, of any vaccines it elects to develop utilizing our technology. In addition, we will be entitled to royalties based on net sales of any vaccine products developed and sold by Aventis pursuant to these agreements.

In connection with our agreement relating to Micromer(R), Aventis sponsored research at AVANT into Micromer(R)-formulated vaccines directed against influenza and parainfluenza virus ("PIV"). This arrangement, pursuant to which we received $2.5 million, covered a two-year period that ended in 1997.

Under the agreement relating to Adjumer(R), we were required to use commercially reasonable efforts to establish a process capable of yielding quantities of clinical grade PCPP for use by Aventis in clinical studies. We have satisfied this requirement. In addition, we have facilitated the production of commercial grade PCPP in a contractor's current Good Manufacturing Practice ("cGMP") compliant manufacturing facility according to agreed upon specifications. The Aventis agreement, while reserving to Aventis the right to manufacture PCPP, anticipates that we will supply PCPP under a cost-plus supply agreement.

PASTEUR MERIEUX-ORAVAX: We have a collaborative arrangement with Pasteur Merieux-Oravax ("PM-O") for the use of our VibrioVec(TM) bacterial delivery system. The agreement grants to PM-O a worldwide license to use VibrioVec(TM) for the delivery of specific H. pylori antigens. A license issue fee as well as research support payments totaling $1.0 million, has been paid to us under this agreement. The agreement also provides for future milestone payments and royalties on net sales of any future products developed by PM-O using VibrioVec(TM). An option previously granted to PM-O for the use of PCPP in the delivery of H. pylori vaccines has expired.

SMITHKLINE: During 1997, we entered into an agreement with SmithKline to collaborate on the development and commercialization of our oral rotavirus vaccine. Under the terms of the agreement, SmithKline received an exclusive worldwide license to commercialize our rotavirus vaccine. We were responsible for continuing the Phase II clinical efficacy study of the rotavirus vaccine, which was completed in August 1998. Subject to the development by SmithKline of a viable manufacturing process, SmithKline must assume responsibility for all subsequent clinical trials and all other development activities. SmithKline made an initial license payment in 1997 upon execution of the agreement and has agreed to make further payments upon the achievement of specified milestones. In addition, we will be entitled to royalties based on net sales of the rotavirus vaccine. In June 1999, the Company received a milestone payment of $500,000 from SmithKline for successfully completing the Phase II clinical efficacy study and establishing a commercially viable process to manufacture the vaccine.

HESKA CORPORATION: In 1998, we entered into an agreement with Heska Corporation ("Heska") whereby Heska was granted the right to use PCPP in specified animal health vaccines. The agreement provides for the payment of license fees, milestone and royalties based on net sales of PCPP-formulated animal vaccines. In September 1999, we received a payment from Heska for achieving a major milestone in efforts to develop and utilize the PCPP polymer as an adjuvant in Heska's animal health vaccine against B. HENSELAE, the bacterium that causes Cat Scratch Disease ("CSD") in humans.

We depend on our collaborative relationships and may enter into more of them in the future. Some of the above referenced agreements give our collaborator substantial responsibility to commercialize a product and to make decisions about the amount and timing of resources that are devoted to developing and commercializing a product. As a result, we do not have complete control over how resources are used toward some of our products.

In addition, some of these agreements relate to products in the early stages of research and development. Others require AVANT and our collaborator to jointly decide on the feasibility of developing a particular product using our technologies. In either case, these agreements may terminate without benefit to us if the underlying products are not fully developed. Moreover, once specific products are chosen for development, the agreements relating to them may require AVANT to meet specified milestones, to invest money and other resources in the development process or to negotiate additional licenses and other agreements, which may not be possible or advantageous. If we fail to meet our obligations under those agreements, they could terminate and we might need to enter into relationships with other collaborators and to spend additional time, money, and other valuable resources in the process.

Moreover, we cannot predict whether our collaborators will continue their development efforts or, if they do, whether their efforts will achieve success. Many of our collaborators face the same kinds of risks and uncertainties in their business that we face. A delay or setback to a collaborator will, at a minimum, delay the commercialization of any affected products, and may ultimately prevent it. Moreover, any collaborator could breach its agreement with us or otherwise not use best efforts to promote our products. A collaborator may choose to pursue alternative technologies or products that compete with our technologies or products. In either case, if a collaborator failed to successfully develop

one of our products, we would need to find another collaborator. Our ability to do so would depend on our legal right to do so at the time and whether the product remained commercially viable.

F. RISK FACTORS

You should consider carefully these risk factors together with all of the information included or incorporated by reference in this Annual Report. This section includes some forward-looking statements.

OUR HISTORY OF LOSSES AND UNCERTAINTY OF FUTURE PROFITABILITY MAKE OUR COMMON STOCK A HIGHLY SPECULATIVE INVESTMENT

We have had no commercial revenues to date from sales of our products and cannot predict when we will. We have accumulated net operating losses since inception of approximately $133.3 million, as of December 31, 1999. We expect to spend substantial funds to continue research and product testing of the following products we have in the pre-clinical and clinical testing stages of development:

Product	Use	Stage
TP10	Organ transplantation	clinical phase II
TP10	Pediatric cardiac surgery	clinical phase I/II
TP10	Heart attacks	clinical phase I
TP20	Stroke	preclinical
CETi-1 vaccine	Atherosclerosis	clinical phase I
Rotavirus vaccine	Rotavirus infection	clinical phase II
Cholera vaccine	Cholera infection	clinical phase II
Adjumer(R)	Influenza	clinical phase II
Adjumer(R)	Respiratory syncytial virus	clinical phase I/II
Adjumer(R)	Lyme disease	preclinical
Therapore(TM)	Hepatitis	preclinical
Therapore(TM)	HIV	preclinical
Therapore(TM)	Cancer	preclinical
TCAR	Multiple sclerosis	clinical phase II

If and when any of these products receive Food and Drug Administration approval, we will need to make substantial investments to establish sales, marketing, quality control, and regulatory compliance capabilities. We cannot predict how quickly our lead products will progress through the regulatory approval process. As a result, we may continue to lose money for several years. We will disclose the progress each product is making through pre-clinical and clinical testing, and the preparations we are making for products that are nearing approval for sale in our periodic reports under the Securities Exchange Act of 1934.

IF WE CANNOT SELL CAPITAL STOCK TO RAISE NECESSARY FUNDS, IT MAY FORCE US TO LIMIT OUR RESEARCH, DEVELOPMENT AND TESTING PROGRAMS

We will need to raise more capital from investors to advance our lead products through the clinical testing and pre-commercialization stages of development before they generate revenues for us. However, based on our history of losses, we may have difficulty attracting sufficient investment interest. We may also try to obtain funding through research grants and agreements with commercial collaborators. This kind of funding is at the discretion of other organizations and companies which have limited funds and many companies compete with us for those funds. As a result, we may not receive any research grants or funds from collaborators. We will provide specific information about the sources and adequacy of funding for our active research and development programs in our periodic reports under the Securities Exchange Act of 1934.

IF SELLING STOCKHOLDERS CHOOSE TO SELL SHARES IN LARGE VOLUME, THE TRADING PRICE OF OUR COMMON STOCK COULD SUFFER

In September 1999, we sold 5,459,375 shares of our common stock in a private placement at $1.92 per share. This was the latest of several private placements of our common stock. Those shares plus among others, 2,043,494 shares we sold in a March 1998 private placement at $1.90 per share, 1,433,750 shares we issued in June 1998 in settlement of a contract dispute with a landlord, and 3,138,559 shares that employees may purchase under stock options at prices ranging from $0.30 to $7.81 per share, can be resold in the public securities markets without restriction. These shares in total account for approximately 27.4 % of our total common stock outstanding as of December 31, 1999. If large numbers of shares are sold over a short period of time, the price of our stock may decline rapidly or fluctuate widely.

IF OUR PRODUCTS DO NOT PASS REQUIRED TESTS FOR SAFETY AND EFFECTIVENESS, WE WILL NOT BE ABLE TO DERIVE COMMERCIAL REVENUE FROM THEM

For AVANT to succeed, we will need to derive commercial revenue from the products we have under development. The FDA has not approved any of our lead products for sale to date. Our lead drug, TP10, is undergoing phase II clinical testing for use in pediatric cardiac surgery and organ transplantation. TP10 has also undergone phase I clinical testing for use in treating heart attacks. Other products in our vaccine programs are in various stages of preclinical and clinical testing. Preclinical tests are performed at an early stage of a product's development and provide information about a product's effectiveness on laboratory animals. Preclinical tests can last years. If a product passes its preclinical tests satisfactorily, we file an investigational new drug application for the product with the FDA, and if the FDA gives its approval we begin phase I clinical tests. Phase I testing generally lasts between six and 12 months. If phase I test results are satisfactory and the FDA gives its approval, we can begin phase II clinical tests. Phase II testing generally lasts between six and 18 months. If phase II test results are satisfactory and the FDA gives its approval, we can begin phase III pivotal studies. Phase III studies generally last between 12 and 36 months. Once clinical testing is completed and a new drug application is filed with the FDA, it may take several more years to receive FDA approval. We will disclose the progress of our ongoing tests and any FDA action on our products in our periodic reports under the Securities Exchange Act of 1934.

In all cases we must show that a pharmaceutical product is both safe and effective before the FDA, or drug approval agencies of other countries where we intend to sell the product, will approve it for sale. Our research and testing programs must comply with drug approval requirements both in the United States and in other countries, since we are developing our lead products with companies, including Novartis Pharma AG, Yamanouchi Pharmaceutical and Aventis Pasteur, which intend to commercialize them both in the U.S. and abroad. A product may fail for safety or effectiveness at any stage of the testing process. The key risk we face is that none of our products under development will come through the testing process to final approval for sale, with the result that we cannot derive any commercial revenue from them after investing significant amounts of capital in multiple stages of pre-clinical and clinical testing.

PRODUCT TESTING IS CRITICAL TO THE SUCCESS OF OUR PRODUCTS BUT SUBJECT TO DELAY OR CANCELLATION IF WE HAVE DIFFICULTY ENROLLING PATIENTS

As our portfolio of potential products moves from pre-clinical testing to clinical testing, and then through progressively larger and more complex clinical trials, we will need to enroll an increasing number of patients with the appropriate characteristics. At times we have experienced difficulty enrolling patients and we may experience more difficulty as the scale of our clinical testing program increases. The factors that affect our ability to enroll patients are largely uncontrollable and include principally the following:

- the nature of the clinical test
- the size of the patient population
- the distance between patients and clinical test sites
- the eligibility criteria for the trial

As clinical tests currently in progress continue and new tests begin, we will disclose in our periodic reports under the Securities Exchange Act of 1934 our progress in enrolling sufficient patients to keep our various programs moving forward, including any specific difficulties we face from time to time and their expected consequences on the affected program. If we cannot enroll patients as needed, our costs may increase or it could force us to delay or terminate testing for a product.

WE DEPEND GREATLY ON THE INTELLECTUAL CAPABILITIES AND EXPERIENCE OF OUR KEY EXECUTIVES AND SCIENTISTS AND THE LOSS OF ANY OF THEM COULD AFFECT OUR ABILITY TO DEVELOP OUR PRODUCTS

The loss of Dr. Una S. Ryan, our president and chief executive officer, or other key members of our staff could harm us. We have an employment agreement with Dr. Ryan. We do not have any key-person insurance coverage. We also depend on our scientific collaborators and advisors, all of whom have outside commitments that may limit their availability to us. In addition, we believe that our future success will depend in large part upon our ability to attract and retain highly skilled scientific, managerial and marketing personnel, particularly as we expand our activities in clinical trials, the regulatory approval process and sales and manufacturing. We face significant competition for this type of personnel from other companies, research and academic institutions, government entities and other organizations. We cannot predict our success in hiring or retaining the personnel we require for continued growth.

WE RELY ON THIRD PARTIES TO PLAN, CONDUCT, MONITOR AND SUPPLY OUR CLINICAL TESTS, AND THEIR FAILURE TO PERFORM AS REQUIRED WOULD INTERFERE WITH OUR PRODUCT DEVELOPMENT

We rely on third parties, including Duke University Medical Center, The Chicago Center for Clinical Research and SmithKline Beecham to conduct our clinical tests. If any one of those third parties fails to perform as we expect or if their work fails to meet regulatory standards, our testing could be delayed, cancelled or rendered ineffective. We also depend on third party suppliers, including Walter Reed Army Institute of Research, Marathon Biopharmaceuticals, Inc., and Multiple Peptide Systems, to provide us with suitable quantities of materials necessary for clinical tests. If these materials are not available in suitable quantities of appropriate quality, in a timely manner, and at a feasible cost, our clinical tests will face delays.

WE DEPEND GREATLY ON THIRD PARTY COLLABORATORS TO LICENSE, DEVELOP AND COMMERCIALIZE SOME OF OUR PRODUCTS, AND THEY MAY NOT MEET OUR EXPECTATIONS

We have agreements with other companies, including Heska Corporation, Innogenetics, Inc., Novartis Pharma AG, Aventis Pasteur, SmithKline Beecham, and Yamanouchi Pharmaceutical, for the licensing, development and ultimate commercialization of most of our products. Some of those agreements give substantial responsibility over the products to the collaborator. Some collaborators may be unable or unwilling to devote sufficient resources to develop our products as their agreements require. They often face business risks similar to ours, which could interfere with their efforts. Also, collaborators may choose to devote their resources to products that compete with ours. If a collaborator does not successfully develop any one of our products, we will need to find another collaborator to do so. Our search for a new collaborator will depend on our legal right to do so at the time and whether the product remains commercially viable.

WE MAY FACE DELAYS, DIFFICULTIES OR UNANTICIPATED COSTS IN ESTABLISHING SALES, DISTRIBUTION AND MANUFACTURING CAPABILITIES FOR OUR COMMERCIALLY READY PRODUCTS

We have chosen to retain, rather than license, all rights to some of our lead products, such as TP10 for pediatric cardiac surgery. If we proceed with this strategy, we will have full responsibility for commercialization of these products if and when they are approved for sale. We currently lack the marketing, sales and distribution capabilities that we will need to carry out this strategy. To market any of our products directly, we must develop a substantial marketing and sales force with technical expertise and a supporting distribution capability. We have little expertise in this area, and we may not succeed. We may find it necessary to enter into strategic partnerships on uncertain but potentially unfavorable terms to sell, market and distribute our products when they are approved for sale.

We do not currently plan to develop internal manufacturing capabilities to produce any of our products if they are approved for sale. To the extent that we choose to market and distribute products ourselves, this strategy will make us dependent on other companies to produce our products in adequate quantities, in compliance with regulatory requirements, and at a competitive cost. We may not find third parties capable of meeting those manufacturing needs.

OUR RELIANCE ON THIRD PARTIES REQUIRES US TO SHARE OUR TRADE SECRETS, WHICH INCREASES THE POSSIBILITY THAT A COMPETITOR WILL DISCOVER THEM

Because we rely on third parties to develop our products, we must share trade secrets with them. We seek to protect our proprietary technology in part by confidentiality agreements and, if applicable, inventor's rights agreements with our collaborators, advisors, employees and consultants. If these agreements are breached, our competitors may discover our

trade secrets. A competitor's discovery of our trade secrets would impair our competitive position. Moreover, we conduct a significant amount of research through academic advisors and collaborators who are prohibited from entering into confidentiality or inventor's rights agreements by their academic institutions.

WE LICENSE TECHNOLOGY FROM OTHER COMPANIES TO DEVELOP OUR PRODUCTS, AND THOSE COMPANIES COULD RESTRICT OUR USE OF IT

Companies that license to us technologies we use in our research and development programs may require us to achieve milestones or devote minimum amounts of resources to develop products using those technologies. They may also require us to make significant royalty and milestone payments, including a percentage of any sublicensing income, as well as payments to reimburse them for patent costs. The number and variety of our research and development programs require us to establish priorities and to allocate available resources among competing programs. From time to time we may choose to slow down or cease our efforts on particular products. If in doing so we fail to perform our obligations under a license fully, the licensor can terminate the licenses or permit our competitors to use the technology. Moreover, we may lose our right to market and sell any products based on the licensed technology.

WE HAVE MANY COMPETITORS IN OUR FIELD AND THEY MAY DEVELOP TECHNOLOGIES THAT MAKE OURS OBSOLETE

Biotechnology, pharmaceuticals and therapeutics are rapidly evolving fields in which scientific and technological developments are expected to continue at a rapid pace. We have many competitors in the U.S. and abroad, including Alexion Pharmaceutical, Bayer, Merck, Pfizer, Immune Response and Wyeth-Lederle. Our success depends upon our ability to develop and maintain a competitive position in the product categories and technologies on which we focus. Many of our competitors have greater capabilities, experience and financial resources than we do. Competition is intense and is expected to increase as new products enter the market and new technologies become available. Our competitors may:

- develop technologies and products that are more effective than ours, making ours obsolete or otherwise noncompetitive

- obtain regulatory approval for products more rapidly or effectively than us

- obtain patent protection or other intellectual property rights that would block our ability to develop competitive products

WE RELY ON PATENTS, PATENT APPLICATIONS AND OTHER INTELLECTUAL PROPERTY PROTECTIONS TO PROTECT OUR TECHNOLOGY AND TRADE SECRETS; THEY ARE EXPENSIVE AND MAY NOT PROVIDE SUFFICIENT PROTECTION

Our success depends in part on our ability to obtain and maintain patent protection for technologies that we use. Biotechnology patents involve complex legal, scientific and factual questions and are highly uncertain. To date, there is no consistent policy regarding the breadth of claims allowed in biotechnology patents, particularly in regard to patents for technologies for human uses like those we use in our business. We cannot predict whether the patents we seek will issue. If they do issue, a competitor may challenge them and limit their scope. Moreover, our patents may not afford effective protection against competitors with similar technology. A successful challenge to any one of our patents could result in a third party's ability to use the technology covered by the patent. We also face the risk that others will infringe, avoid or circumvent our patents. Technology that we license from others is subject to similar risks, which could harm our ability to use that technology. If we, or a company that licenses technology to us, were not the first creator of an invention that we use, our use of the underlying product or technology will face restrictions, including elimination.

If we must defend against suits brought against us or prosecute suits against others involving intellectual property rights, we will incur substantial costs. In addition to any potential liability for significant monetary damages, a decision against us may require us to obtain licenses to patents or other intellectual property rights of others on potentially unfavorable terms. If those licenses from third parties are necessary but we cannot acquire them, we would attempt to design around the relevant technology, which would cause higher development costs and delays, and may ultimately prove impracticable.

OUR BUSINESS REQUIRES US TO USE HAZARDOUS MATERIALS, WHICH INCREASES OUR EXPOSURE TO DANGEROUS AND COSTLY ACCIDENTS

Our research and development activities involve the use of hazardous chemicals, biological materials and radioactive compounds. Although we believe that our safety procedures for handling and disposing hazardous materials comply with the standards prescribed by applicable laws and regulations, we cannot completely eliminate the risk of accidental contamination or injury from these materials. In the event of an accident, an injured party will likely sue us for any resulting damages with potentially significant liability. The ongoing cost of complying with environmental laws and regulations is significant and may increase in the future. In addition, in connection with our merger with Virus Research Institute, Inc. in 1998, we assumed the real property lease at Virus Research Institute, Inc.'s former site. We understand that this property has a low level of oil-based and other hazardous material contamination. We believe that the risks posed by this contamination are low, but we cannot predict whether additional hazardous contamination exists at this site, or that changes in applicable law will not require us to clean up the current contamination of the property.

G. COMPETITION

Competition in the biotechnology and vaccine industries is intense. We face competition from many companies in the United States and abroad, including a number of large pharmaceutical companies, firms specialized in the development and production of vaccines, adjuvants and vaccine and immunotherapeutic delivery systems and major universities and research institutions. Most of our competitors have substantially greater resources, more extensive experience in conducting preclinical studies and clinical testing and obtaining regulatory approvals for their products, greater operating experience, greater research and development and marketing capabilities and greater production capabilities than those of AVANT. There can be no assurance that our competitors will not develop technologies and products that are safer or more effective than any which are being developed by us or which would render our technology and products obsolete and noncompetitive, and our competitors may succeed in obtaining FDA approval for products more rapidly than AVANT. There can be no assurance that the vaccines and immunotherapeutic products under development by us and our collaborators will be able to compete successfully with existing products or products under development by other companies, universities and other institutions or that they will obtain regulatory approval in the United States or elsewhere. We believe that the principal competitive factors in the vaccine and immunotherapeutic market are product quality, measured by efficacy and safety, ease of administration and price.

Our competitive position will also depend upon our ability to attract and retain qualified personnel, obtain patent protection or otherwise develop proprietary products or processes and secure sufficient capital resources for the often lengthy period between technological conception and commercial sales. We will require substantial capital resources to complete development of some or all of our products, obtain the necessary regulatory approvals and successfully manufacture and market its products. In order to secure capital resources, we anticipate having to sell additional capital stock, which would dilute existing stockholders. We may also attempt to obtain funds through research grants and agreements with commercial collaborators. However, these types of fundings are uncertain because they are at the discretion of the organizations and companies that control the funds. As a result, we may not receive any funds from grants or collaborations. Alternatively, we may borrow funds from commercial lenders, likely at high interest rates, which would increase the risk of any investment in AVANT.

H. MANUFACTURING

We have no manufacturing facilities, no experience in volume manufacturing and plan to rely upon collaborators or contractors to manufacture our proposed products for both clinical and commercial purposes. We believe that there is currently sufficient capacity worldwide for the production of our potential products by our collaborators or through contract manufacturers.

To date, we have been arranging with contract manufacturers for the manufacture of PCPP in quantities sufficient for preclinical and clinical studies, and for clinical trial supplies of our rotavirus vaccine candidate. Future manufacture of our rotavirus vaccine is the responsibility of SmithKline, which has received from us a world-wide exclusive license to commercialize this vaccine.

We have contracted for the development and initial supply of the starting materials for PCPP but do not yet have a written contract with a manufacturer for commercial production of PCPP. We have facilitated the production of commercial grade PCPP in a contractor's cGMP manufacturing facility according to agreed upon specifications. The Aventis agreement, while reserving to Aventis the right to manufacture PCPP, anticipates that we may supply PCPP under a cost-plus supply agreement. We have also entered into a collaborative arrangement with WRAIR for the manufacture of a Therapore(TM) -HIV product. WRAIR will manufacture the HIV-specific component for this product and we have contracted with Marathon Biopharmaceuticals, Inc. to manufacture the other component. WRAIR has made Cholera Peru-15 and Bengal-15 vaccines under a collaborative agreement with us. The CETi-1 vaccine is made under contracts with Multiple Peptide Services and Bioconcepts, Inc. The manufacturing processes for our other vaccine and immunotherapeutic delivery systems and vaccines utilize known technologies. We believe that the products we currently have under development can be readily scaled up to permit manufacture in commercial quantities. However, there can be no assurance that we will not encounter difficulties in scaling up the manufacturing processes.

Use of third party manufacturers limits our control over and ability to monitor the manufacturing process. As a result, we may not be able to detect a variety of problems that may arise. If third party manufacturers fail to meet our manufacturing needs in an acceptable manner, we would face delay and additional costs while it develops internal manufacturing capabilities or finds alternative third party manufacturers.

We intend to establish manufacturing arrangements with manufacturers that comply with the FDA's requirements and other regulatory standards, although there can be no assurance that we will be able to do so. In the future, we may, if it becomes economically attractive to do so, establish our own manufacturing facilities to produce any vaccine products that we may develop. In order for us to establish a manufacturing facility, we will require substantial additional funds and will be required to hire and retain significant additional personnel and comply with the extensive cGMP regulations of the FDA applicable to such facility. The product manufacturing facility would also need to be licensed for the production of vaccines by the FDA.

I. MARKETING

Under the terms of existing and future collaborative agreements, we rely and expect to continue to rely on the efforts of our collaborators for the sale and marketing of our products. There can be no assurance that our collaborators will market vaccine products incorporating our technologies, or, if marketed, that such efforts will be successful. The failure of our collaborators to successfully market products would harm our business.

We have retained, and in the future intend to retain, marketing rights to some of our product candidates, including vaccine and immunotherapeutic delivery systems and vaccine candidates, in selected geographic areas and for specified indications. We intend to seek marketing and distribution agreements and/or co-promotion agreements for the distribution of our products in these geographic areas and for these indications. We believe that these arrangements could enable us to generate greater financial return than might be obtained from early stage licensing and collaboration agreements. We have no marketing and sales staff and limited experience relating to marketing and distribution of commercial products, including vaccines. If we determine in the future to engage in direct marketing of our products, we will be required to recruit an experienced marketing group, develop a supporting distribution capability and incur significant additional expenditures. There can be no assurance that we will be able to establish a successful marketing force. We may choose or find it necessary to enter into strategic partnerships on uncertain, but potentially unfavorable, terms to sell, market and distribute our products. Any delay in the marketing or distribution of our products, whether it results from problems with internal capabilities or with a collaborative relationship, could harm the value of an investment in AVANT.

J. PATENTS, LICENSES AND PROPRIETARY RIGHTS

AVANT's policy is to protect our technology by filing patent applications and obtaining patent rights covering our own technology, both in the United States and in foreign countries. In addition, we have acquired and will seek to acquire as needed or desired, exclusive rights of others through assignment or license to complement our portfolio of patent rights. We also rely on trade secrets, unpatented know-how and technological expertise and innovation to develop and maintain our competitive position.

PATENTS: The successful development and marketing of products by AVANT will depend in part on our ability to create and maintain intellectual property, including patent rights. We have established a proprietary patent position in the areas of complement inhibitor technology, vaccine technologies and diagnostic technologies, and we are the owner or exclusive licensee of numerous patents and pending applications around the world. Although we continue to pursue patent protection for our products, no assurance can be given that any pending application will issue as a patent, that any issued patent will have a scope that will be of commercial benefit, or that we will be able to successfully enforce our patent position against competitors.

In the area of complement molecules, we are co-owner with The Johns Hopkins University and Brigham & Women's Hospital, whose rights AVANT has exclusively licensed, of patents and applications covering inventions relating to complement receptor type 1 (CR1). These rights are based in part on the work of Dr. Douglas Fearon and include U.S. and foreign patents which claim nucleic acid sequences encoding CR1, sCR1 and active fragments; purification methods; and therapeutic uses of sCR1. We also own or have rights to a number of other issued patents and patent applications relating to sCR1, sCR1sLe x and other complement inhibitor molecules and their uses.

In 1996, we licensed portions of our patent and technology rights regarding CR1 to CytoTherapeutics, Inc. ("CytoTherapeutics") for use in protecting CytoTherapeutics' proprietary cell-encapsulation products for the delivery of therapeutic substances to the central nervous system.

In 1996, we amended our agreement with Astra to transfer some of our patent rights and licenses to the TCAR technology to Astra. This transfer includes patent applications which have resulted to date in U.S. patents covering the DNA, proteins, protein fragments and antibodies relating to the Alpha TCAR and the DNA, full-length proteins and antibodies relating to Beta TCAR, and two European patents covering Beta TCAR inventions. In addition, we have transferred filings on T cell antigen receptor inventions resulting from the partnership with Astra.

In July 1999, we entered into a transfer and sale agreement with Innogenetics, Inc. ("Innogenetics") in which we conveyed to Innogenetics our rights in the TRAx(R) technology for detection of cell surface markers, such as CD4 and CD8 on T cells. This agreement gave Innogenetics the exclusive rights to sell the TRAx(R) CD4 and CD8 diagnostic products worldwide, with AVANT receiving payments and the rights to receive future royalties on sales.

In the area of vaccine technology, we own issued U.S. patents and corresponding foreign applications directed to the use of vaccines incorporating our Adjumer(R) vaccine delivery technology, and directed to the use of vaccines incorporating our Micromer(R) vaccine delivery technology. Further, we own and have licensed other U.S. patents and patent applications, and corresponding foreign applications, directed to technology that may be useful for our Micromer(R) and Adjumer(R) vaccine delivery systems. We have an exclusive license to a United States patent application, and corresponding foreign applications, directed to a vector construct that is used in our VibrioVec(TM) vaccine delivery system; we have an exclusive license to an issued U.S. patent directed to a rotavirus strain antigen which forms the basis of our rotavirus vaccine; and we have an exclusive license to a U.S. patent application, and corresponding foreign applications, directed to a defective HSV2 virus for use in our vaccine directed against genital herpes. We also have an exclusive license to U.S. patent applications and a non-exclusive license to US and foreign patents and applications directed to technology that may be useful for our Therapore(TM) system. We have two issued patents in foreign countries and additional pending patent applications in the U.S. and selected foreign countries relating to control of CETP activity through vaccination.

There can be no assurance that patent applications owned by or licensed to AVANT will result in granted patents or that, if granted, the resultant patents will afford protection against competitors with similar technology. It is also possible that third parties may obtain patent or other proprietary rights that may be necessary or useful to AVANT. In cases where third parties are first to invent a particular product or technology, it is possible that those parties will obtain patents that will be sufficiently broad to prevent us from using important technology or from further developing or commercializing important vaccine and immunotherapeutic systems and vaccine candidates. If licenses from third parties are necessary but cannot be obtained, commercialization of the covered products might be delayed or prevented. Even if these licenses can be obtained, they would probably require us to pay ongoing royalties and other costs, which could be substantial.

Although a patent has a statutory presumption of validity in the United States, the issuance of a patent is not conclusive as to validity or as to the enforceable scope of the patent claims. The validity or enforceability of a patent after its issuance by the Patent and Trademark Office can be challenged in litigation. As a business that uses a substantial amount of intellectual property, we face a heightened risk of intellectual property litigation. If the outcome of the litigation is

adverse to the owner of the patent, third parties may then be able to use the invention covered by the patent without payment. There can be no assurance that our issued patents or any patents subsequently issued to or licensed by us will not be successfully challenged in the future. In addition, there can be no assurance that our patents will not be infringed or that the coverage of our patents will not be successfully avoided by competitors through design innovation.

We are aware that others, including universities and companies, have filed patent applications and have been granted patents in the United States and other countries which claim subject matter potentially useful or necessary to the commercialization of our products. The ultimate scope and validity of existing or future patents which have been or may be granted to third parties, and the availability and cost of acquiring rights in those patents necessary to the manufacture, use or sale of our products presently cannot be determined by AVANT.

We use a mutated Vibrio cholerae in our VibrioVec(TM) vaccine delivery system. We are aware of an issued U.S. patent which claims a culture of mutated Vibrio cholerae. We believe that only one claim (the "Claim") of the patent may be pertinent to our VibrioVec(TM) system. The remaining claims of the patent cover other cultures which we believe are not pertinent to VibrioVec(TM). We have received an opinion of counsel from Fish & Richardson, P.C. that, based on the analysis set forth in their opinion and the facts known to them, the Claim is invalid. It should be noted that a party challenging validity of a patent has the burden of proving invalidity and that the outcome of any litigation cannot be predicted with certainty. Accordingly, there can be no assurance that, if litigated, a court would conclude that the Claim is invalid.

In addition, we are aware of a foreign patent with claims that could conflict with AVANT's vaccine candidates and vaccine delivery systems. We believe that the relevant claims under this patent do not extend to or restrict our activities, however there can be no assurance that a foreign court would reach the same conclusion. We are also aware of an issued U.S. patent relating to the same technology covered by a patent application to which we have been granted an exclusive license, and in January 2000, an interference was declared in the U.S. Patent and Trademark Office to determine who is entitled to a U.S. patent on the herpes vaccine technology.

In addition to the patents referred to in the previous two paragraphs, there may be other patent applications and issued patents belonging to competitors that may require us to alter our vaccine candidates and vaccine and immunotherapeutic delivery systems, pay licensing fees or cease some of our activities. If our product candidates conflict with patents that have been or may be granted to competitors, universities or others, the patent owners could bring legal actions against us claiming damages and seeking to enjoin manufacturing and marketing of the patented products. If any of these actions are successful, in addition to any potential liability for damages, we could be required to obtain a license in order to continue to manufacture or market the affected products. There can be no assurance that we would prevail in any such action or that any license required under any such third party patent would be made available on acceptable terms or at all. We believe that there may be significant litigation in the biotechnology and vaccine industries regarding patent and other intellectual property rights. If we become involved in that litigation, we could consume substantial resources.

LICENSES: We have entered into several significant license agreements relating to technology that is being developed by AVANT and/or its collaborators, including licenses from: Massachusetts Institute of Technology covering proprietary technologies for vaccine delivery related to PCPP microparticles; Penn State Research Foundation covering the production of polyphosphazene polymer; Harvard College relating to proprietary technology involving genetically altered Vibrio cholera and Salmonella strains; Cincinnati Children's Hospital involving proprietary rights and technologies relating to an attenuated rotavirus strain for a rotavirus vaccine; Harvard College and the Dana Farber Cancer Institute relating to a genetically-altered HSV2 virus for use in a genital herpes virus vaccine; and Harvard College and the NIH for the proprietary technology related to Therapore(TM), a novel immunotherapy delivery system to be developed for delivery of products for the treatment of persistent viral infections and some forms of cancer. In general, these institutions (except the NIH) have granted us an exclusive worldwide license (with right to sublicense) to make, use and sell products embodying the licensed technology, subject to the reservation by the licensor of a non-exclusive right to use the technologies for non-commercial purposes. Generally, the term of each license is through the expiration of the last of the patents issued with respect to the technologies covered by the license. We have generally agreed to use reasonable efforts to develop and commercialize licensed products and to achieve specified milestones and pay license fees, milestone payments and royalties based on the net sales of the licensed products or to pay a percentage of sublicense income. If we breach our obligations, the licensor has the right to terminate the license, and, in some cases, convert the license to a non-exclusive license.

PROPRIETARY RIGHTS: We also rely on unpatented technology, trade secrets and confidential information, and no assurance can be given that others will not independently develop substantially equivalent information and techniques or otherwise gain access to our know-how and information, or that we can meaningfully protect our rights in such unpatented technology, trade secrets and information. We require each of our employees, consultants and advisors to execute a confidentiality agreement at the commencement of an employment or consulting relationship with AVANT. The agreements generally provide that all inventions conceived by the individual in the course of employment or in providing services to AVANT and all confidential information developed by, or made known to, the individual during the term of the relationship shall be the exclusive property of AVANT and shall be kept confidential and not disclosed to third parties except in limited specified circumstances. There can be no assurance, however, that these agreements will provide meaningful protection for our information in the event of unauthorized use or disclosure of such confidential information.

K. GOVERNMENT REGULATION

Our activities and products are significantly regulated by a number of governmental entities, including the FDA in the United States and by comparable authorities in other countries and by the USDA with respect to products developed by Heska. These entities regulate, among other things, the manufacture, testing, safety, effectiveness, labeling, documentation, advertising and sale of our products. We must obtain regulatory approval for a product in all of these areas before we can commercialize the product. Product development within this regulatory framework takes a number of years and involves the expenditure of substantial resources. Many products that initially appear promising ultimately do not reach the market because they are found to be unsafe or ineffective when tested. Our inability to commercialize a product would impair our ability to earn future revenues.

In the United States, vaccines and immunotherapeutics for human use are subject to FDA approval as "biologics" under the Public Health Service Act and "drugs" under the Federal Food, Drug and Cosmetic Act. The steps required before a new product can be commercialized include: preclinical studies in animals, clinical trials in humans to determine safety and efficacy and FDA approval of the product for commercial sale.

Data obtained at any stage of testing is susceptible to varying interpretations which could delay, limit or prevent regulatory approval. Moreover, during the regulatory process, new or changed drug approval policies may cause unanticipated delays or rejection of our product. We may not obtain necessary regulatory approvals within a reasonable period of time, if at all, or avoid delays or other problems in testing its products. Moreover, even if we received regulatory approval for a product, the approval may require limitations on use, which would restrict the size of the potential market for the product.

The FDA provides that human clinical trials may begin thirty (30) days after receipt and review of an Investigational New Drug ("IND") application, unless the FDA requests additional information or changes to the study protocol within that period. An IND must be sponsored and filed by AVANT for each of our proposed products. Authorization to conduct a clinical trial in no way assures that the FDA will ultimately approve the product. Clinical trials are usually conducted in three sequential phases; in a Phase I trial, the product is given to a small number of healthy volunteers to test for safety (adverse effects). Phase II trials are conducted on a limited group of the target patient population; safety, optimal dosage and efficacy are studied. A Phase III trial is performed in a large patient population over a wide geographic area to prove that significant efficacy exists. The FDA has ongoing oversight over all these trials and can order a temporary or permanent discontinuation if that action is warranted. Such an action could materially harm AVANT. Clinical tests are critical to the success of our products but are subject to unforeseen and uncontrollable delay, including delay in enrollment of patients. Any delay in clinical trials could delay our commercialization of a product.

A product's safety and effectiveness in one test does not necessarily indicate its safety and effectiveness in any other test, including more advanced ones. Moreover, we may not discover all potential problems with a product even after completing testing on it. Some of our products and technologies have undergone only preclinical testing. As a result, we do not know whether they are safe or effective for humans. Also, regulatory authorities may decide, contrary to our findings, that a product is unsafe or not as effective in actual use as its test results indicated. This could prevent the product's widespread use, require its withdrawal from the market or expose us to liability.

The results of the clinical trials and all supporting data are submitted to the FDA for approval. A Biologics License Application ("BLA") is submitted for a biologic product; a New Drug Application (an "NDA") for a drug product. The interval between IND filing and BLA/NDA filing is usually at least several years due to the length of the clinical trials;

and the BLA/NDA review process can take over a year. During this time the FDA may request further testing, additional trials or may turn down the application. Even with approval, the FDA frequently requires post-marketing safety studies (known as Phase IV trials) to be performed.

The FDA requires that the manufacturing facility that produces a licensed product meet specified standards, undergo an inspection and obtain an establishment license prior to commercial marketing. Subsequent discovery of previously unknown problems with a product or its manufacturing process may result in restrictions on the product or the manufacturer, including withdrawal of the product from the market. Failure to comply with the applicable regulatory requirements can result in fines, suspensions of regulatory approvals, product recalls, operating restrictions and criminal prosecution.

The Advisory Committee on Immunization Practices ("ACIP") of the CDC has a role in setting the public market in the United States for the vaccine products we intend to develop. The ACIP makes recommendations on the appropriate use of vaccines and related products and the CDC develops epidemiologic data relevant to vaccine requirements and usage.

To market our products abroad, we are subject to varying foreign regulatory requirements. Although international efforts are being made to harmonize these requirements, applications must currently be made in each country. The data necessary and the review time varies significantly from one country to another. Approval by the FDA does not ensure approval by the regulatory bodies of other countries.

Our collaborators are subject to all of the above-described regulations in connection with the commercialization of products utilizing our technology.

L. PRODUCT LIABILITY

The risk of product liability claims, product recalls and associated adverse publicity is inherent in the testing, manufacturing, marketing and sale of medical products. If and when we manufacture vaccines that are recommended for routine administration to children, we will be required to participate in the National Vaccine Injury Compensation Program. This program compensates children having adverse reactions to some routine childhood immunizations with funds collected through an excise tax from the manufacturers of these vaccines.

We have clinical trial liability insurance coverage in the amount of $5 million. However, there can be no assurance that such insurance coverage is or will continue to be adequate or available. We may choose or find it necessary under our collaborative agreements to increase our insurance coverage in the future. We may not be able to secure greater or broader product liability insurance coverage on acceptable terms or at reasonable costs when needed. Any liability for mandatory damages could exceed the amount of our coverage. A successful product liability claim against us could require us to pay a substantial monetary award. Moreover, a product recall could generate substantial negative publicity about our products and business and inhibit or prevent commercialization of other product candidates.

M. EMPLOYEES; SCIENTIFIC CONSULTANTS

As of March 10, 2000, we employed 50 full time persons, 16 of whom have doctoral degrees. Of these employees, 36 were engaged in or directly support research and development activities.

We have also retained a number of scientific consultants and advisors in various fields and have entered into consulting agreements with each of them. These consultants include the following members of the Scientific Advisory Board: Dr. Mark Davis, Stanford University; Dr. Tak Mak, Ontario Cancer Institute; Dr. Peter Ward, University of Michigan School of Medicine; Dr. Hans Wigzell, Karolinska Institute; Dr. Peter Henson, National Jewish Center for Immunology and Respiratory Medicine; Dr. Peter Libby, Brigham and Women's Hospital; and Dr. Robert Langer, Massachusetts Institute of Technology.

ITEM 2. PROPERTIES

We lease approximately 54,000 square feet of laboratory and office space in Needham, Massachusetts, of which we sublease approximately 13,000 square feet of excess laboratory and office space to a tenant. The lease has an initial six-year term which expires in April 2002. Under the lease agreement, the Company is obligated to pay a base annual rent of

$756,400 until the end of the initial term. The sublease relating to the 13,000 square feet of excess space has an initial four-year term which expires in April 2000 with an option to extend the lease to April 2002. Under the sublease agreement, which was extended by the subtenant to April 2002, we will receive base annual sub-rental income of $134,500 until the end of the initial term. Aggregate net base rental payments for the years ended December 31, 1999 and 1998 for this facility were $580,600 and $662,000, respectively.

We also lease approximately 17,800 square feet of laboratory and office space in Cambridge, Massachusetts. The lease has a five-year term, which commenced on December 1, 1996. Under the lease agreement, we are obligated to pay a base annual rent of $293,700 until the end of the lease term. Effective February 1, 1999, we sublet the entire Cambridge, Massachusetts facility through the end of the lease term. Under the sublease agreement, we will receive base annual sub-rental income of $431,700 of which approximately $36,000 will be payable to the landlord as additional rent.

ITEM 3. LEGAL PROCEEDINGS

None.

ITEM 4. SUBMISSION OF MATTERS TO A VOTE OF SECURITIES HOLDERS

None.

PART II

ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY AND RELATED STOCKHOLDER MATTERS

The common Stock of AVANT Immunotherapeutics, Inc. ("AVANT") began trading on the Nasdaq National Market (the "Nasdaq") under the symbol "AVAN" on August 24, 1998. Prior to that date, we were traded on the Nasdaq under the symbol "TCEL". The following table sets forth for the periods indicated the high and low closing sales prices for our common stock as reported by Nasdaq.

FISCAL PERIOD	HIGH	LOW
YEAR ENDED DECEMBER 31, 1998		
1Q (Jan. 1- March 31, 1998)	$ 2.94	$ 1.81
2Q (April 1 - June 30, 1998)	4.50	2.38
3Q (July 1 - Sept. 30, 1998)	2.81	1.19
4Q (Oct. 1 - Dec. 31, 1998)	1.78	1.06
YEAR ENDED DECEMBER 31, 1999		
1Q (Jan. 1- March 31, 1999)	$ 2.41	$ 1.06
2Q (April 1 - June 30, 1999)	2.13	1.13
3Q (July 1 - Sept. 30, 1999)	3.13	1.69
4Q (Oct. 1 - Dec. 31, 1999)	2.47	1.50

As of March 10, 2000, there were approximately 671 shareholders of record of our common stock. The price of the common stock was $14.44 as of the close of the market on March 10, 2000. We have not paid any dividends on our common stock since our inception and do not intend to pay any dividends in the foreseeable future. Declaration of dividends will depend, among other things, upon the operating and future earnings of AVANT, our capital requirements and general business conditions.

On September 22, 1999, we closed a private placement of approximately 5.5 million shares of common stock at $1.92 per share for a total amount of $10.5 million. Nomura was the placing agent for the offering that included several European and U.S. institutional investors. The transaction was not registered under the Securities Act of 1933, as amended, in reliance on an exemption from registration provided by Rule 506 of that Act, which was available because, among other things, there were fewer than thirty five purchasers of common stock and more than six months had elapsed from the date of any previous offerings. Proceeds from the private placement are being used to support clinical development of our lead complement inhibitor, TP10, in infants undergoing cardiac surgery on cardiopulmonary bypass and other company activities.

ITEM 6. SELECTED FINANCIAL DATA

The selected consolidated financial data presented below for the years ended December 31, 1999, 1998, 1997, 1996 and 1995 have been derived from the audited consolidated financial statements of AVANT. The results of operations for 1999 and 1998 include the operating results of Virus Research Institute, Inc. ("VRI") from August 21, 1998, the date on which AVANT acquired VRI, through the present (see Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations"). All amounts are in thousands except per share data.

CONSOLIDATED STATEMENTS OF OPERATIONS DATA	Year Ended December 31,				
	1999	1998	1997	1996	1995
OPERATING REVENUE:					
Product Sales, Product Development and Licensing Agreements	$ 1,484	$ 2,150	$ 1,192	$ 1,115	$ 3,963
OPERATING EXPENSE:					
Research and Development	7,872	5,703	5,257	6,036	8,005
Charge for Purchased In-Process Research & Development	--	44,630	--	--	--
Legal Settlement	--	(166)	6,109	--	(2,900)
Other Operating Expense	5,556	4,377	3,494	6,549	7,821
Total Operating Expense	13,428	54,544	14,860	12,585	12,926
Non-Operating Income, Net	635	594	560	680	705
Net Loss	$ (11,309)	$ (51,800)	$ (13,108)	$ (10,790)	$ (8,258)
Basic and Diluted Net Loss Per Common Share	$ (0.26)	$ (1.56)	$ (0.52)	$ (0.50)	$ (0.47)
Weighted Average Common Shares Outstanding	44,076	33,177	25,140	21,693	17,482

CONSOLIDATED BALANCE SHEET DATA	December 31,				
	1999	1998	1997	1996	1995
Working Capital	$ 12,289	$ 12,298	$ 4,629	$ 11,673	$ 11,208
Total Assets	19,883	22,650	9,827	17,224	18,532
Other Long Term Obligations	269	563	750	--	182
Accumulated Deficit	(133,345)	(122,036)	(70,237)	(57,129)	(46,339)
Total Stockholders' Equity	17,413	18,770	6,316	15,619	16,000

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

In January 1997, the Securities and Exchange Commission issued Financial Reporting Release No. 48, which expands the disclosure requirements for certain derivatives and other financial instruments. We do not utilize derivative financial instruments. See Notes 1 and 2 to the Consolidated Financials Statements for a description of our use of other financial instruments.

SAFE HARBOR STATEMENT UNDER THE PRIVATE SECURITIES LITIGATION REFORM ACT OF 1995: STATEMENTS CONTAINED IN THE FOLLOWING, ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS, THAT ARE NOT HISTORICAL FACTS MAY BE FORWARD-LOOKING STATEMENTS THAT ARE SUBJECT TO A VARIETY OF RISKS AND UNCERTAINTIES. THERE ARE A NUMBER OF IMPORTANT FACTORS THAT COULD CAUSE THE ACTUAL RESULTS TO DIFFER MATERIALLY FROM THOSE EXPRESSED IN ANY FORWARD-LOOKING STATEMENTS MADE BY AVANT. THESE FACTORS INCLUDE, BUT ARE NOT LIMITED TO: (I) OUR ABILITY TO SUCCESSFULLY COMPLETE PRODUCT RESEARCH AND DEVELOPMENT, INCLUDING PRE-CLINICAL AND CLINICAL STUDIES, AND COMMERCIALIZATION; (II) OUR ABILITY TO OBTAIN SUBSTANTIAL ADDITIONAL FUNDING; (III) OUR ABILITY TO OBTAIN REQUIRED GOVERNMENTAL APPROVALS; (IV) OUR ABILITY TO ATTRACT MANUFACTURING, SALES, DISTRIBUTION AND MARKETING PARTNERS AND OTHER STRATEGIC ALLIANCES; AND (V) OUR ABILITY TO DEVELOP AND COMMERCIALIZE ITS PRODUCTS BEFORE ITS COMPETITORS.

ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

AVANT's principle activity since our inception has been research and product development conducted on our own behalf, as well as through joint development programs with several pharmaceutical companies. We were incorporated in the State of Delaware in December 1983.

A significant portion of AVANT's revenue has consisted of payments by others to fund sponsored research, milestone payments under joint development agreements, license fees, payments for material produced for preclinical and clinical studies, and sales of test kits and antibodies. Certain portions of the collaborative payments are received in advance, recorded as deferred revenue and recognized when earned in later periods.

Inflation and changing prices have not had a significant effect on continuing operations and are not expected to have any in the near future.

OVERVIEW

We are engaged in the discovery, development and commercialization of products that harness the human immune response to prevent and treat disease. Our products derive from a broad set of complementary technologies with the ability to inhibit the complement system, regulate T and B cell activity, and enable the creation and delivery of preventative and therapeutic vaccines. We are using these technologies to develop vaccines and immunotherapeutics that prevent or treat disease caused by infectious organisms, and drugs and treatment vaccines that modify undesirable activity by the body's own proteins or cells.

ACQUISITION

On August 21, 1998 AVANT acquired VRI, a company engaged in the discovery and development of systems for the delivery of vaccines and immunotherapeutics, and novel vaccines for adults and children. We issued 14,036,400 shares of AVANT's common stock and warrants to purchase 1,811,200 shares of AVANT's common stock in exchange for all of the outstanding common stock of VRI, on the basis of 1.55 shares of our common stock and .20 of an AVANT warrant for each share of VRI common stock. The acquisition has been accounted for as a purchase. Consequently, the purchase price was allocated to the acquired assets and assumed liabilities based upon their fair value at the date of acquisition. The excess of the purchase price over the tangible assets acquired was assigned to collaborative relationships, work force and goodwill and is being amortized on a straight line basis over 12 to 60 months. An allocation of $44,630,000 was made to in-process research and development ("IPR&D") which represented purchased in-process technology which had not yet reached technological feasibility and had no alternative future use. The amount was charged as an expense in our financial statements during the third quarter of 1998.

As of the date of acquisition, VRI was engaged in the following six significant research and development projects:

1. Adjumer(R) -- a vaccine delivery system being developed with a collaborator, Aventis, as an adjuvant to enhance the immune response to injected vaccines.
2. Micromer(R) -- a vaccine delivery system designed to facilitate the mucosal (intranasal or oral) delivery of antigens and stimulate both the systemic and mucosal branches of the immune system.
3. Vibrio Vec(TM)-- a vaccine and immunotherapeutic system that uses a \ bacterial vector for the oral delivery of antigens.
4. Rotavirus vaccine -- a vaccine against rotavirus infection being developed with a collaborator, SmithKline.

5. Herpes vaccine - a vaccine for the prevention of genital herpes.
6. Therapore(TM) - a novel technology for the development of immunotherapeutics.

As of the acquisition date, the IPR&D value assigned to each project, the estimated cost to reach technological feasibility and the projected product release date was as set forth below:

Project	Adjumer(R)	Micromer(R)	Vibrio Vec(TM)	Rotavirus	Herpes	Therapore(TM)
Value Assigned	$15,450,000	$ 3,260,000	$ 2,450,000	$ 3,120,000	$ 2,240,000	$18,110,000
Estimated Cost to Complete	$ 9,500,000	$ 3,300,000	$ 900,000	$ 1,200,000	$ 1,600,000	$41,200,000
Estimated Project Release Date	2001-2004	2002-2004	2003	2002	2007	2004

As of December 31, 1999, technological feasibility had not yet been reached on any of the major projects acquired, and no significant departures from the assumptions included in the valuation analysis had occurred. Substantial additional research and development will be required prior to reaching technological feasibility. In addition, each project will need to successfully complete a series of clinical trials and will need to receive Food & Drug Administration ("FDA") approval prior to commercialization. There can be no assurance these projects will ever reach feasibility or develop into products that can be marketed profitably, nor can there be assurance that AVANT and our collaborators will be able to develop and commercialize these products before our competitors. If these products are not successfully developed and do not become commercially viable, our financial condition and results of operations could be harmed.

The acquisition of VRI represents the only purchase of historical IPR&D by AVANT. As of December 31, 1999, we have no immediate plans to acquire additional IPR&D, although we expect to raise additional capital, as required, through licensing of technology programs with existing or new collaborative partners, possible business combinations, or issuance of common stock via private placement and public offering.

NEW DEVELOPMENTS

Positive Phase I/II results of AVANT's lead drug candidate, TP10, in patients undergoing lung transplantation were presented in April 1998. Results in these patients showed that TP10 therapy appears safe and well tolerated and demonstrated significant efficacy. TP10 is our product name for sCR1, a therapeutic compound which inhibits the complement system, a key triggering mechanism for the inflammatory response. In 1997, we entered into an agreement with Novartis relating to the development of TP10 for use in xenotransplantation (animal organs into humans) and allotransplantation (human organs into humans). We granted Novartis a two-year option to license TP10 with exclusive worldwide marketing rights (except Japan) in the fields of xenotransplantation and allotransplantation. We received our second option fee payment in November 1998 which initiated year two of the option agreement. In July 1999, Novartis exercised its option to license TP10 for use in the field of transplantation. In December 1999, the Novartis agreement was amended to include marketing rights for Japan. The decision to license TP10 resulted in a $6 million equity investment and license payment by Novartis which was received by AVANT in January 2000. Under the agreement, we may receive additional milestone payments of up to $14 million upon attainment of certain development and regulatory goals. We will also be entitled to royalties on product sales under the agreement.

In September 1999, we initiated an open-label, Phase I/II trial of TP10 in infants undergoing cardiac surgery for congenital heart defects. The trial will evaluate the ability of TP10 to mitigate the injury to the heart and other organs that occurs when patients are placed on cardiopulmonary bypass circuits.

In August 1998, AVANT announced positive results of our Phase II efficacy study of our vaccine for the prevention of rotavirus disease in infants. Rotavirus is a major cause of acute diarrhea and dehydration in infants for which there are currently no approved vaccines, although several are under development. The rotavirus vaccine is being developed and commercialized in collaboration with SmithKline. Following successful completion of the Phase II trial, SmithKline has assumed responsibility for and funds all subsequent clinical and other development activities. In June 1999, we received

a milestone payment of $500,000 for the successful completion of the Phase II clinical efficacy study and the establishment of a commercially viable process for manufacture of the vaccine. We will be entitled to receive additional milestone payments and royalties on vaccine sales under the agreement which grants SmithKline exclusive worldwide marketing rights to the rotavirus vaccine.

AVANT is a party to two license agreements with Aventis pursuant to which Aventis has been granted the exclusive and co-exclusive right (exclusive, except for the right of AVANT or one other person licensed by AVANT) to make, use and sell certain of our vaccines. We received a milestone payment of $600,000 from our collaborator Aventis in the fourth quarter of 1998. The milestone payment relates to a Phase I clinical trial using our Adjumer(R)-formulated RSV vaccine initiated by Aventis in 1998.

Based on encouraging results from a Phase I clinical trial of the humanized monoclonal antibody, ATM-027, in patients with multiple sclerosis, our collaborator Astra initiated a Phase II clinical trial for ATM-027 in patients with multiple sclerosis in 1998. ATM-027 is one of the products derived from our T cell antigen receptor (TCAR) program, now under development by Astra. In December 1999, we announced results of the Phase II study of ATM-027 which showed that ATM-027 was safe and well tolerated, however, in the view of Astra the reduction of disease activity in the study population did not reach a level that would be of value for those patients. Therefore, Astra made the decision to stop further development of ATM-027 for multiple sclerosis but is reviewing development of the TCAR peptide as a vaccine for multiple sclerosis under the terms of the TCAR agreement.

RESULTS OF OPERATIONS

FISCAL YEAR ENDED DECEMBER 31, 1999 COMPARED WITH FISCAL YEAR ENDED DECEMBER 31, 1998

AVANT reported a net loss of $11,309,100, or $0.26 per share, for the year ended December 31, 1999, compared to a net loss of $51,799,700, or $1.56 per share, for the year ended December 31, 1998. The net loss for the year ended December 31, 1998, includes a charge of $44,630,000 for purchased in-process research and development related to the acquisition of VRI in August 1998. Excluding the charge for purchased in-process research and development in 1998, the net loss for 1999 increased 57.7% to $11,309,100, or $0.26 per share, compared to a net loss of $7,169,700, or $0.22 per share, for 1998. The weighted average common shares outstanding used to calculate the net loss per common share was 44,076,400 in 1999 and 33,177,200 in 1998.

OPERATING REVENUE

Total operating revenue decreased $666,900, or 31.0%, to $1,483,500 in 1999 from $2,150,400 in 1998.

Product development and licensing revenue decreased $611,000, or 29.2%, to $1,483,500 in 1999 from $2,094,500 in 1998. Product development and licensing revenue in 1999 consisted primarily of a $750,000 nonrefundable option fee associated with our agreement with Novartis, a milestone payment of $500,000 from SmithKline and $193,500 received in connection with our SBIR grants. In 1998, we recognized $1,000,000 of a nonrefundable option fee from Novartis in product development and licensing revenue, milestone payments totaling $600,000 from Aventis and $494,500 received in connection with our SBIR grants.

There were no product sales recorded in 1999. Product sales for 1998 totaled $55,900 and were derived from sales of our TRAx(R) test kits. In August 1999, AVANT sold the TRAx(R) line of diagnostic products and the TRAx(R) technology.

OPERATING EXPENSE

Total operating expense for 1999 was $13,427,800 compared to $54,544,300 for 1998. Operating expense for 1998 included a charge of $44,630,000 for purchased in-process research and development in connection with the acquisition of VRI in August 1998. Excluding the purchased in-process research and development charge in 1998, operating expense increased $3,513,500, or 35.4%, to $13,427,800 for 1999 compared to $9,914,300 for 1998. The increase in total operating expense for 1999 compared to 1998 is primarily due to: (i) a full year of operations of VRI in 1999 versus four months in 1998, combined with an increase of goodwill amortization expense of $729,400; (ii) an increase in clinical trials cost; and (iii) an increase in expense associated with the manufacture of clinical materials for AVANT-funded clinical studies.

Research and development expense increased $2,168,700, or 38.0%, to $7,871,800 in 1999 from $5,703,100 in 1998. The increase in 1999 compared to 1998 is primarily due to a full year of operations of VRI in 1999 versus four months in 1998, costs associated with conducting the Phase I clinical trial of CETi-1 vaccine and the Phase I/II clinical trial of TP10, both ongoing in 1999, and an increase in expense associated with the manufacture of clinical materials.

General and administrative expense increased $472,100, or 12.4%, to $4,280,200 in 1999 compared to $3,808,100 in 1998. Included in general and administrative expense in 1999 and 1998 are charges of $105,900 and $294,500 for the write-off of certain capitalized patent costs associated with our SMIR program and our TRAx(R) technology, respectively. Excluding the writeoff of patent costs in 1999 and 1998, general and administrative expense increased $660,700, or 18.8%, to $4,174,300 for 1999 compared to $3,513,600 for 1998. The increase in 1999 compared to 1998 is primarily due to a full year of operations of VRI in 1999 versus four months in 1998.

NON-OPERATING INCOME, NET

Non-operating income, net increased $41,000, or 6.9%, to $635,200 for 1999 compared to $594,200 in 1998. Interest income increased $63,300, or 11.1%, to $635,200 for 1999 compared to $571,900 for 1998. The increase in interest income is primarily due to higher average cash balances in 1999.

FISCAL YEAR ENDED DECEMBER 31, 1998 COMPARED WITH FISCAL YEAR ENDED DECEMBER 31, 1997

AVANT reported a net loss of $51,799,700, or $1.56 per share, for the year ended December 31, 1998, compared to a net loss of $13,108,000, or $0.52 per share, for the year ended December 31, 1997. The net loss for the year ended December 31, 1998, includes a charge of $44,630,000 for purchased in-process research and development related to the acquisition of VRI in August 1998. The net loss for the year ended December 31, 1997 includes a charge of $6,108,800 for the settlement of litigation with our former landlord and the landlord's mortgagee. Excluding the charge for purchased in-process research and development in 1998 and the charge for the settlement of our litigation in 1997, the net loss for 1998 increased 2.4% to $7,169,700, or $0.22 per share, compared to $6,999,200, or $0.28 per share, for 1997. The weighted average common shares outstanding used to calculate the net loss per common share was 33,177,200 in 1998 and 25,139,900 in 1997.

OPERATING REVENUE

Total operating revenue increased $958,300, or 80.4%, to $2,150,400 in 1998 from $1,192,100 in 1997.

Product development and licensing revenue increased $946,900 in 1998, or 82.5%, to $2,094,500 from $1,147,600 in 1997. Product development and licensing revenue in 1998 consisted primarily of a $1,000,000 nonrefundable option fee associated with our agreement with Novartis, a milestone payment of $600,000 from Aventis and $494,500 received in connection with our SBIR grants. In 1997, we recognized $250,000 of a nonrefundable option fee from Novartis in product development and licensing revenue, milestone payments totaling $650,000 from Astra and $247,600 received in connection with our SBIR grants.

Product sales for 1998 and 1997 totaled $55,900 and $44,500, respectively, and were derived from sales of our TRAx(R) test kits.

OPERATING EXPENSE

Operating expense of $54,544,300 for 1998 included a charge of $44,630,000 for purchased in-process research and development in connection with the acquisition of VRI in August 1998. In May 1998, we used cash as collateral for a $750,000 note due November 15, 1999 issued in connection with a settlement agreement with its former landlord and the landlord's mortgagee. In accordance with the settlement agreement, 66,250 shares of our common stock issued to secure the note were returned to AVANT. The common stock was valued at $165,600 as of October 31, 1997 and its return is included as a reduction of operating expense in 1998. Operating expense of $14,859,600 for 1997 included a charge of $6,108,800 for the settlement of litigation with our former landlord and the landlord's mortgagee. Excluding the purchased in-process research and development charge in 1998 and the legal settlement in 1997, operating expense increased $1,163,500, or 13.3%, to $9,914,300 for 1998 compared to $8,750,800 for 1997. The increase in operating

expense for 1998 compared to 1997 is primarily due to four months of operations of VRI combined with goodwill amortization expense of $546,400 and the write-off of certain capitalized patent costs relating to our TRAx(R) technology.

Research and development expense increased $446,200, or 8.5%, to $5,703,100 in 1998 from $5,256,900 in 1997. The increase in 1998 compared to 1997 is primarily due to four months of operations of VRI, partially offset by costs associated with Phase I and Phase I/II clinical trials of TP10 ongoing in 1997.

General and administrative expense increased $335,200, or 9.7%, to $3,808,100 in 1998 compared to $3,472,900 in 1997. Included in general and administrative expense in 1998 is a charge of $294,500 for the write-off of certain capitalized patent costs associated with our TRAx(R) technology. Reductions in legal costs in 1998 primarily due to the settlement of litigation in 1997 and lower consulting costs in 1998 compared to 1997 were offset by certain general and administrative costs associated with four months of operations of VRI.

NON-OPERATING INCOME, NET

Non-operating income, net increased $34,700, or 6.2%, to $594,200 for 1998 compared to $559,500 in 1997. Interest income decreased $5,400, or 0.9%, to $571,900 for 1998 compared to $577,300 for 1997. The reductions in interest income are primarily due to lower cash balances combined with lower interest rates in 1998.

LIQUIDITY AND CAPITAL RESOURCES

AVANT's cash, cash equivalents and marketable securities at December 31, 1999 was $13,619,000 compared to $13,840,300 at December 31, 1998. Cash used in operations was $8,539,100 in 1999 compared to $8,852,000 in 1998 and $7,695,400 in 1997.

In July 1999, Novartis exercised its option to license TP10 for use in the field of transplantation. The decision to license TP10 resulted in a $6 million payment by Novartis which was received by AVANT in January 2000.

In September 1999, we completed a private placement of 5,459,400 shares of common stock to institutional investors at a price of $1.92 per share. Net proceeds from the common stock issuance totaled approximately $9,838,900. In March 1998, we completed a private placement of 2,043,500 shares of common stock to institutional investors at a price of $1.90 per share. Net proceeds from the common stock issuance totaled approximately $3,699,800.

In November 1997, AVANT reached a settlement of the litigation with our former landlord and the landlord's mortgagee. As part of the settlement, we agreed to pay $858,800 in cash on November 17, 1997 and issue a total of 1,500,000 shares of our common stock. In addition, we signed a note for $750,000, due on November 16, 1998 secured by $750,000 cash and a note for $750,000 due November 15, 1999 secured by 132,500 shares of common stock. The total settlement, valued at $6,108,800, is comprised of the cash and notes totaling $2,358,800 and common stock valued at $3,750,000 as of October 31, 1997. The common stock is subject to restrictions on transfer in accordance with the settlement agreement and limits the number of shares that may be sold over a given period of time. In May 1998, in accordance with the settlement agreement, we elected to secure the note for $750,000 due November 15, 1999 by $750,000 cash in exchange for the return of 66,250 shares or one half of the common stock originally used to secure the note. The cash collateral is recorded as short-term restricted cash at December 31, 1998. In November 1999, the note was paid in full.

During 1994, we entered into an agreement providing AVANT with the right to lease up to $2,000,000 of equipment for up to a five-year term. The lease arrangement contains certain restrictive covenants, determined at the end of each fiscal quarter which, for the quarter ended September 30, 1995 included a minimum cash, cash equivalents and short-term investments balance of $10,000,000. At September 30, 1995 our cash, cash equivalents and short-term investment balance was below $10,000,000. As a result, in accordance with the lease agreement, we pledged as collateral cash equal to the amount outstanding on the lease which is to remain in a certificate of deposit until the end of the lease, or as otherwise agreed by the lessor and AVANT. At December 31, 1999, we had $217,000 pledged as collateral recorded as long-term restricted cash.

AVANT believes that cash inflows from existing collaborations, interest income on invested funds and our current cash and cash equivalents, net of restricted amounts, will be sufficient to meet estimated working capital requirements and fund operations beyond December 31, 2000 and into the first half of 2001. The working capital requirements of AVANT are dependent on several factors including, but not limited to, the costs associated with research and development programs, preclinical and clinical studies and the scope of collaborative arrangements. During 2000, we expect to take steps to raise

additional capital including, but not limited to, licensing of technology programs with existing or new collaborative partners, possible business combinations, or issuance of common stock via private placement and public offering.

THE STATEMENTS IN THE FOLLOWING SECTION INCLUDE THE "YEAR 2000 READINESS DISCLOSURE" WITHIN THE MEANING OF THE YEAR 2000 INFORMATION AND READINESS DISCLOSURE ACT.

YEAR 2000

The "Year 2000" issue affects computer systems that have date sensitive programs that may not properly recognize the year 2000. Systems that do not properly recognize such information could generate data or cause a system to fail, resulting in business interruption. Through the first ten weeks of the year 2000, AVANT's operations are fully functioning and have not experienced any significant issues associated with the Year 2000 problem discussed above. Costs associated with modifications made by AVANT to be Year 2000 compliant were immaterial. There can be no assurance, however, that a failure by another company's system to be Year 2000 compliant would not have a material adverse affect on our business, operating results and financial condition.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

REPORT OF INDEPENDENT ACCOUNTANTS

To The Board of Directors and Shareholders of
AVANT Immunotherapeutics, Inc.

In our opinion, the accompanying consolidated balance sheets and the related consolidated statements of income and of cash flows present fairly, in all material respects, the financial position of AVANT Immunotherapeutics, Inc. and its subsidiaries at December 31, 1999 and 1998, and the results of their operations and their cash flows for each of the three years in the period ended December 31, 1999, in conformity with accounting principles generally accepted in the United States. These financial statements are the responsibility of the Company's management; our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits of these statements in accordance with auditing standards generally accepted in the United States, which require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for the opinion expressed above.

PricewaterhouseCoopers LLP
Boston, Massachusetts
February 14, 1999

CONSOLIDATED BALANCE SHEET

	DECEMBER 31, 1999	DECEMBER 31, 1998
ASSETS		
Current Assets:		
Cash and Cash Equivalents	$ 13,619,000	$ 8,937,200
Marketable Securities	--	4,903,100
Current Portion Restricted Cash	--	750,000
Current Portion Lease Receivable	431,700	395,700
Prepaid and Other Current Assets, Net	439,000	629,700
Total Current Assets	14,489,700	15,615,700
Property and Equipment, Net	1,256,800	1,111,400
Restricted Cash	217,000	365,000
Long-Term Lease Receivable	395,700	827,300
Other Assets	3,523,500	4,730,700
Total Assets	$ 19,882,700	$ 22,650,100
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current Liabilities:		
Accounts Payable	$ 575,300	$ 363,700
Accrued Expenses	1,331,500	1,184,700
Deferred Revenue	--	750,000
Short-Term Note Payable	--	750,000
Current Portion Lease Payable	293,700	269,200
Total Current Liabilities	2,200,500	3,317,600
Long-Term Lease Payable	269,200	562,900
Commitments and Contingent Liabilities (Notes 3 and 13)		
Stockholders' Equity:		
Common Stock, $.001 Par Value 75,000,000 Shares Authorized; 48,127,400 Issued and Outstanding at December 31, 1999; 42,512,400 Issued and 42,508,600 Outstanding at December 31, 1998	48,100	42,500
Additional Paid-In Capital	150,710,300	140,777,200
Less: 0 and 3,800 Common Treasury Shares at Cost at December 31, 1999 and 1998, respectively	--	(13,800)
Accumulated Deficit	(133,345,400)	(122,036,300)
Total Stockholders' Equity	17,413,000	18,769,600
Total Liabilities and Stockholders' Equity	$ 19,882,700	$ 22,650,100

The accompanying notes are an integral part of the consolidated financial statements.

CONSOLIDATED STATEMENT OF OPERATIONS

	YEAR ENDED DECEMBER 31, 1999	YEAR ENDED DECEMBER 31, 1998	YEAR ENDED DECEMBER 31, 1997
OPERATING REVENUE:			
Product Development and Licensing Agreements	$ 1,483,500	$ 2,094,500	$ 1,147,600
Product Sales	--	55,900	44,500
Total Operating Revenue	1,483,500	2,150,400	1,192,100
OPERATING EXPENSE:			
Research and Development	7,871,800	5,703,100	5,256,900
General and Administrative	4,280,200	3,808,100	3,472,900
Cost of Product Sales	--	22,300	21,000
Charge for Purchased In-Process Research & Development	--	44,630,000	--
Legal Settlement	--	(165,600)	6,108,800
Amortization of Goodwill	1,275,800	546,400	--
Total Operating Expense	13,427,800	54,544,300	14,859,600
Operating Loss	(11,944,300)	(52,393,900)	(13,667,500)
Non-Operating Income, Net	635,200	594,200	559,500
Net Loss	$ (11,309,100)	$ (51,799,700)	$ (13,108,000)
Basic and Diluted Net Loss Per Common Share	$ (0.26)	$ (1.56)	$ (0.52)
Weighted Average Common Shares Outstanding	44,076,400	33,177,200	25,139,900

The accompanying notes are an integral part of the consolidated financial statements.

CONSOLIDATED STATEMENT OF STOCKHOLDERS' EQUITY
FOR THE YEARS ENDED DECEMBER 31, 1999, 1998 AND 1997

	Shares	Common Stock Par Value	Additional Paid-In Capital	Treasury Stock Cost	Accumulated Deficit	Total Stockholders' Equity
BALANCE AT DECEMBER 31, 1996	24,965,400	$ 25,000	$ 72,791,800	$(69,000)	$ (57,128,600)	$15,619,200
Issuance at $1.81 to $2.13 per Share upon Exercise of Stock Options	12,000	--	22,400	--	--	22,400
Employee Stock Purchase Plan Issuance at $1.38 and $1.39 per Share	--	--	(20,700)	33,200	--	12,500
Issuance at $2.50 per Share for Settlement of Litigation	1,500,000	1,500	3,748,500	--	--	3,750,000
Compensation Expense Associated with Issuance at $1.94 per Share	10,000	--	19,400	--	--	19,400
Net Loss for the Year Ended December 31, 1997	--	--	--	--	(13,108,000)	(13,108,000)
BALANCE AT DECEMBER 31, 1997	26,487,400	$ 26,500	$ 76,561,400	$(35,800)	$ (70,236,600)	$ 6,315,500
Issuance at $0.60 to $1.81 per Share upon Exercise of Stock Options	11,400	--	15,300	--	--	15,300
Employee Stock Purchase Plan Issuance at $1.65 and $1.94 per Share	--	--	(10,700)	22,000	--	11,300
Returned Shares from Settlement of Litigation at $2.50 per Share	(66,300)	--	(165,600)	--	--	(165,600)
Net Proceeds from Stock Issuance	2,043,500	2,000	3,697,800	--	--	3,699,800
Share Issued for Acquisition of Virus Research Institute, Inc.	14,036,400	14,000	60,679,000	--	--	60,693,000
Net Loss for the Year Ended December 31, 1998	--	--	--	--	(51,799,700)	(51,799,700)
BALANCE AT DECEMBER 31, 1998	42,512,400	$ 42,500	$ 140,777,200	$(13,800)	$(122,036,300)	$18,769,600
Issuance at $0.10 to $1.81 per Share upon Exercise of Stock Options	152,100	100	102,000	--	--	102,100
Employee Stock Purchase Plan Issuance at $1.46 to $1.78 per Share	3,500	--	(2,200)	13,800	--	11,600
Net Proceeds from Stock Issuance	5,459,400	5,500	9,833,300	--	--	9,838,800
Net Loss for the Year Ended December 31, 1999	--	--	--	--	(11,309,100)	(11,309,100)
BALANCE AT DECEMBER 31, 1999	48,127,400	$ 48,100	$ 150,710,300	$ --	$(133,345,400)	$17,413,000

The accompanying notes are an integral part of the consolidated financial statements.

CONSOLIDATED STATEMENT OF CASH FLOWS

Increase (Decrease) in Cash and Cash Equivalents	YEAR ENDED DECEMBER 31, 1999	YEAR ENDED DECEMBER 31, 1998	YEAR ENDED DECEMBER 31, 1997
CASH FLOWS FROM OPERATING ACTIVITIES:			
Net Loss	$ (11,309,100)	$ (51,799,700)	$ (13,108,000)
Adjustments to Reconcile Net Loss to Cash Used by Operating Activities:			
Depreciation and Amortization	1,988,600	989,800	353,800
Write-off of Capitalized Patent Costs	105,900	337,000	51,100
Non-Cash Portion of Litigation Settlement	--	(165,600)	5,250,000
Compensation Expense Associated with Stock Issuance	--	--	19,400
Gain on Sale of Equipment	--	(22,300)	--
Charge for Purchased In-Process Research and Development	--	44,630,000	--
Changes in Assets and Liabilities, Net of Acquisition:			
Current Portion Restricted Cash	750,000	--	(750,000)
Prepaid and Other Current Assets	190,700	(1,529,900)	81,700
Accounts Payable and Accrued Expenses	358,400	(1,291,300)	(343,400)
Deferred Revenue	(750,000)	--	750,000
Lease Receivable	395,600	--	--
Lease Payable	(269,200)	--	--
Net Cash Used by Operating Activities	(8,539,100)	(8,852,000)	(7,695,400)
CASH FLOWS FROM INVESTING ACTIVITIES:			
Acquisition of Property and Equipment	(688,500)	(294,800)	(76,900)
Proceeds from the Sale of Equipment	--	25,200	--
Redemption of Marketable Securities	4,903,100	4,463,000	--
Increase in Patents and Licenses	(344,200)	(426,000)	(381,200)
Decrease in Long-Term Restricted Cash, Net	148,000	160,000	160,000
Cash Received from Acquisition of Virus Research Institute, Inc.	--	4,391,500	--
Payment of Notes Payable	(750,000)	(750,000)	--
Payment Received on Convertible Note Receivable	--	--	1,802,700
Other	--	57,600	400
Net Cash Provided by Investing Activities	3,268,400	7,626,500	1,505,000
CASH FLOWS FROM FINANCING ACTIVITIES:			
Net Proceeds from Stock Issuance	9,850,400	3,711,100	12,500
Proceeds from Exercise of Stock Options	102,100	15,300	22,400
Net Cash Provided by Financing Activities	9,952,500	3,726,400	34,900
Increase (Decrease) in Cash and Cash Equivalents	4,681,800	2,500,900	(6,155,500)
Cash and Cash Equivalents at Beginning of Period	8,937,200	6,436,300	12,591,800
Cash and Cash Equivalents at End of Period	$ 13,619,000	$ 8,937,200	$ 6,436,300

The accompanying notes are an integral part of the consolidated financial statements.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
YEARS ENDED DECEMBER 31, 1999, 1998 and 1997

1. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

(A) NATURE OF BUSINESS

AVANT Immunotherapeutics, Inc. ("AVANT") is a biopharmaceutical company engaged in the discovery, development and commercialization of products that harness the human immune response to prevent and treat disease. We develop and commercialize products on a proprietary basis and in collaboration with established pharmaceutical partners, including Novartis Pharma AG, AstraZeneca plc, Yamanouchi Pharmaceutical Co., Ltd., Aventis Pasteur, SmithKline Beecham plc and Heska Corporation.

In September 1999, we completed a private placement of 5,459,400 shares of common stock to institutional investors at a price of $1.92 per share. Net proceeds from the common stock issuance totaled approximately $9,838,800. In March 1998, we completed a private placement of 2,043,500 shares of common stock to institutional investors at a price of $1.90 per share. Net proceeds from the common stock issuance totaled approximately $3,699,800. On August 21, 1998, AVANT acquired all of the outstanding capital stock of Virus Research Institute, Inc. ("VRI"), a company engaged in the discovery and development of (i) systems for the delivery of vaccines and immunotherapeutics and (ii) novel vaccines (see Note 14).

AVANT's cash and cash equivalents at December 31, 1999 was $13,619,000. Our working capital at December 31, 1999 was $12,289,200. We incurred a loss of $11,309,100 for the year ended December 31, 1999. AVANT believes that cash inflows from existing grants and collaborations, interest income on invested funds and our current cash, cash equivalents, and marketable securities will be sufficient to meet estimated working capital requirements and fund operations beyond December 31, 2000. The working capital requirements of AVANT are dependent on several factors including, but not limited to, the costs associated with research and development programs, preclinical and clinical studies and the scope of collaborative arrangements. During 2000, we expect to take steps to raise additional capital including, but not limited to, licensing of technology programs with existing or new collaborative partners, possible business combinations, or issuance of common stock via private placement and public offering. There can be no assurances that such efforts will be successful.

In July 1999, Novartis exercised its option to license TP10 for use in the field of transplantation. The decision to license TP10 resulted in a $6 million payment by Novartis which was received by AVANT in January 2000. The payment included an equity investment of $2,307,700 for 1,439,496 shares of our common stock at $1.60 per share and a license fee of $3,692,300.

In March 1996, we sold substantially all of the assets of our wholly-owned subsidiary, T Cell Diagnostics, Inc while retaining all rights to the TRAx(R) product franchise. In August 1999, we sold the TRAx(R) line of diagnostic products and the TRAx(R) technology to Innogenetics, Inc. for a combination of cash and future royalty payments.

(B) BASIS OF PRESENTATION

The consolidated financial statements include the accounts of AVANT Immunotherapeutics, Inc. and our wholly owned subsidiary Polmerix, Inc. All intercompany transactions have been eliminated.

(C) CASH EQUIVALENTS AND INVESTMENTS

AVANT considers all highly liquid investments purchased with a maturity of three months or less to be cash equivalents. Short-term investments are those with maturities in excess of three months but less than one year. All cash equivalents and short-term investments have been classified as available for sale and are reported at fair market value with unrealized gains and losses included in stockholders' equity.

In addition to cash equivalents, at December 31, 1998, we had investments in corporate and municipal debt securities that are classified in the balance sheet as held-to-maturity in accordance with the provisions of Statement of Financial Accounting Standards No. 115 ("SFAS 115"), "Accounting for Certain Instruments in Debt and Equity Securities."

Held-to-maturity investments are securities we have the positive intent and ability to hold to maturity. These securities are accounted for at amortized cost, which approximates fair value.

We invest our non-operating cash in debt instruments of financial institutions, government entities and corporations, and mutual funds. We have established guidelines relative to credit ratings, diversification and maturities that maintain safety and liquidity.

(D) FAIR VALUE OF FINANCIAL INSTRUMENTS

AVANT enters into various types of financial instruments in the normal course of business. Fair values for cash, cash equivalents, short-term investments, accounts and notes receivable, accounts and notes payable and accrued expenses approximate carrying value at December 31, 1999 and 1998, due to the nature and the relatively short maturity of these instruments.

(E) REVENUE RECOGNITION

AVANT has entered into various license and development agreements with pharmaceutical and biotechnology companies. Nonrefundable revenue derived from such agreements is recognized over the specified development period as research and development or discovery activities are performed. Cash received in advance of activities being performed is recorded as deferred revenue. Nonrefundable milestone fees are recognized when they are earned in accordance with the performance requirements and contractual terms. Revenues from product sales are recorded when the product is shipped.

(F) RESEARCH AND DEVELOPMENT COSTS

Research and development costs are expensed as incurred.

(G) INVENTORIES

Inventories are stated at the lower of cost or market. Cost is determined using the first-in, first-out (FIFO) method.

(H) PROPERTY AND EQUIPMENT

Property and equipment is stated at cost and depreciated over the estimated useful lives of the related assets using the straight-line method. Laboratory equipment and office furniture and equipment are depreciated over a five year period and computer equipment is depreciated over a three year period. Leasehold improvements are amortized over the shorter of the estimated useful life or the noncancelable term of the related lease.

(I) LICENSES, PATENTS AND TRADEMARKS

Included in other assets are some costs associated with purchased licenses and some costs associated with patents and trademarks which are capitalized and amortized over the shorter of the estimated useful lives or ten years using the straight-line method. We periodically evaluate the recoverability of these assets in accordance with Statement of Financial Accounting Standards No. 121 ("SFAS 121"), "Accounting for the Impairment of Long-Lived Assets and for Long-Lived Assets to be Disposed Of".

(J) LOSS PER SHARE

In February 1997, the Financial Accounting Standards Board issued Statement of Financial Accounting Standards No. 128 ("SFAS 128"), "Earnings per Share", which changed the method of calculating earnings per share. SFAS 128, which we adopted in the fourth quarter of 1997, requires the presentation of "basic" earnings per share and "diluted" earnings per share. As a result of our net loss, both basic and diluted earnings per share are computed by dividing the net loss available to common shareholders by the weighted average number of shares of common stock outstanding.

(K) STOCK COMPENSATION

AVANT's employee stock compensation plans are accounted for in accordance with Accounting Principles Board Opinion No. 25, "Accounting for Stock Issued to Employees." The Company adopted the disclosure requirements of

Statement of Financial Accounting Standards No. 123 ("SFAS 123"), "Accounting for Stock-Based Compensation" (see Note 7).

(L) USE OF ESTIMATES

The preparation of the financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect reported amounts and disclosures. Actual results could differ from those estimates.

2. SHORT-TERM INVESTMENTS AND RESTRICTED CASH

AVANT invests in high quality, short-term investments which are considered highly liquid and are available to support current operations. We also invest in high quality, debt securities which are classified as held-to-maturity. At December 31, 1999 and 1998, our investments that met the definition of cash equivalents were recorded at cost, which approximated fair value.

Pursuant to the terms of the settlement agreement between AVANT and our former landlord, we pledged as collateral $750,000 at December 31, 1998 (see Note 13). We also have $217,000 and $365,000 pledged as collateral at December 31, 1999 and 1998, respectively, in accordance with the terms of an operating lease (see Note 3).

3. PROPERTY, EQUIPMENT AND LEASES

Property and equipment includes the following:

	December 31, 1999	December 31, 1998
Laboratory Equipment	$ 2,595,400	$ 2,480,000
Office Furniture and Equipment	1,176,800	1,148,200
Leasehold Improvements	938,100	393,600
Property and Equipment, Total	4,710,300	4,021,800
Less Accumulated Depreciation and Amortization	(3,453,500)	(2,910,400)
	$ 1,256,800	$ 1,111,400

Depreciation expense related to equipment and leasehold improvements was approximately $543,100, $267,600 and $224,000 for the years ended December 31, 1999, 1998 and 1997, respectively.

In May 1996, we entered into a six-year lease for laboratory and office space in Needham, Massachusetts. The lease replaced two-year lease and sublease agreements entered into in March 1995 for the same location and increased the amount of office and laboratory space available.

In 1994, we entered into a lease agreement providing AVANT with the right to lease up to $2,000,000 of equipment for up to a five-year term. The lease agreement contains specified restrictive covenants determined at the end of each fiscal quarter which, for the quarter ended September 30, 1995, included a minimum cash, cash equivalents and short-term investments balance of $10,000,000. At September 30, 1995 our cash and cash equivalents balance was below $10,000,000. As a result, in accordance with the lease agreement, we pledged cash as collateral to the lessor equal to the amount outstanding on the lease which is to remain in a certificate of deposit until the end of the lease or as otherwise agreed by the lessor and AVANT. We have recorded $217,000 and $365,000 as long-term restricted cash at December 31, 1999 and 1998, respectively.

Obligations for base rent, net of sublease income, under these and other noncancelable operating leases as of December 31, 1999 are approximately as follows:

Year ending December 31,	2000	$ 741,200
	2001	709,200
	2002	252,100
	Total minimum lease payments	$ 1,702,500

Our total rent for all operating leases (including rent expense net of sublease income) was approximately $804,900, $909,500 and $851,400 for the years ended December 31, 1999, 1998 and 1997, respectively.

4. OTHER ASSETS

Other assets include the following:

	DECEMBER 31, 1999	DECEMBER 31, 1998
Capitalized Patent Costs	$ 2,101,300	$ 1,890,300
Accumulated Amortization	(715,300)	(595,500)
Capitalized Patent Costs, Net	1,386,000	1,294,800
Goodwill and Other Intangible Assets, Net of Accumulated Amortization of $1,822,200 and $546,400	2,013,500	3,289,300
Other Non Current Assets	124,000	146,600
	$ 3,523,500	$ 4,730,700

In December 1999 and 1998, in accordance with SFAS 121, we evaluated and subsequently wrote off approximately $105,900 and $294,500 of capitalized patent costs relating to our SMIR program and our TRAx(R) test kit program, respectively. These writeoffs were included in operating expense as general and administrative expense for the years ended December 31, 1999 and 1998.

Amortization expense for the years ended December 31, 1999, 1998 and 1997 relating to the capitalized costs of purchased licenses, patents and trademarks was approximately $169,700, $175,800 and $129,800, respectively. Goodwill amortization expense for the years ended December 31, 1999 and 1998 was approximately $1,275,800 and $546,400, respectively.

5. ACCRUED EXPENSES

Accrued expenses include the following:

	DECEMBER 31, 1999	DECEMBER 31, 1998
Accrued License Fees	$ 8,300	$ 60,000
Accrued Payroll and Employee Benefits	333,200	258,700
Accrued Clinical Trials	409,200	195,500
Accrued Legal	138,100	263,800
Other Accrued Expenses	442,700	406,700
	$ 1,331,500	$ 1,184,700

6. INCOME TAXES

	YEAR ENDED DECEMBER 31, 1999	1998	1997
Income tax benefit:			
Federal	$ 3,628,500	$ 17,640,500	$ 4,539,100
State	189,000	3,141,500	529,000
	3,817,500	20,782,000	5,068,100
Deferred tax assets valuation allowance	(3,817,500)	(20,782,000)	(5,068,100)
	$ --	$ --	$ --

Deferred tax assets are comprised of the following:

	December 31, 1999	December 31, 1998
Net Operating Loss Carryforwards	$ 39,851,000	$ 36,821,000
Tax Credit Carryforwards	4,742,000	4,427,000
Other	645,000	172,000
Gross Deferred Tax Assets	45,238,000	41,420,000
Deferred Tax Assets Valuation Allowance	(45,238,000)	(41,420,000)
	$ --	$ --

Reconciliation between the amount of reported income tax expenses and the amount computed using the U.S. Statutory rate of 35% follows:

	1999	1998	1997
Loss at Statutory Rates	$ (3,866,800)	$ (17,612,200)	$ (4,587,800)
Research and Development Credits	(200,000)	(218,700)	(172,100)
State tax benefit, net of federal tax liabilities	(747,200)	(514,000)	(591,500)
Other	438,300	190,400	283,300
Expiration of State NOLS	558,200	170,800	--
In Process R&D	--	15,174,200	--
Benefit of losses and credits not recognized, increase in valuation allowance	3,817,500	2,809,500	5,068,100
	$ --	$ --	$ --

AVANT has provided a full valuation allowance for deferred tax assets as management has concluded that it is more likely than not that we will not recognize any benefits from our net deferred tax asset. The timing and amount of future earnings will depend on numerous factors, including our future profitability. We will assess the need for a valuation allowance as of each balance sheet date based on all available evidence.

At December 31, 1999, we had U.S. net operating loss carryforwards of $104,000,000, U.S. capital loss carryforwards of $1,852,000, and U.S. tax credits of $3,467,000 which expire at various dates through 2019.

Under the Tax Reform Act of 1986, substantial changes in our ownership could result in an annual limitation on the amount of net operating loss carryforwards, research and development tax credits, and capital loss carryforwards which could be utilized.

7. STOCKHOLDERS' EQUITY

(A) PUBLIC AND PRIVATE STOCK OFFERINGS

On September 22, 1999, we completed a private placement of 5,459,400 newly issued shares of common stock. Net proceeds were approximately $9,838,800 after deducting all associated expenses.

On March 24, 1998, we completed a private placement of 2,043,500 newly issued shares of common stock. Net proceeds were approximately $3,699,800 after deducting all associated expenses.

(B) PREFERRED STOCK

At December 31, 1999 and 1998, AVANT had authorized preferred stock comprised of 1,163,102 shares of convertible Class B and 3,000,000 shares of convertible Class C of which 350,000 shares has been designated as Class C-1 Junior Participating Cumulative, the terms of which are to be determined by our Board of Directors. There was no preferred stock outstanding at December 31, 1999 and 1998.

(C) WARRANTS

AVANT has issued warrants to purchase common stock in connection with the acquisition of VRI on August 21, 1998. The warrants are exercisable at $6.00 per share and expire August 22, 2003. In connection with the acquisition of VRI, we also assumed the obligations of VRI with respect to each outstanding warrant to purchase VRI common stock (a "VRI Warrant"). Each VRI Warrant assumed by AVANT, which will continue to have, and be subject to, the terms and conditions of the applicable warrant agreements and warrant certificates, has been adjusted consistent with the ratio at which our common stock was issued in exchange for VRI common stock in the acquisition.

Warrants outstanding at December 31, 1999 are as follows:

Security	Number of Shares	Exercise Price Per Share	Expiration Date
Common stock	35,657	$ .62	February 9, 2004
Common stock	76,842	1.26	December 14, 2005
Common stock	17,050	6.19	April 12, 2001
Common stock	1,811,843	6.00	August 22, 2003

(D) STOCK COMPENSATION AND EMPLOYEE STOCK PURCHASE PLANS

STOCK COMPENSATION

On May 6, 1999, AVANT's 1999 Stock Option and Incentive Plan (the "1999 Plan") was adopted. The 1999 Plan replaces the Amended and Restated 1991 Stock Compensation Plan, which was an amendment and restatement of our 1985 Incentive Option Plan. The 1999 Plan permits the granting of incentive stock options (intended to qualify as such under Section 422A of the Internal Revenue Code of 1986, as amended), non-qualified stock options, stock appreciation rights, performance share units, restricted stock and other awards of restricted stock in lieu of cash bonuses to employees, consultants and outside directors.

The 1999 Plan allows for a maximum of 2,000,000 shares of common stock to be issued prior to May 6, 2009. The Board of Directors determines the term of each option, option price, number of shares for which each option is granted and the rate at which each option vests. All options vested either on the first anniversary date or over a four year period and the term of each option cannot exceed ten years (five years for options granted to holders of more than 10% of the voting stock of AVANT). The exercise price of stock options shall not be less than the fair market value of the common stock at the date of grant (110% of fair market value for options granted to holders of more than 10% of the voting stock of AVANT).

In connection with the acquisition of VRI, we assumed the obligations of VRI under VRI's 1992 Equity Incentive Plan (the "VRI Plan") and each outstanding option to purchase VRI common stock (a "VRI Stock Option") granted under the VRI Plan. Each VRI Stock Option assumed by AVANT is deemed to constitute an option to acquire, on the same terms and conditions as were applicable under the VRI Plan, shares of AVANT's common stock which has been adjusted consistent with the ratio at which our common stock was issued in exchange for VRI's common stock in the acquisition. As of the date the acquisition was completed we assumed options to acquire 1,532,055 shares of our common stock at a weighted average exercise price of $2.34.

EMPLOYEE STOCK PURCHASE PLAN

The 1994 Employee Stock Purchase Plan (the "1994 Plan") was adopted on June 30, 1994. All full time employees of AVANT are eligible to participate in the 1994 Plan. A total of 150,000 shares of common stock are reserved for issuance under this plan. Under the 1994 Plan, each participating employee may contribute up to 15% of his or her compensation to purchase up to 500 shares of common stock per year in any public offering and may withdraw from the offering at any time before stock is purchased. Participation terminates automatically upon termination of employment. The purchase price per share of common stock in an offering is 85% of the lower of its fair market value at the beginning of the offering period or the applicable exercise date.

A summary of stock option activity for the years ended December 31, 1999, 1998 and 1997 is as follows:

	1999		1998		1997	
	Shares	Weighted Average Exercise Price Per Share	Shares	Weighted Average Exercise Price Per Share	Shares	Weighted Average Exercise Price Per Share
Outstanding at January 1,	3,354,708	$ 2.65	1,773,242	$ 3.20	2,303,196	$ 5.94
Granted	557,500	1.60	638,250	1.99	492,750	1.77
Assumed in acquisition	--	--	1,532,055	2.34	--	--
Exercised	(152,056)	0.67	(11,355)	1.34	(12,000)	1.86
Canceled	(621,593)	3.76	(577,484)	2.82	(1,010,704)	8.78
Outstanding at December 31,	3,138,559	$ 2.34	3,354,708	$ 2.65	1,773,242	$ 3.20
At December 31,						
Options exercisable	2,091,562		2,542,950		1,039,437	
Available for grant	2,833,818		1,095,206		1,296,716	
Weighted average fair value of options granted during year		$ 0.83		$ 1.10		$ 0.92

The following tables summarize information about the stock options outstanding at December 31, 1999:

	Options Outstanding		
Range of Exercise Prices	Number Outstanding at December 31, 1999	Weighted Average Remaining Contractual Life	Weighted Average Exercise Price per Share
$ 0.30 - 0.64	556,062	4.46	$ 0.63
0.95 - 1.67	579,477	8.83	1.47
1.81 - 2.06	686,210	8.23	1.91
2.44 - 3.59	720,063	6.41	2.75
3.81 - 7.81	596,747	4.98	4.77
$ 0.30 - 7.81	3,138,559	6.64	$ 2.34

	Options Exercisable	
Range of Exercise Prices	Number Exercisable at December 31, 1999	Weighted Average Exercise Price per Share
$ 0.30 - 0.64	556,062	$ 0.63
0.95 - 1.67	115,291	1.58
1.81 - 2.06	225,711	1.88
2.44 - 3.59	597,751	2.79
3.81 - 7.81	596,747	4.77
$ 0.30 - 7.81	2,091,562	$ 2.62

FAIR VALUE DISCLOSURES

Had compensation costs for AVANT's stock compensation plans been determined based on the fair value at the grant dates, consistent with SFAS 123, our net loss, and net loss per share for the years ending December 31, 1999, 1998 and 1997 would be as follows:

	1999	1998	1997
Net Loss:			
As reported	$ 11,309,100	$ 51,799,700	$ 13,108,000
Pro forma	11,416,700	52,150,800	13,514,100
Basic and Diluted Net Loss Per Share:			
As reported	$ 0.26	$ 1.56	$ 0.52
Pro forma	0.26	1.57	0.54

The fair value of the option grant is estimated on the date of grant using the Black-Scholes option pricing model with the following assumptions:

	1999	1998	1997
Expected dividend yield	0%	0%	0%
Expected stock price volatility	63%	63%	57%
Risk-free interest rate	5.0% - 6.1%	4.5% - 5.6%	5.5% - 6.4%
Expected option term	2.5 Years	2.5 Years	2.7 Years

Because the determination of the fair value of all options granted includes an expected volatility factor in addition to the factors detailed in the table above, and because additional option grants are expected to be made each year, the above pro forma disclosures are not representative of pro forma effects of reported net income for future years.

(E) SHAREHOLDER RIGHTS PLAN

On November 10, 1994, AVANT's Board of Directors declared a dividend of one preferred share purchase right for each share of common stock outstanding. Each right entitles the holder to purchase from AVANT one-one thousandth of a share of Series C-1 Junior Participating Cumulative Preferred Stock (a "Unit"), par value $0.01 at a price of $16.00 per one-one thousandth of a share, subject to specified adjustments. The Units are exercisable only if a person or a group acquires 15% or more of the outstanding common stock of AVANT or commences a tender offer which would result in the ownership of 15% or more of our outstanding common stock. Once a Unit becomes exercisable, the plan allows our shareholders to purchase common stock at a substantial discount. Unless earlier redeemed, the Units expire on November 10, 2004. AVANT is entitled to redeem the Units at $0.01 per Unit subject to adjustment for any stock split, stock dividend or similar transaction.

As of December 31, 1999 and 1998, we have authorized the issuance of 350,000 shares of Series C-1 Junior Participating Cumulative Preferred Stock for use in connection with the shareholder rights plan.

(F) ACQUISITION OF VIRUS RESEARCH INSTITUTE, INC.

AVANT issued 14,036,400 shares of our common stock and warrants to purchase approximately 1,811,200 shares of our common stock on August 21, 1998, in exchange for all of the outstanding common stock of VRI (see Note 14).

8. RESEARCH AND LICENSING AGREEMENTS

AVANT has entered into licensing agreements with several universities and research organizations. Under the terms of these agreements, we have received licenses or options to license technology, specified patents or patent applications. We have made required payments of nonrefundable license fees and royalties which amounted to approximately $221,500, $100,000 and $65,000 for the years ended December 31, 1999, 1998 and 1997, respectively.

9. PRODUCT DEVELOPMENT AND DISTRIBUTION AGREEMENTS

AVANT's product development revenues were received from contracts with different organizations. Total revenue received by us in connection with these contracts for the years ended December 31, 1999, 1998 and 1997 were approximately $1,483,500, $2,094,500 and $1,147,600, respectively. A summary of these contracts follows:

(A) NOVARTIS PHARMA AG

In 1997, we entered into an option agreement with Novartis Pharma AG ("Novartis"), a worldwide pharmaceutical company headquartered in Basel, Switzerland, relating to the development of TP10 for use in xenotransplantation (animal organs into humans) and allotransplantation (human to human). Under the agreement, we received annual option fees and supplies of TP10 for clinical trials in return for granting Novartis a two-year option to license TP10 with exclusive worldwide (except Japan) marketing rights. In July 1999, Novartis exercised its option to license TP10 for use in the field of transplantation. The decision to license TP10 resulted in a $6 million equity investment and license fee payment by Novartis which was received by AVANT in January 2000. Under the agreement, we may receive additional milestone payments based upon attainment of specified development and regulatory goals, which has an approximate aggregate value of up to $14 million. We may also receive funding for research as well as royalty payments on eventual product sales.

(B) SMITHKLINE BEECHAM

During 1997, AVANT entered into an agreement with SmithKline Beecham plc ("SmithKline") to collaborate on the development and commercialization of our oral rotavirus vaccine. Under the terms of the agreement, SmithKline received an exclusive worldwide license to commercialize AVANT's rotavirus vaccine. We were responsible for continuing the Phase II clinical efficacy study of the rotavirus vaccine, which was completed in August 1998. Subject to the development by SmithKline of a viable manufacturing process, SmithKline is required to assume responsibility for all subsequent clinical trials and all other development activities. SmithKline made an initial license payment in 1997 upon execution of the agreement and has agreed to make further payments upon the achievement of specified milestones. In addition, we will be entitled to royalties based on net sales of the rotavirus vaccine. In June 1999, we received a milestone payment of $500,000 from SmithKline for the successful completion of the Phase II clinical efficacy study and the establishment of a commercially viable process for manufacture of the vaccine.

(C) ASTRAZENECA

In 1992, we entered into a product development and distribution agreement with AstraZeneca plc ("Astra"), a worldwide pharmaceutical company headquartered in Sodertalje, Sweden, for the joint development and marketing of therapeutic products using our proprietary T cell antigen receptor ("TCAR") technology. The products developed exclusively and jointly with Astra were monoclonal antibodies and protein-derived immunomodulators that may have efficacy in treating autoimmune diseases such as multiple sclerosis, Crohn's disease, and rheumatoid arthritis.

In 1996, we suspended further internal funding of the research and development of the TCAR program and further amended our agreement with Astra to transfer some of our rights to the TCAR technology to Astra in addition to sole responsibility for further development and commercialization of the TCAR technology. Under the amended agreement, we received an initial signing fee of $100,000 and could receive future milestone and royalty payments upon Astra's successful development and commercialization of the TCAR technology. In 1997, we recognized revenue from milestone payments from Astra of $650,000. In December 1999, we announced results of a Phase II study of the TCAR monoclonal antibody (ATM-027) being developed by Astra for the treatment of multiple sclerosis. The results showed that ATM-027 was safe and well tolerated, however, in the view of Astra, the reduction of disease activity in the study population did not reach a level that would be of value for those patients. Therefore, Astra made the decision to stop further development of ATM-027 for multiple sclerosis but is reviewing development of the TCAR peptide as a vaccine for multiple sclerosis under the terms of the TCAR agreement.

(D) AVENTIS PASTEUR

In 1994, AVANT entered into a license agreement with Aventis Pasteur ("Aventis") which granted Aventis the exclusive right to make, use and sell Adjumer(R)-formulated vaccines for prevention of influenza, Lyme disease and diseases caused by meningococcus and the co-exclusive right (exclusive, except for the right of AVANT or one other person licensed by AVANT) to make, use and sell Adjumer(R)-formulated vaccines directed against five other pathogens, including pneumococcus and RSV. We have retained rights to make, use, sell and license Adjumer(R)-formulated vaccines against the subject infections in most of the Far East, including China and Japan, subject to geographical extension rights available to Aventis. In December 1998, we received a milestone payment of $600,000 from Aventis upon commencement of the first Phase I clinical trial of the Adjumer(R)-formulated vaccine for RSV.

(E) HESKA CORPORATION

In January 1998, AVANT entered into an agreement with Heska Corporation ("Heska") whereby Heska was granted the right to use PCPP in specified animal health vaccines. The agreement provides for the payment of license fees, milestone and royalties based on net sales of PCPP-formulated animal vaccines. In September 1999, we received a payment from Heska for the achievement of a major milestone in efforts to develop and utilize the PCPP polymer as an adjuvant in Heska's animal health vaccine against B. HENSELAE, the bacterium that causes Cat Scratch Disease in humans.

10. NON-OPERATING INCOME

Non-operating income includes the following:

	YEAR ENDED DECEMBER 31, 1999	1998	1997
Interest and Dividend Income	$ 635,200	$ 571,900	$ 577,300
Gain on Sale of Equipment	--	22,300	--
Loss on Sale of Investments	--	--	(17,800)
	$ 635,200	$ 594,200	$ 559,500

11. DEFERRED SAVINGS PLAN

Under section 401(k) of the Internal Revenue Code of 1986, as amended, the Board of Directors adopted, effective May 1990, a tax-qualified deferred compensation plan for employees of AVANT. Participants may make tax deferred contributions up to 15%, or $10,000, of their total salary in 1999. AVANT may, at its discretion, make contributions to the plan each year matching up to 1% of the participant's total annual salary. AVANT contributions amounted to $30,100, $20,100 and $20,600 for the years ended December 31, 1999, 1998 and 1997, respectively.

12. FOREIGN SALES

Product sales were generated geographically as follows:

NET PRODUCT SALES FOR THE TWELVE MONTHS ENDED	EUROPE	USA	ASIA	OTHER	TOTAL
December 31, 1999	$ --	$ --	$ --	$ --	$ --
December 31, 1998	5,000	31,000	--	20,000	56,000
December 31, 1997	5,000	29,000	--	11,000	45,000

13. LITIGATION

In December 1994, AVANT filed a lawsuit in the Superior Court of Massachusetts against the landlord of our former Cambridge, Massachusetts headquarters to recover the damages incurred by AVANT resulting from the evacuation of the building due to air quality problems, which caused skin and respiratory irritation to a significant number of employees. The landlord defendant filed counterclaims, alleging we breached our lease obligations. The court ordered a limited trial between AVANT and the landlord on factual issues which began on November 20, 1996. Closing arguments for the limited trial were heard on January 13, 1997. In a separate lawsuit, the landlord's mortgagee filed claims against AVANT for payment of the same rent alleged to be owed. A motion for summary judgment filed by the bank was denied by the court. In August 1997, the Superior Court of Massachusetts entered findings of fact and conclusions of law on the limited trial of AVANT's lawsuit against the landlord. In its findings, the Court concluded that we had not proved, as alleged by us, that any fireproofing fibers contaminated our space, our space was not uninhabitable because of contamination from fireproofing fibers and we were not justified in terminating its lease on the grounds that our office and laboratories were uninhabitable. In November 1997, AVANT reached a settlement of the litigation with our former landlord and the landlord's mortgagee. We agreed to pay $858,800 in cash on November 17, 1997 and issue a total of

1,500,000 shares of our common stock. In addition, we signed a note for $750,000 payable on November 16, 1998 secured by $750,000 cash collateral and a note for $750,000 due November 15, 1999, secured by 132,500 shares of common stock. The total settlement, valued at $6,108,800, is comprised of the cash and notes totaling $2,358,800 and common stock valued at $3,750,000 as of October 31, 1997 and is included in operating expense for the year ended December 31, 1997. The common stock issued is subject to restrictions on transfer per the settlement agreement. The settlement agreement also provides for specific registration rights for the shares of common stock to become effective no later than September 30, 1998. Upon such registration, however, the settlement agreement limits the number of shares that may be sold over a given period of time.

In May 1998, we used cash as collateral for a $750,000 note due November 15, 1999 issued in connection with a settlement agreement with our former landlord and the landlord's mortgagee. In accordance with the settlement agreement, 66,250 shares of our common stock issued to secure the note were returned to AVANT. The common stock was valued at $165,600 as of October 31, 1997 and its return is included as a reduction of operating expense in 1998. In November 1999, the note was paid in full.

14. ACQUISITION OF VIRUS RESEARCH INSTITUTE, INC.

On August 21, 1998, AVANT acquired all of the outstanding capital stock of VRI, a company engaged in the discovery and development of (i) systems for the delivery of vaccines and immunotherapeutics and (ii) novel vaccines. We issued approximately 14,036,400 shares of AVANT's common stock and warrants to purchase approximately 1,811,200 shares of AVANT's common stock in exchange for all of the outstanding common stock of VRI, on the basis of 1.55 shares of AVANT's common stock and .20 of an AVANT warrant for each share of VRI common stock. The purchase price of $63,004,700 consisted of (i) the issuance of 14,036,400 shares of AVANT common stock valued at $51,686,800 and 1,811,200 AVANT warrants valued at $4,980,700 for all outstanding VRI capital stock, (ii) the issuance of AVANT warrants valued at $387,600 in exchange for all of the outstanding VRI warrants, (iii) the issuance of options to purchase AVANT common stock valued at $3,637,900 for all of the outstanding options to purchase VRI common stock assumed by us, and (iv) severance and transaction costs totaling $2,311,700. As of the date of the acquisition of VRI, the Company had already begun to formulate a plan to assess which activities of VRI to continue and to identify all significant actions to be taken to terminate a number of VRI employees and to relocate the remaining employees from the VRI facility in Cambridge, MA (which was to be closed) to our facility in Needham, MA. The costs associated with this plan, including severance costs of approximately $243,000, were recognized upon consummation of the merger and are included in the $2,311,700 referenced above. The plan was finalized and implemented during 1998 and the first quarter of 1999. Actual costs were not materially different from those accrued at the acquisition date and were paid in 1998 and early 1999.

The acquisition has been accounted for as a purchase. Consequently, the operating results of VRI from the acquisition date have been included in our consolidated results of operations. The purchase price was allocated to the acquired assets and assumed liabilities, based upon their fair value at the date of acquisition, as follows:

Net tangible assets acquired	$ 14,539,000
Intangible assets acquired:	
Work force	470,000
Collaborative relationships	1,090,000
Goodwill	2,275,700
In-process technology	44,630,000
Total	$ 63,004,700

The values assigned to the intangible assets acquired, including the IPR&D, were determined based on fair market value using a risk adjusted discounted cash flow approach. VRI was a development stage biotechnology enterprise and its resources were substantially devoted to research and development at the date of acquisition. Management is responsible for determining the fair value of the acquired IPR&D.

Each of VRI's six research and development projects in-process was valued through detailed analysis of product development data concerning the stage of development, time and resources needed to complete the project, expected income-generating ability and associated risks. The significant assumptions underlying the valuations included potential revenues, costs of completion, the timing of product releases and the selection of an appropriate discount rate. None of VRI's projects have reached technological feasibility nor do they have any alternative future use. Consequently, in accordance with generally accepted accounting principles, the amount allocated to IPR&D was charged as an expense in the AVANT consolidated financial statements for the year ended December 31, 1998. The remaining intangible assets arising from the acquisition are being amortized on a straight line basis over 12 months and 60 months.

A discussion of the in-process research and development projects identified at the time of acquisition follows. The projected costs to complete the projects represent costs to be incurred by AVANT and do not include any costs to be expended by our collaborators. (i) ADJUMER(R) VACCINE DELIVERY SYSTEM. Adjumer(R) is being developed as an adjuvant to enhance the immune response to injected vaccines. AVANT and our collaborator, Aventis, are conducting research on the development of Adjumer(R)-formulated vaccines utilizing a variety of Aventis' antigens, including influenza, lyme disease, pneumococcus, meningococcus, RSV and hepatitis B. As of the acquisition date, with projected release dates ranging from 2001 to 2004, the estimated cost to complete the project for all antigens exceeded $9,500,000. In addition, substantial additional work is required by Aventis prior to commercialization. Discount rates ranging from 42.5% to 47.5% were used in determining the IPR&D value of $15,450,000 which was assigned to the Adjumer(R) vaccine delivery system. (ii) MICROMER(R) VACCINE DELIVERY SYSTEM. Micromer(R) is a proprietary vaccine delivery system designed to facilitate the mucosal (intranasal or oral) delivery of antigens and stimulate both the systemic and mucosal branches of the immune system. AVANT is conducting research on a number of Micromer(R)-formulated vaccines, including influenza and RSV. As of the acquisition date, the estimated cost to complete the development of Micromer(R)-formulated vaccines for influenza and RSV exceeded $3,300,000 with projected release dates of 2002 and 2004, respectively. A discount rate of 45% was utilized in determining the IPR&D value of $3,260,000 which was assigned to Micromer(R). (iii) VIBRIO VEC(TM) VACCINE DELIVERY SYSTEM. Vibrio Vec(TM) is a proprietary vaccine and immunotherapeutic system that uses A bacterial vector for the oral delivery of antigens. AVANT is conducting research on a number of antigens proposed to be delivered by Vibrio Vec(TM), including, in conjunction with our collaborators, Pasteur Merieux-Oravax and CSL, Ltd., a vaccine targeting H. pylori. At the acquisition date, the projected product release date was 2003 and the approximate research and development cost required to complete the Vibrio Vec(TM) project totaled approximately $900,000. A discount rate of 45% was used in determining the IPR&D value of $2,450,000 which was assigned to Vibrio Vec(TM) at the time of acquisition. (iv) ROTAVIRUS VACCINE. A collaboration with SmithKline was established by AVANT to develop and commercialize our novel, proprietary vaccine against rotavirus infection, a major cause of diarrhea and vomiting in infants. At the acquisition date, a project release date was projected of 2002, with $1,200,000 in additional research and development expenditures anticipated. In addition, substantial work is required to be completed by SmithKline prior to commercialization of the rotavirus vaccine. An IPR&D value of $3,120,000 was assigned to the rotavirus vaccine utilizing a discount rate of 45%. (v) HERPES VACCINE. The herpes vaccine is a proprietary vaccine for the prevention of genital herpes ("HSV2"). At the time of acquisition, the vaccine was in a preclinical development stage with a projected product release date of 2007 and an estimated cost to complete of $1,600,000. A discount rate of 45% was utilized in determining the IPR&D value of $2,240,000 which was assigned to the herpes vaccine. (vi) THERAPORE(TM). AVANT was granted an exclusive worldwide license from Harvard for Therapore(TM), a novel technology for the development of immunotherapeutics. We are conducting preclinical research to evaluate this system for the treatment of persistent viral infections, such as Hepatitis B, Hepatitis C and HIV, and some forms of cancer including melanoma. The first release date for a Therapore(TM) product is estimated to be in 2004 and the projected research and development cost to complete all indications of Therapore(TM) approximated $41,200,000 at the acquisition date. A discount rate of 50% was utilized in determining the IPR&D value of $18,110,000 which was assigned to Therapore(TM).

As of December 31, 1999, the technological feasibility of the projects had not yet been reached and no significant departures from the assumptions included in the valuation analysis had occurred. Substantial additional research and development will be required prior to reaching technological feasibility. In addition, each product needs to successfully complete a series of clinical trials and to receive FDA approval prior to commercialization. We are also dependent upon the activities of our collaborators in developing and marketing our products. There can be no assurance that these projects will ever reach feasibility or develop into products that can be marketed profitably, nor can there be assurance

AVANT and our collaborators will be able to develop and commercialize these products before our competitors. If these products are not successfully developed and do not become commercially viable, our financial condition and results of operations could be materially affected.

The following unaudited pro forma financial summary is presented as if the operations of AVANT and VRI were combined as of January 1, 1998 and 1997, respectively. The unaudited pro forma combined results are not necessarily indicative of the actual results that would have occurred had the acquisition been consummated at that date, or of the future operations of the combined entities. Nonrecurring charges, such as the acquired in-process research and development charge of $44,630,000, are not reflected in the following pro forma financial summary.

Year Ended December 31,	1998	1997
Operating Revenue	$ 2,206,500	$ 3,697,600
Net Loss	(13,389,800)	(21,311,500)
Basic and diluted net loss per share	(0.32)	(0.54)

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURES

None.

PART III

ITEM 10. DIRECTORS AND EXECUTIVE OFFICERS OF THE REGISTRANT

The information under the Sections "Proposal 1 - Election of Directors" and "Management" in the Registrant's Proxy Statement for the Annual Meeting of Stockholders to be held on May 8, 2000, is hereby incorporated by reference.

ITEM 11. EXECUTIVE COMPENSATION

The information under the Section "Management" of the Registrant's Proxy Statement for the Annual Meeting of Stockholders to be held on May 8, 2000, is hereby incorporated by reference.

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT

The information under the Section "Beneficial Ownership of Common Stock" of the Registrant's Proxy Statement for the Annual Meeting of Stockholders to be held on May 8, 2000, is hereby incorporated by reference.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS

The information under the Sections "Proposal 1 - Election of Directors" and "Management" of the Registrant's Proxy Statement for the Annual Meeting of Stockholders to be held on May 8, 2000, is hereby incorporated by reference.

PART IV

ITEM 14. EXHIBITS, FINANCIAL STATEMENT SCHEDULES, AND REPORTS ON FORM 8-K

(A) The following documents are filed as part of this Form 10-K:

(1) FINANCIAL STATEMENTS:

See "Index to Consolidated Financial Statements" at Item 8.

(2) FINANCIAL STATEMENT SCHEDULES:

Schedules are omitted since the required information is not applicable or is not present in amounts sufficient to require submission of the schedule, or because the information required is included in the Consolidated Financial Statements or Notes thereto.

(3) EXHIBITS:

No.	Description	Page No.
2.1	Agreement and Plan of Merger, dated as of May 12, 1998, by and among the Company, TC Merger Corp., Virus Research Institute, Inc.	Incorporated by reference to Exhibit 2.1 of the Company's Registration Statement on Form S-4 (Reg. No. 333-59215)
3.1	Third Restated Certificate of Incorporation of the Company	Incorporated by reference to Exhibit 3.1 of the Company's Registration Statement on Form S-4 (Reg. No. 333-59215)
3.2	Certificate of Amendment of Third Restated Certificate of Incorporation of the Company	Incorporated by reference to Exhibit 3.1 of the Company's Registration Statement on Form S-4 (Reg. No. 333-59215)
3.3	Certificate of Designation for series C-1 Junior Participating Cumulative Preferred Stock	Incorporated by reference to Exhibit 3.1 of the Company's Registration Statement on Form S-4 (Reg. No. 333-59215)
3.4	Second Certificate of Amendment of Third Restated Certificate of Incorporation of the Company	Incorporated by reference to Exhibit 3.2 of the Company's Registration Statement on Form S-4 (Reg. No. 333-59215)
3.5	Amended and Restated By-Laws of the Company as of November 10, 1994	Incorporated by reference to Exhibit 3.3 of the Company's Registration Statement on Form S-4 (Reg. No. 333-59215)
4.1	Shareholder Rights Agreement dated November 10, 1994 between the Company and State Street Bank and Trust Company as Rights Agent	Filed herewith
4.2	Form of Stock Purchase Agreement dated March 20, 1998 relating to the Company's private placement of Common Stock	Incorporated by reference to Exhibit 4.1 of the Company's Registration Statement on Form S-3 (Reg. No. 333-56755)
10.1	Amended and Restated 1991 Stock Compensation Plan dated as of April 1, 1995	Incorporated by reference to the Company's Annual Report on Form 10K for the fiscal year ended December 31, 1995
10.2	1994 Employee Stock Purchase Plan	Incorporated by reference to the Company's Registration Statement on Form S-8 filed June 8, 1994
10.3	AVANT Immunotherapeutics, Inc. 1999 Stock Option and Incentive Plan	Incorporated by reference to Exhibit A to the Company's Proxy Statement on Schedule 14A filed on April 1, 1999
10.4	Virus Research Institute, Inc. 1992 Equity Incentive Plan as amended and restated	Filed herewith
10.5	Performance Plan of the Company	Filed herewith
10.6	Form of Agreement relating to Change of Control	Filed herewith
10.7	Termination Agreement between the Company and SmithKline Beecham p.l.c. relating April 7, 1995, portions of which are subject to confidential treatment	Incorporated by reference to the Company's report to sCR1 dated on Form 8-K filed April 27, 1995

10.8	Pledge Agreement between the Company and Fleet Credit Corporation dated October 24, 1995	Incorporated by reference to the Company's report on Form 10-Q for the quarter period ended September 30, 1995
10.9	Amended and Restated Employment Agreement between the Company and Una S. Ryan, Ph.D. dated August 20, 1998.	Incorporated by reference to the Company's Annual Report on Form 10-K for the fiscal year ended December 31, 1998
10.10	Second Amended and Restated Product Development and Distribution Agreement between Astra AB and the Company dated May 1, 1996, portions of which subject to confidential treatment	Incorporated by reference to the Company's Annual Report on Form 10-K for the fiscal year ended December 31, 1996 are
10.11	Commercial Lease Agreement of May 1, 1997 between the Company and Fourth Avenue Ventures Limited	Incorporated by reference to the Company's report on Form 10-Q for the quarterly period ended September 30, 1996
10.12	Option Agreement by and between the Company and Novartis Pharma AG dated as of October 31, 1997, portions of which are subject to confidential treatment	Incorporated by reference to the Company's report on Form 10-Q/A for the quarterly period ended September 30, 1997
10.13	Settlement Agreement between the Company and Forest City 38 Sidney Street, Inc.; Forest City Management, Inc.; and Forest City Enterprises, Inc.	Incorporated by reference to the Company's Annual Report on Form 10-K for the fiscal year ended December 31, 1997
10.14	Lease dated December 1, 1996 between Virus Research institute, Inc. and Moulton Realty Company as amended.	Filed herewith.
10.15	License Agreement dated as of May 1, 1992 between Virus Research Institute, Inc. and the President and Fellows of Harvard College ("Harvard") as amended.	Filed herewith.
10.16	License and Clinical Trials Agreement dated as of February 27, 1995 between Virus Research Institute, Inc. and The James N. Gamble Institute of Medical Research (assigned to Children's Hospital of Cincinnati).	Filed herewith.
10.17 Section	License Agreement dated December 6, 1991 between Virus Research Institute, Inc. and Massachusetts Institute of Technoloby	Filed herewith.
10.18 Section	License Agreement dated as of December 13, 1994 between Virus Research Institute, Inc. and Pasteur Merieux Serums & Vaccins S.A. ("Pasteur Merieux").	Filed herewith.
10.19 Section	License Agreement dated as of August 2, 1995 between Virus Research Institute, Inc. and Pasteur Merieux.	Filed herewith.
10.20 Section	License Agreement dated as of December 1, 1997 between Virus Research Institute, Inc. and SmithKline Beecham PLC.	Filed herewith.
10.21 Section	License Agreement dated as of March 28, 1997 among Virus Research Institute, Inc. and Harvard.	Filed herewith.
21.0	List of Subsidiaries	Filed herewith
23.0	Consent of Independent Accountants	Page 333
27.0	Financial Data Schedule	Page 334

Section Confidential treatment requested.

(B) Reports on Form 8-K.

AVANT did not file any current reports on Form 8-K during the last quarter of the period covered by this Form 10-K.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

AVANT IMMUNOTHERAPEUTICS, INC. Date

by: s/UNA S. RYAN March 15, 2000
Una S. Ryan

President and Chief Executive Officer

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed by the following persons in the capacities and on the dates indicated.

SIGNATURE	TITLE	DATE
s/J. BARRIE WARD (J. Barrie Ward)	Chairman	March 15, 2000
s/UNA S. RYAN (Una S. Ryan)	President, Chief Executive Officer, and Director	March 15, 2000
s/AVERY W. CATLIN (Avery W. Catlin)	Senior Vice President, Chief Financial Officer and Treasurer	March 15, 2000
s/FREDERICK W. KYLE (Frederick W. Kyle)	Director	March 15, 2000
s/JOHN W. LITTLECHILD (John W. Littlechild)	Director	March 15, 2000
s/THOMAS R. OSTERMUELLER (Thomas R. Ostermueller)	Director	March 15, 2000
s/HARRY H. PENNER, JR. (Harry H. Penner, Jr.)	Director	March 15, 2000
s/PETER A. SEARS (Peter A. Sears)	Director	March 15, 2000

Exhibit 4.1

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T CELL SCIENCES, INC.

and

STATE STREET BANK AND TRUST COMPANY,

as Rights Agent

Shareholder Rights Agreement

Dated as of November 10, 1994

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SHAREHOLDER RIGHTS AGREEMENT

Agreement, dated as of November 10, 1994, between T Cell Sciences, Inc., a Delaware corporation (the "Company"), and State Street Bank and Trust Company, a Massachusetts trust company (the "Rights Agent").

W I T N E S S E T H

WHEREAS, the Board of Directors of the Company desires to provide shareholders of the Company with the opportunity to benefit from the long-term prospects and value of the Company and to ensure that shareholders of the Company receive fair and equal treatment in the event of any proposed takeover of the Company; and

WHEREAS, on November 10, 1994, the Board of Directors of the Company authorized and declared a dividend distribution of one Right (as such term is hereinafter defined) for each outstanding share of Common Stock, par value $0.001 per share, of the Company (the "Common Stock") outstanding as of the close of business on November 29, 1994 (the "Record Date"), and contemplates the issuance of one Right for each share of Common Stock of the Company issued (whether originally issued or sold from the Company's treasury) between the Record Date and the earlier of the Distribution Date or the Expiration Date (as such terms are hereinafter defined), each Right initially representing the right to purchase one one-thousandth of a share of Series C-1 Junior Participating Cumulative Preferred Stock of the Company having the rights, powers and preferences set forth on Exhibit A hereto, upon the terms and subject to the conditions hereinafter set forth (the "Rights");

NOW, THEREFORE, in consideration of the premises and the mutual agreements herein set forth, the parties hereby agree as follows:

Section 1. Certain Definitions. For purposes of this Agreement, the following terms have the meanings indicated:

(a) "Acquiring Person" shall mean any Person (as hereinafter defined) who or which, together with all Affiliates (as such term is hereinafter defined) and Associates (as such term is hereinafter defined) of such Person, shall be the Beneficial Owner (as such term is hereinafter defined) of 15% or more of the shares of Common Stock then outstanding, but shall not include (i) the Company, (ii) any Subsidiary (as such term is hereinafter defined) of the Company, (iii) any employee benefit plan or compensation arrangement of the Company or any Subsidiary of the Company or (iv) any Person holding shares of Common Stock organized, appointed or established by the Company or any Subsidiary of the Company for or pursuant to the terms of any such employee benefit plan or compensation arrangement (the Persons described in clauses (i) through (iv) above are referred to herein as "Exempt Persons").

Notwithstanding the foregoing, no Person shall become an "Acquiring Person" as the result

of an acquisition of Common Stock by the Company which, by reducing the number of shares outstanding, increases the proportionate number of shares beneficially owned by such Person to 15% or more of the shares of Common Stock then outstanding; provided, however, that if a Person shall become the Beneficial Owner of 15% or more of the shares of Common Stock of the Company then outstanding by reason of share purchases by the Company and shall, after such share purchases by the Company, become the Beneficial Owner of any additional shares (other than pursuant to a stock split, stock dividend or similar transaction) of Common Stock of the Company and immediately thereafter be the Beneficial Owner of 15% or more of the shares of Common Stock then outstanding, then such Person shall be deemed to be an "Acquiring Person."

In addition, notwithstanding the foregoing, a Person shall not be an "Acquiring Person" if the Board of Directors of the Company determines that a Person who would otherwise be an "Acquiring Person," as defined pursuant to the foregoing provisions of this Section 1(a), has become such inadvertently, and such Person divests as promptly as practicable a sufficient number of shares of Common Stock so that such Person would no longer be an "Acquiring Person," as defined pursuant to the foregoing provisions of this Section 1(a).

(b) "Affiliate" and "Associate" shall have the respective meanings ascribed to such terms in Rule 12b-2 of the General Rules and Regulations (the "Rules") under the Securities Exchange Act of 1934, as amended (the "Exchange Act"), as in effect on the date of this Agreement; provided, however, that no Person who is a director or officer of the Company shall be deemed an Affiliate or an Associate of any other director or officer of the Company solely as a result of his or her position as director or officer of the Company.

(c) A Person shall be deemed the "Beneficial Owner" of, and shall be deemed to "beneficially own," any securities:

(i) which such Person or any of such Person's Affiliates or Associates, directly or indirectly, beneficially owns (as determined pursuant to Rule 13d-3 of the Rules under the Exchange Act, as in effect on the date of this Agreement);

(ii) which such Person or any of such Person's Affiliates or Associates, directly or indirectly, has:

(A) the right to acquire (whether such right is exercisable immediately or only after the passage of time or upon the satisfaction of any conditions or both) pursuant to any agreement, arrangement or understanding (whether or not in writing) (other than customary agreements with and between underwriters and selling group members with respect to a bona fide public offering of securities) or upon the exercise of conversion rights, exchange rights, rights (other than the Rights), warrants or options, or otherwise; provided, however, that a Person shall not be deemed the "Beneficial Owner" of, or to "beneficially own," (1) securities tendered pursuant to a tender or exchange offer made by or on behalf of such Person or any of such Person's Affiliates or Associates until such tendered securities are accepted for purchase or exchange; (2) securities issuable upon

exercise of these Rights at any time prior to the occurrence of a Triggering Event; or (3) securities issuable upon exercise of Rights from and after the occurrence of a Triggering Event, which Rights were acquired by such Person or any of such Person's Affiliates or Associates prior to the Distribution Date or pursuant to Sections 3(a), 11(i) or 22 hereof; or

(B) the right to vote pursuant to any agreement, arrangement or understanding (whether or not in writing); provided, however, that a Person shall not be deemed the "Beneficial Owner" of, or to "beneficially own," any security under this clause (B) if the agreement, arrangement or understanding to vote such security (1) arises solely from a revocable proxy given in response to a public proxy or consent solicitation made pursuant to, and in accordance with, the Rules of the Exchange Act and (2) is not also then reportable by such person on Schedule 13D under the Exchange Act (or any comparable or successor report); or

(C) the right to dispose of pursuant to any agreement, arrangement or understanding (whether or not in writing) (other than customary arrangements with and between underwriters and selling group members with respect to a bona fide public offering of securities); or

(iii) which are beneficially owned, directly or indirectly, by any other Person (or any Affiliate or Associate thereof) with which such Person or any of such Person's Affiliates or Associates has any agreement, arrangement or understanding (whether or not in writing) (other than customary agreements with and between underwriters and selling group members with respect to a bona fide public offering of securities) for the purpose of acquiring, holding, voting (except pursuant to a revocable proxy as described in clause (B) of Section 1(d)(ii) hereof) or disposing of any securities of the Company;

provided, however, that (1) no Person engaged in business as an underwriter of securities shall be deemed the Beneficial Owner of any securities acquired through such Person's participation as an underwriter in good faith in a firm commitment underwriting until the expiration of 40 days after the date of such acquisition, and (2) no Person who is a director or an officer of the Company shall be deemed, as a result of his or her position as director or officer of the Company, the Beneficial Owner of any securities of the Company that are beneficially owned by any other director or officer of the Company.

(d) "Business Day" shall mean any day other than a Saturday, Sunday, or a day on which banking institutions in the Commonwealth of Massachusetts are authorized or obligated by law or executive order to close.

(e) "Close of business" on any given date shall mean 5:00 P.M., Boston, Massachusetts time, on such date; provided, however, that if such date is not a Business Day it shall mean 5:00 P.M., Boston, Massachusetts time, on the next succeeding Business Day.

(f) "Common Stock" shall mean the Common Stock, par value $0.001 per

share, of the Company, except that "Common Stock" when used with reference to any Person other than the Company shall mean the capital stock with the greatest voting power, or the equity securities or other equity interests having power to control or direct the management, of such Person or, if such Person is a Subsidiary of another Person, the Person which ultimately controls such first-mentioned Person and which has issued and outstanding such capital stock, equity securities or equity interests.

(g) "Distribution Date" shall have the meaning defined in Section 3(a) hereof.

(h) "Exercise Price" shall have the meaning defined in Section 4(a) hereof.

(i) "Expiration Date" and "Final Expiration Date" shall have the meanings set forth in Section 7(a) hereof.

(j) "Fair Market Value" of any securities or other property shall be as determined in accordance with Section 11(d) hereof.

(k) "Person" shall mean an individual, a corporation, a partnership, an association, a joint stock company, a trust, a business trust, a government or political subdivision, any unincorporated organization, or any other association or entity.

(l) "Preferred Stock" shall mean shares of Series C-1 Junior Participating Cumulative Preferred Stock, par value $0.01 per share, of the Company having the rights and preferences set forth in the form of Certificate of Designation attached hereto as Exhibit A.

(m) "Principal Party" shall have the meaning defined in Section 13(b) hereof.

(n) "Redemption Price" shall have the meaning defined in Section 23 hereof.

(o) "Section 11(a)(ii) Event" shall have the meaning defined in Section 11(a)(ii) hereof.

(p) "Section 13 Event" shall mean any event described in clauses (x), (y) or (z) of Section 13(a) hereof.

(q) "Stock Acquisition Date" shall mean the date of the first public announcement (which for purposes of this definition shall include, without limitation, the issuance of a press release or the filing of a publicly-available report or other document with the Securities and Exchange Commission or any other governmental agency) by the Company or an Acquiring Person that an Acquiring Person has become such.

(r) "Subsidiary" shall mean, with respect to any Person, any other Person of which a majority of the voting power of the voting equity securities or voting interests is owned, directly or indirectly, by such Person, or which is otherwise controlled by such Person.

(s) "Triggering Event" shall mean any Section 11(a)(ii) Event or any Section 13 Event.

Section 2. Appointment of Rights Agent. The Company hereby appoints the Rights Agent to act as agent for the Company and the holders of the Rights (who, in accordance with Section 3 hereof, shall prior to the Distribution Date (as hereinafter defined in Section 3(a)) also be the holders of the Common Stock) in accordance with the terms and conditions hereof and the Rights Agent hereby accepts such appointment. The Company may from time to time appoint such Co-Rights Agents as it may deem necessary or desirable. In the event the Company appoints one or more Co-Rights Agents, the respective duties of the Rights Agent and any Co-Rights Agents shall be as the Company shall determine.

Section 3. Issue of Right Certificates.

(a) From the date hereof until the earlier of (i) the close of business on the tenth Business Day after the Stock Acquisition Date or (ii) the close of business on the tenth Business Day (or such other Business Day, if any, as the Board of Directors may determine in its sole discretion) after the date of the commencement by any Person, other than an Exempt Person, of a tender or exchange offer if, upon consummation thereof, such Person would be the Beneficial Owner of 15% or more of the shares of Common Stock then outstanding (including any such date which is after the date of this Agreement and prior to the issuance of the Rights) (the earliest of such dates being herein referred to as the "Distribution Date"), (x) the Rights will be evidenced (subject to the provisions of Section 3(b) hereof) by the certificates for the Common Stock registered in the names of the holders of the Common Stock (which certificates for Common Stock shall be deemed also to be certificates for Rights) and not by separate certificates, and (y) the Rights will be transferable only in connection with the transfer of the underlying shares of Common Stock. As soon as practicable after the Company has notified the Rights Agent of the occurrence of the Distribution Date, the Rights Agent will, at the Company's expense send, by first-class, insured, postage prepaid mail, to each record holder of the Common Stock as of the close of business on the Distribution Date, at the address of such holder shown on the records of the Company, one or more certificates, in substantially the form of Exhibit B hereto (the "Right Certificates"), evidencing one Right for each share of Common Stock so held. In the event that an adjustment in the number of Rights per share of Common Stock has been made pursuant to Section 11(o) hereof, the Company shall make the necessary and appropriate rounding adjustments (in accordance with Section 14(a) hereof) at the time of distribution of the Right Certificates, so that Right Certificates representing only whole numbers of Rights are distributed and cash is paid in lieu of any fractional Rights. As of and after the close of business on the Distribution Date, the Rights will be evidenced solely by such Right Certificates.

(b) With respect to certificates for the Common Stock issued prior to the close of business on the Record Date, the Rights will be evidenced by such certificates for the Common Stock on or until the Distribution Date (or the earlier redemption, expiration or termination of the Rights), and the registered holders of the Common Stock also shall be the registered holders of the associated Rights. Until the Distribution Date (or the earlier redemption, expiration or termination of the Rights), the transfer of any of the certificates for the

Common Stock outstanding prior to the date of this Agreement shall also constitute the transfer of the Rights associated with the Common Stock represented by such certificate.

(c) Certificates for the Common Stock issued after the Record Date, but prior to the earlier of the Distribution Date or the redemption, expiration or termination of the Rights, shall be deemed also to be certificates for Rights, and shall bear a legend, substantially in the form set forth below:

> This certificate also evidences and entitles the holder hereof to certain Rights as set forth in a Shareholder Rights Agreement between T Cell Sciences, Inc. and State Street Bank and Trust Company, as Rights Agent, dated as of November 10, 1994 (the "Rights Agreement"), the terms of which are hereby incorporated herein by reference and a copy of which is on file at the principal offices of T Cell Sciences, Inc. Under certain circumstances, as set forth in the Rights Agreement, such Rights will be evidenced by separate certificates and will no longer be evidenced by this certificate. T Cell Sciences, Inc. may redeem the Rights at a redemption price of $0.01 per Right, subject to adjustment, under the terms of the Rights Agreement. T Cell Sciences, Inc. will mail to the holder of this certificate a copy of the Rights Agreement, as in effect on the date of mailing, without charge promptly after receipt of a written request therefor. Under certain circumstances, Rights issued to or held by Acquiring Persons or any Affiliates or Associates thereof (as defined in the Rights Agreement), and any subsequent holder of such Rights, may become null and void.

With respect to such certificates containing the foregoing legend, the Rights associated with the Common Stock represented by such certificates shall be evidenced by such certificates alone until the Distribution Date (or the earlier redemption, expiration or termination of the Rights), and the transfer of any of such certificates shall also constitute the transfer of the Rights associated with the Common Stock represented by such certificates. In the event that the Company purchases or acquires any shares of Common Stock after the Record Date but prior to the Distribution Date, any Rights associated with such Common Stock shall be deemed cancelled and retired so that the Company shall not be entitled to exercise any Rights associated with the shares of Common Stock which are no longer outstanding. The failure to print the foregoing legend on any such Common Stock certificate or any defect therein shall not affect in any manner whatsoever the application or interpretation of the provisions of Section 7(e) hereof.

Section 4. Form of Right Certificates.

(a) The Right Certificates (and the forms of election to purchase shares and of

assignment and certificate to be printed on the reverse thereof) shall each be substantially in the form of Exhibit B hereto and may have such marks of identification or designation and such legends, summaries or endorsements printed thereon as the Company may deem appropriate and as are not inconsistent with the provisions of this Agreement, or as may be required to comply with any applicable law, rule or regulation or with any rule or regulation of any stock exchange on which the Rights may from time to time be listed, or to conform to customary usage. The Rights Certificates shall be in a machine printable format and in a form reasonably satisfactory to the Rights Agent. Subject to the provisions of Section 11 and Section 22 hereof, the Right Certificates, whenever distributed, shall be dated as of the Record Date, shall show the date of countersignature, and on their face shall entitle the holders thereof to purchase such number of one one-thousandths of a share of Preferred Stock as shall be set forth therein at the price set forth therein (the "Exercise Price"), but the number of such shares and the Exercise Price shall be subject to adjustment as provided herein.

(b) Any Right Certificate issued pursuant to Section 3(a) or Section 22 hereof that represents Rights beneficially owned by (i) an Acquiring Person or any Associate or Affiliate of an Acquiring Person, (ii) a transferee of an Acquiring Person (or of any Associate or Affiliate of an Acquiring Person) who becomes a transferee after the Acquiring Person becomes such, or (iii) a transferee of an Acquiring Person (or of any such Associate or Affiliate) who becomes a transferee prior to or concurrently with the Acquiring Person becoming such and receives such Rights pursuant to either (A) a transfer (whether or not for consideration) from the Acquiring Person to holders of equity interests in such Acquiring Person or to any Person with whom the Acquiring Person has any continuing agreement, arrangement or understanding (whether or not in writing) regarding the transferred Rights or (B) a transfer which the Board of Directors of the Company has determined is part of a plan, arrangement or understanding which has as a primary purpose or effect the avoidance of Section 7(e) hereof, and any Right Certificate issued pursuant to Section 6, Section 11 or Section 22 upon transfer, exchange, replacement or adjustment of any other Right Certificate referred to in this sentence, shall have deleted therefrom the second sentence of the existing legend on such Right Certificate and in substitution therefor shall contain the following legend:

> The Rights represented by this Right Certificate are or were beneficially owned by a Person who was or became an Acquiring Person or an Affiliate or an Associate of an Acquiring Person (as such terms are defined in the Rights Agreement). This Right Certificate and the Rights represented hereby may become null and void under certain circumstances as specified in Section 7(e) of the Rights Agreement.

The Company shall give notice to the Rights Agent promptly after it becomes aware of the existence and identity of any Acquiring Person or any Associate or Affiliate thereof. The Company shall instruct the Rights Agent in writing of the Rights which should be so legended. The failure to print the foregoing legend on any such Right Certificate or any defect therein shall not affect in any manner whatsoever the application or interpretation of the provisions of Section 7(e) hereof.

Section 5. Countersignature and Registration.

(a) The Right Certificates shall be executed on behalf of the Company by its Chairman of the Board, or its President or any Vice President and by its Treasurer or any Assistant Treasurer, or by its Secretary or any Assistant Secretary, either manually or by facsimile signature, and shall have affixed thereto the Company's seal or a facsimile thereof which shall be attested to by the Secretary or any Assistant Secretary of the Company, either manually or by facsimile signature. The Right Certificates shall be manually countersigned by an authorized signatory of the Rights Agent and shall not be valid for any purpose unless so countersigned. In case any officer of the Company who shall have signed any of the Right Certificates shall cease to be such officer of the Company before countersignature by the Rights Agent and issuance and delivery by the Company, such Right Certificates, nevertheless, may be countersigned by an authorized signatory of the Rights Agent, and issued and delivered by the Company with the same force and effect as though the person who signed such Right Certificates had not ceased to be such officer of the Company; and any Right Certificates may be signed on behalf of the Company by any person who, at the actual date of the execution of such Right Certificate, shall be a proper officer of the Company to sign such Right Certificate, although at the date of the execution of this Rights Agreement any such person was not such an officer.

(b) Following the Distribution Date, the Rights Agent will keep or cause to be kept, at one of its offices designated as the appropriate place for surrender of Right Certificates upon exercise or transfer, books for registration and transfer of the Right Certificates issued hereunder. Such books shall show the names and addresses of the respective holders of the Right Certificates, the number of Rights evidenced on its face by each of the Right Certificates and the date of each of the Right Certificates.

Section 6. Transfer, Split Up, Combination and Exchange of Right Certificates; Mutilated, Destroyed, Lost or Stolen Right Certificates.

(a) Subject to the provisions of Section 4(b), Section 7(e) and Section 14 hereof at any time after the close of business on the Distribution Date, and at or prior to the close of business on the Expiration Date, any Right Certificate or Certificates may be transferred, split up, combined or exchanged for another Right Certificate or Certificates, entitling the registered holder to purchase a like number of one one-thousandths of a share of Preferred Stock (or following a Triggering Event, preferred stock, cash, property, debt securities, common stock or any combination thereof) as the Right Certificate or Certificates surrendered then entitled such holder to purchase and at the same Exercise Price. Any registered holder desiring to transfer, split up, combine or exchange any Right Certificate shall make such request in writing delivered to the Rights Agent, and shall surrender the Right Certificate or Certificates to be transferred, split up, combined or exchanged, with the form of assignment and certificate duly executed, at the office or offices of the Rights Agent designated for such purpose. Neither the Rights Agent nor the Company shall be obligated to take any action whatsoever with respect to the transfer of any such surrendered Right Certificate until

the registered holder shall have completed and signed the certificate contained in the form of assignment on the reverse side of such Right Certificate and shall have provided such additional evidence of the identity of the Beneficial Owner (or former Beneficial Owner) or Affiliates or Associates thereof as the Company shall reasonably request. Thereupon the Rights Agent shall, subject to Section 4(b), Section 7(e) and Section 14 hereof, countersign and deliver to the Person entitled thereto a Right Certificate or Certificates, as the case may be, as so requested. The Company may require payment by the registered holder of a Right Certificate, of a sum sufficient to cover any tax or governmental charge that may be imposed in connection with any transfer, split up, combination or exchange of Right Certificates.

(b) Upon receipt by the Company and the Rights Agent of evidence reasonably satisfactory to them of the loss, theft, destruction or mutilation of a Right Certificate, and, in case of loss, theft or destruction, of indemnity or security satisfactory to them, and reimbursement to the Company and the Rights Agent of all reasonable expenses incidental thereto, and upon surrender to the Rights Agent and cancellation of the Right Certificate, if mutilated, the Company will execute and deliver a new Right Certificate of like tenor to the Rights Agent for countersignature and delivery to the registered owner in lieu of the Right Certificate so lost, stolen, destroyed or mutilated.

Section 7. Exercise of Rights; Exercise Price: Expiration Date of Rights.

(a) Subject to Section 7(e) hereof, the registered holder of any Right Certificate may exercise the Rights evidenced thereby (except as otherwise provided herein) in whole or in part at any time after the Distribution Date upon surrender of the Right Certificate, with the form of election to purchase and the certificate on the reverse side thereof duly executed, to the Rights Agent at the office or offices of the Rights Agent designated for such purpose, together with payment of the aggregate Exercise Price for the total number of one one-thousandths of a share of Preferred Stock (or other securities, cash or other assets, as the case may be) as to which such surrendered Rights are then exercised, at or prior to the earlier of (i) the close of business on November 10, 2004 (the "Final Expiration Date"), (ii) the time at which the Rights are redeemed as provided in Section 23 hereof or (iii) the time at which such Rights are exchanged as provided in Section 24 hereof (the earlier of (i), (ii) or (iii) being herein referred to as the "Expiration Date"). Except as set forth in Section 7(e) hereof and notwithstanding any other provision of this Agreement, any Person who prior to the Distribution Date becomes a record holder of shares of Common Stock may exercise all of the rights of a registered holder of a Right Certificate with respect to the Rights associated with such shares of Common Stock in accordance with the provisions of this Agreement, as of the date such Person becomes a record holder of shares of Common Stock.

(b) The Exercise Price for each one one-thousandth of a share of Preferred Stock pursuant to the exercise of a Right shall initially be $16.00, shall be subject to adjustment from time to time as provided in Section 11 and Section 13 hereof and shall be payable in lawful money of the United States of America in accordance with Section 7(c) below.

(c) Upon receipt of a Right Certificate representing exercisable Rights, with the form of election to purchase and the certificate on the reverse side thereof duly executed,

accompanied by payment of the Exercise Price for the shares to be purchased and an amount equal to any applicable transfer tax (as determined by the Rights Agent) in cash, or by certified check or bank draft payable to the order of the Company, the Rights Agent shall, subject to Section 20(k) hereof, thereupon promptly (i)(A) requisition from any transfer agent of Preferred Stock (or make available, if the Rights Agent is the transfer agent therefor) certificates for the number of one one-thousandths of a share of Preferred Stock to be purchased and the Company hereby irrevocably authorizes its transfer agent to comply with all such requests, or (B) if the Company shall have elected to deposit the total number of shares of Preferred Stock issuable upon exercise of the Rights hereunder with a depositary agent, requisition from the depositary agent depositary receipts representing such number of one one-thousandths of a share of Preferred Stock as are to be purchased (in which case certificates for the shares of Preferred Stock represented by such receipts shall be deposited by the transfer agent with the depositary agent) and the Company will direct the depositary agent to comply with such request, (ii) when appropriate, requisition from the Company the amount of cash, if any, to be paid in lieu of issuance of fractional shares in accordance with Section 14 hereof, (iii) promptly after receipt of such certificates or depositary receipts, cause the same to be delivered to or upon the order of the registered holder of such Right Certificate, registered in such name or names as may be designated by such holder and (iv) when appropriate, after receipt promptly deliver such cash to or upon the order of the registered holder of such Right Certificate. In the event that the Company is obligated to issue other securities (including Common Stock) of the Company, pay cash or distribute other property pursuant to Section 11(a) hereof, the Company will make all arrangements necessary so that such other securities, cash or other property are available for distribution by the Rights Agent, if and when appropriate.

(d) In case the registered holder of any Right Certificate shall exercise less than all the Rights evidenced thereby, a new Right Certificate evidencing Rights equivalent to the Rights remaining unexercised shall be issued by the Rights Agent and delivered to the registered holder of such Right Certificate or to his duly authorized assigns, subject to the provisions of Section 14 hereof.

(e) Notwithstanding anything in this Agreement to the contrary, from and after the first occurrence of a Section 11(a)(ii) Event, any Rights beneficially owned by (i) an Acquiring Person or any Associate or Affiliate of an Acquiring Person, (ii) a transferee of an Acquiring Person (or of any Associate or Affiliate of an Acquiring Person) who becomes a transferee after the Acquiring Person becomes such or (iii) a transferee of an Acquiring Person (or of any Associate or Affiliate of an Acquiring Person) who becomes a transferee prior to or concurrently with the Acquiring Person becoming such and receives such Rights pursuant to either (A) a transfer (whether or not for consideration) from the Acquiring Person to holders of equity interests in such Acquiring Person or to any Person with whom the Acquiring Person has any continuing agreement, arrangement or understanding regarding the transferred Rights or (B) a transfer which the Board of Directors of the Company has determined is part of a plan, arrangement or understanding which has as a primary purpose or effect the avoidance of this Section 7(e), shall become null and void without any further action and no holder of such Rights shall have any rights whatsoever with respect to such Rights, whether under any provision of this Agreement or otherwise. The Company shall use all reasonable efforts to

ensure that the provisions of this Section 7(e) and Section 4(b) hereof are complied with, but shall have no liability to any holder of Right Certificates or other Person as a result of its failure to make any determinations with respect to an Acquiring Person or any Affiliates or Associates of an Acquiring Person or any transferee of any of them hereunder.

(f) Notwithstanding anything in this Agreement to the contrary, neither the Rights Agent nor the Company shall be obligated to undertake any action with respect to a registered holder of Rights upon the occurrence of any purported exercise as set forth in this Section 7 unless such registered holder shall have (i) completed and signed the certificate contained in the form of election to purchase set forth on the reverse side of the Right Certificate surrendered for such exercise, and (ii) provided such additional evidence of the identity of the Beneficial Owner (or former Beneficial Owner) or Affiliates or Associates thereof as the Company shall reasonably request.

Section 8. Cancellation and Destruction of Right Certificates. All Right Certificates surrendered for the purpose of exercise, transfer, split up, combination or exchange shall, if surrendered to the Company or any of its agents, be delivered to the Rights Agent for cancellation or in cancelled form, or, if surrendered to the Rights Agent, shall be cancelled by it, and no Right Certificates shall be issued in lieu thereof except as expressly permitted by any of the provisions of this Agreement. The Company shall deliver to the Rights Agent for cancellation and retirement, and the Rights Agent shall so cancel and retire, any other Right Certificate purchased or acquired by the Company otherwise than upon the exercise thereof. The Rights Agent shall deliver all cancelled Right Certificates to the Company.

Section 9. Reservation and Availability of Preferred Stock.

(a) The Company covenants and agrees that it will cause to be reserved and kept available out of its authorized and unissued shares of Preferred Stock or any authorized and issued shares of Preferred Stock held in its treasury, the number of shares of Preferred Stock that will be sufficient to permit the exercise in full of all outstanding and exercisable Rights.

(b) The Company shall use its best efforts to cause, from and after such time as the Rights become exercisable, all shares of Preferred Stock issued or reserved for issuance to be listed, upon official notice of issuance, upon the principal national securities exchange, if any, upon which the Common Stock is listed or, if the principal market for the Common Stock is not on any national securities exchange, to be eligible for quotation on the National Association of Securities Dealers Automated Quotation System ("NASDAQ") or any successor thereto or other comparable quotation system.

(c) The Company shall use its best efforts to (i) file, as soon as practicable following the earliest date after the occurrence of a Section 11(a)(ii) Event on which the consideration to be delivered by the Company upon exercise of the Rights has been determined in accordance with Section 11(a)(iii) hereof, or as soon as required by law following the Distribution Date, as the case may be, a registration statement under the Securities Act of 1933,

as amended (the "Securities Act"), with respect to the securities purchasable upon exercise of the Rights on an appropriate form, (ii) cause such registration statement to become effective as soon as practicable after such filing and (iii) cause such registration statement to remain effective (with a prospectus that at all times meets the requirements of the Securities Act) until the earlier of (A) the date as of which the Rights are no longer exercisable for such securities or (B) the Expiration Date. The Company will also take such action as may be appropriate under, and which will ensure compliance with, the securities or "blue sky" laws of the various states in connection with the exercisability of the Rights. The Company may temporarily suspend, for a period of time not to exceed ninety (90) days after the date determined in accordance with the provisions of the first sentence of this Section 9(c), the exercisability of the Rights in order to prepare and file such registration statement and permit it to become effective. Upon such suspension, the Company shall issue a public announcement stating that the exercisability of the Rights has been temporarily suspended, as well as a public announcement at such time as the suspension is no longer in effect, in each case with prompt written notice to the Rights Agent. Notwithstanding any such provision of this Agreement to the contrary, the Rights shall not be exercisable in any jurisdiction unless the requisite qualification in such jurisdiction shall have been obtained.

(d) The Company covenants and agrees that it will take all such action as may be necessary to ensure that all shares of Preferred Stock delivered upon the exercise of the Rights shall, at the time of delivery of the certificates for such shares (subject to payment of the Exercise Price), be duly and validly authorized and issued and fully paid and nonassessable.

(e) The Company further covenants and agrees that it will pay when due and payable any and all federal and state transfer taxes and charges which may be payable in respect of the issuance or delivery of the Right Certificates or of any certificates for shares of Preferred Stock upon the exercise of Rights. The Company shall not, however, be required to pay any transfer tax which may be payable in respect of any transfer or delivery of Right Certificates to a person other than, or in respect of the issuance or delivery of securities in a name other than that of, the registered holder of the Right Certificates evidencing Rights surrendered for exercise or to issue or deliver any certificates for securities in a name other than that of the registered holder upon the exercise of any Rights until such tax shall have been paid (any such tax being payable by the holder of such Right Certificate at the time of surrender) or until it has been established to the Company's satisfaction that no such tax is due.

Section 10. Preferred Stock Record Date. Each Person in whose name any certificate for Preferred Stock is issued upon the exercise of Rights shall for all purposes be deemed to have become the holder of record of the shares of Preferred Stock represented thereby on, and such certificate shall be dated, the date upon which the Right Certificate evidencing such Rights was duly surrendered and payment of the Exercise Price (and any applicable transfer taxes) was made; provided, however, that if the date of such surrender and payment is a date upon which the Preferred Stock transfer books of the Company are closed, such person shall be deemed to have become the record holder of such shares on, and such certificate shall be dated, the next succeeding Business Day on which the Preferred Stock transfer books of the Company are open. Prior to the exercise of the Right evidenced thereby, the holder of a Right Certificate

shall not be entitled to any rights of a shareholder of the Company with respect to shares for which the Rights shall be exercisable, including, without limitation, the right to vote, to receive dividends or other distributions or to exercise any preemptive rights, and shall not be entitled to receive any notice of any proceedings of the Company, except as provided herein.

Section 11. Adjustment of Exercise Price, Number and Kind of Shares or Number of Rights. The Exercise Price, the number and kind of shares covered by each Right and the number of Rights outstanding are subject to adjustment from time to time as provided in this Section 11.

(a) (i) In the event the Company shall at any time after the date of this Agreement (A) declare a dividend on the Preferred Stock payable in shares of Preferred Stock, (B) subdivide the outstanding Preferred Stock, (C) combine the outstanding Preferred Stock into a smaller number of shares or (D) issue any shares of its capital stock in a reclassification of the Preferred Stock (including any such reclassification in connection with a consolidation or merger in which the Company is the continuing or surviving corporation), except as otherwise provided in this Section 11(a) and Section 7(e) hereof, the Exercise Price in effect at the time of the record date for such dividend or of the effective date of such subdivision, combination or reclassification, and the number and kind of shares of capital stock issuable on such date, shall be proportionately adjusted so that the holder of any Right exercised after such time shall be entitled to receive the aggregate number and kind of shares of capital stock which, if such Right had been exercised immediately prior to such date and at a time when the Preferred Stock transfer books of the Company were open, he would have owned upon such exercise and been entitled to receive by virtue of such dividend, subdivision, combination or reclassification; provided, however, that in no event shall the consideration to be paid upon the exercise of a Right be less than the aggregate par value of the shares of capital stock of the Company issuable upon exercise of a Right. If an event occurs which would require an adjustment under both Section 11(a)(i) and Section 11(a)(ii) hereof, the adjustment provided for in this Section 11(a)(i) shall be in addition to, and shall be made prior to, any adjustment required pursuant to Section 11(a)(ii) hereof.

(ii) Subject to the provisions of Section 24 hereof, in the event any Person, alone or together with its Affiliates and Associates, shall become an Acquiring Person (a "Section 11(a)(ii) Event"), then promptly following any such occurrence, proper provision shall be made so that each holder of a Right, except as provided in Section 7(e) hereof, shall thereafter have a right to receive, upon exercise thereof at the then current Exercise Price in accordance with the terms of this Agreement, such number of shares of Preferred Stock of the Company as shall equal the result obtained by (x) multiplying the then current Exercise Price by the then number of one one-thousandths of a share of Preferred Stock for which a Right was exercisable immediately prior to the first occurrence of a Section 11(a)(ii) Event and dividing that product by (y) 50% of the Fair Market

Value per one one-thousandth of a share of the Preferred Stock (determined pursuant to Section 11(d)) on the date of the occurrence of a Section 11(a)(ii) Event.

(iii) In the event that there shall not be sufficient authorized but unissued shares of Preferred Stock to permit the exercise in full of the Rights in accordance with the foregoing Section 11(a)(ii), the Company shall take all action as may be necessary to authorize and reserve for issuance such number of additional shares of Preferred Stock as may from time to time be required to be issued upon the exercise in full of all Rights outstanding and, if necessary, shall use its best efforts to obtain shareholder approval thereof. Notwithstanding the foregoing provisions of this Section 11(a)(iii), in lieu of issuing shares of Preferred Stock in accordance with Section 11(a)(ii) hereof, if a majority of the Directors then in office determines that such action is necessary or appropriate and is not contrary to the interests of the holders of the Rights, they may elect to cause the Company to pay, and if sufficient shares of Preferred Stock cannot be issued for such purpose in accordance with the provisions hereof, the Company shall issue or pay upon the exercise of the Rights, cash, property, debt securities, shares of preferred stock or common stock, or any combination thereof, having an aggregate Fair Market Value equal to the Fair Market Value of the shares of Preferred Stock which otherwise would have been issuable pursuant to Section 11(a)(ii). Any such election by a majority of the Directors of the Company must be made and publicly announced within 30 days of the date on which any Section 11(a)(ii) Event first occurs following the Stock Acquisition Date.

(b) If the Company shall fix a record date for the issuance of rights, options or warrants to all holders of Preferred Stock entitling them (for a period expiring within 45 calendar days after such record date) to subscribe for or purchase Preferred Stock (or securities having the same or more favorable rights, privileges and preferences as the shares of Preferred Stock ("preferred stock equivalents")) or securities convertible into Preferred Stock or preferred stock equivalents at a price per share of Preferred Stock or per share of preferred stock equivalents (or having a conversion price per share, if a security convertible into Preferred Stock or preferred stock equivalents) less than the Fair Market Value (as determined pursuant to Section 11(d) hereof) per share of Preferred Stock on such record date, the Exercise Price to be in effect after such record date shall be determined by multiplying the Exercise Price in effect immediately prior to such record date by a fraction, the numerator of which shall be the number of shares of Preferred Stock outstanding on such record date, plus the number of shares of Preferred Stock which the aggregate offering price of the total number of shares of Preferred Stock to be offered (and the aggregate initial conversion price of the convertible securities so to be offered) would purchase at such Fair Market Value and the denominator of which shall be the number of shares of Preferred Stock outstanding on such record date, plus the number of additional shares of Preferred Stock and preferred stock equivalents to be offered for subscription or purchase (or into which the convertible securities so to be offered are initially convertible); provided, however, that in no event shall the consideration to be paid upon the

exercise of a Right be less than the aggregate par value of the shares of capital stock of the Company issuable upon exercise of a Right. In case such subscription price may be paid in a consideration part or all of which shall be in a form other than cash, the value of such consideration shall be the Fair Market Value thereof determined in accordance with Section 11(d) hereof. Shares of Preferred Stock owned by or held for the account of the Company shall not be deemed outstanding for the purpose of any such computation. Such adjustments shall be made successively whenever such a record date is fixed; and in the event that such rights or warrants are not so issued, the Exercise Price shall be adjusted to be the Exercise Price which would then be in effect if such record date had not been fixed.

(c) If the Company shall fix a record date for the making of a distribution to all holders of Preferred Stock (including any such distribution made in connection with a consolidation or merger in which the Company is the continuing or surviving corporation) of evidences of indebtedness, cash (other than a regular periodic cash dividend out of the earnings or retained earnings of the Company), assets (other than a dividend payable in Preferred Stock, but including any dividend payable in stock other than Preferred Stock) or convertible securities, subscription rights or warrants (excluding those referred to in Section 11(b)), the Exercise Price to be in effect after such record date shall be determined by multiplying the Exercise Price in effect immediately prior to such record date by a fraction, the numerator of which shall be the Fair Market Value (as determined pursuant to Section 11(d) hereof) per one one-thousandth of a share of Preferred Stock on such record date, less the Fair Market Value (as determined pursuant to Section 11(d) hereof) of the portion of the cash, assets or evidences of indebtedness so to be distributed or of such convertible securities, subscription rights or warrants applicable to one one-thousandth of a share of Preferred Stock and the denominator of which shall be the Fair Market Value (as determined pursuant to Section 11(d) hereof) per one one-thousandth of a share of Preferred Stock; provided, however, that in no event shall the consideration to be paid upon the exercise of a Right be less than the aggregate par value of the shares of capital stock of the Company issuable upon exercise of a Right. Such adjustments shall be made successively whenever such a record date is fixed; and in the event that such distribution is not so made, the Exercise Price shall again be adjusted to be the Exercise Price which would be in effect if such record date had not been fixed.

(d) For the purpose of this Agreement, the "Fair Market Value" of any share of Preferred Stock, Common Stock or any other stock or any Right or other security or any other property shall be determined as provided in this Section 11(d).

(i) In the case of a publicly-traded stock or other security, the Fair Market Value on any date shall be deemed to be the average of the daily closing prices per share of such stock or per unit of such other security for the 30 consecutive Trading Days (as such term is hereinafter defined) immediately prior to such date; provided, however, that in the event that the Fair Market Value per share of any share of stock is determined during a period following the announcement by the issuer of such stock of (x) a dividend or distribution on such stock payable in shares of such stock or securities convertible into shares of such stock or (y) any subdivision, combination or reclassification of such stock, and

prior to the expiration of the 30 Trading Day period after the ex-dividend date for such dividend or distribution, or the record date for such subdivision, combination or reclassification, then, and in each such case, the Fair Market Value shall be properly adjusted to take into account ex-dividend trading. The closing price for each day shall be the last sale price, regular way, or, in case no such sale takes place on such day, the average of the closing bid and asked prices, regular way, in either case as reported in the principal consolidated transaction reporting system with respect to securities listed or admitted to trading on the New York Stock Exchange or, if the securities are not listed or admitted to trading on the New York Stock Exchange, as reported in the principal consolidated transaction reporting system with respect to securities listed on the principal national securities exchange on which such security is listed or admitted to trading; or, if not listed or admitted to trading on any national securities exchange, the last quoted price (or, if not so quoted, the average of the last quoted high bid and low asked prices) in the over-the-counter market, as reported by NASDAQ or such other system then in use; or, if on any such date no bids for such security are quoted by any such organization, the average of the closing bid and asked prices as furnished by a professional market maker making a market in such security selected by the Board of Directors of the Company. If on any such date no market maker is making a market in such security, the Fair Market Value of such security on such date shall be determined reasonably and with utmost good faith to the holders of the Rights by the Board of Directors of the Company, provided, however, that if at the time of such determination there is an Acquiring Person, the Fair Market Value of such security on such date shall be determined by a nationally recognized investment banking firm selected by the Board of Directors, which determination shall be described in a statement filed with the Rights Agent and shall be binding on the Rights Agent and the holders of the Rights. The term "Trading Day" shall mean a day on which the principal national securities exchange on which such security is listed or admitted to trading is open for the transaction of business or, if such security is not listed or admitted to trading on any national securities exchange, a Business Day.

(ii) If a security is not publicly held or not so listed or traded, "Fair Market Value" shall mean the fair value per share of stock or per other unit of such security, determined reasonably and with utmost good faith to the holders of the Rights by the Board of Directors of the Company, provided, however, that if at the time of such determination there is an Acquiring Person, the Fair Market Value of such security on such date shall be determined by a nationally recognized investment banking firm selected by the Board of Directors, which determination shall be described in a statement filed with the Rights Agent and shall be binding on the Rights Agent and the holders of the Rights; provided, however, that for the purposes of making any adjustment provided for by Section 11(a)(ii) hereof, the Fair Market Value of a share of Preferred Stock shall not be less than the product of the then Fair Market Value of a share of Common Stock multiplied by the higher of the then Dividend Multiple or Vote Multiple (as both

of such terms are defined in the Certificate of Designation attached as Exhibit A hereto) applicable to the Preferred Stock and shall not exceed 105% of the product of the then Fair Market Value of a share of Common Stock multiplied by the higher of the then Dividend Multiple or Vote Multiple applicable to the Preferred Stock.

(iii) In the case of property other than securities, the Fair Market Value thereof shall be determined reasonably and with utmost good faith to the holders of Rights by the Board of Directors of the Company, provided, however, that if at the time of such determination there is an Acquiring Person, the Fair Market Value of such property on such date shall be determined by a nationally recognized investment banking firm selected by the Board of Directors, which determination shall be described in a statement filed with the Rights Agent and shall be binding upon the Rights Agent and the holders of the Rights.

(e) Anything herein to the contrary notwithstanding, no adjustment in the Exercise Price shall be required unless such adjustment would require an increase or decrease of at least 1% in the Exercise Price; provided, however, that any adjustments which by reason of this Section 11(e) are not required to be made shall be carried forward and taken into account in any subsequent adjustment. All calculations under this Section 11 shall be made to the nearest cent or to the nearest hundred-thousandth of a share of Common Stock or ten-millionth of a share of Preferred Stock, as the case may be, or to such other figure as the Board of Directors may deem appropriate. Notwithstanding the first sentence of this Section 11(e), any adjustment required by this Section 11 shall be made no later than the earlier of (i) three (3) years from the date of the transaction which mandates such adjustment or (ii) the Expiration Date.

(f) If as a result of any provision of Section 11(a) hereof, the holder of any Right thereafter exercised shall become entitled to receive any shares of capital stock of the Company other than Preferred Stock, thereafter the number of such other shares so receivable upon exercise of any Right shall be subject to adjustment from time to time in a manner and on terms as nearly equivalent as practicable to the provisions with respect to the Preferred Stock contained in Section 11(a), (b), (c), (e), (g) through (k) and (m), inclusive, and the provisions of Sections 7, 9, 10, 13 and 14 hereof with respect to the Preferred Stock shall apply on like terms to any such other shares.

(g) All Rights originally issued by the Company subsequent to any adjustment made to the Exercise Price hereunder shall evidence the right to purchase, at the adjusted Exercise Price, the number of one one-thousandths of a share of Preferred Stock purchasable from time to time hereunder upon exercise of the Rights, all subject to further adjustment as provided herein.

(h) Unless the Company shall have exercised its election as provided in Section 11(i), upon each adjustment of the Exercise Price as a result of the calculations made in Section 11(b) and (c), each Right outstanding immediately prior to the making of such adjustment shall thereafter evidence the right to purchase, at the adjusted Exercise Price, that

number of one one-thousandths of a share of Preferred Stock (calculated to the nearest one ten-millionth) obtained by (i) multiplying (x) the number of one one-thousandths of a share of Preferred Stock for which a Right may be exercisable immediately prior to this adjustment by (y) the Exercise Price in effect immediately prior to such adjustment of the Exercise Price and (ii) dividing the product so obtained by the Exercise Price in effect immediately after such adjustment of the Exercise Price.

(i) The Company may elect on or after the date of any adjustment of the Exercise Price to adjust the number of Rights, in substitution for any adjustment in the number of shares of Preferred Stock purchasable upon the exercise of a Right. Each of the Rights outstanding after the adjustment in the number of Rights shall be exercisable for the number of one one-thousandths of a share of Preferred Stock for which a Right was exercisable immediately prior to such adjustment. Each Right held of record prior to such adjustment of the number of Rights shall become that number of Rights (calculated to the nearest one one-hundred-thousandth) obtained by dividing the Exercise Price in effect immediately prior to adjustment of the Exercise Price by the Exercise Price in effect immediately after adjustment of the Exercise Price. The Company shall make a public announcement of its election to adjust the number of Rights, indicating the record date for the adjustment, and, if known at the time, the amount of the adjustment to be made. This record date may be the date on which the Exercise Price is adjusted or any day thereafter, but, if the Right Certificates have been issued, shall be at least ten (10) days later than the date of the public announcement. If Right Certificates have been issued, upon each adjustment of the number of Rights pursuant to this Section 11(i), the Company shall, as promptly as practicable, cause to be distributed to holders of record of Right Certificates on such record date Right Certificates evidencing, subject to Section 14 hereof, the additional Rights to which such holders shall be entitled as a result of such adjustment, or, at the option of the Company, shall cause to be distributed to such holders of record in substitution and replacement for the Right Certificates held by such holders prior to the date of adjustment, and upon surrender thereof, if required by the Company, new Right Certificates evidencing all the Rights to which such holders shall be entitled after such adjustment. Right Certificates so to be distributed shall be issued, executed and countersigned in the manner provided for herein (and may bear, at the option of the Company, the adjusted Exercise Price) and shall be registered in the names of the holders of record of Right Certificates on the record date specified in the public announcement.

(j) Irrespective of any adjustment or change in the Exercise Price or the number of one one-thousandths of a share of Preferred Stock issuable upon the exercise of the Rights, the Right Certificates theretofore and thereafter issued may continue to express the Exercise Price per share and the number of shares which were expressed in the initial Right Certificates issued hereunder.

(k) Before taking any action that would cause an adjustment reducing the Exercise Price below the then stated value, if any, of the number of one one-thousandths of a share of Preferred Stock issuable upon exercise of the Rights, the Company shall take any corporate action which may, in the opinion of its counsel, be necessary in order that the Company may validly and legally issue fully paid and nonassessable shares of Preferred Stock

at such adjusted Exercise Price.

(l) In any case in which this Section 11 shall require that an adjustment in the Exercise Price be made effective as of a record date for a specified event, the Company may elect to defer until the occurrence of such event the issuing to the holder of any Right exercised after such record date the number of one one-thousandths of a share of Preferred Stock or other capital stock or securities of the Company, if any, issuable upon such exercise over and above the number of one one-thousandths of a share of Preferred Stock and other capital stock or securities of the Company, if any, issuable upon such exercise on the basis of the Exercise Price in effect prior to such adjustment; provided, however, that the Company shall deliver to such holder a due bill or other appropriate instrument evidencing such holder's right to receive such additional shares upon the occurrence of the event requiring such adjustment.

(m) Anything in this Section 11 to the contrary notwithstanding, the Company shall be entitled to make such reductions in the Exercise Price, in addition to those adjustments expressly required by this Section 11, as and to the extent that it in its sole discretion shall determine to be advisable in order that any consolidation or subdivision of the Preferred Stock, issuance wholly for cash of any shares of Preferred Stock at less than the Fair Market Value, issuance wholly for cash of shares of Preferred Stock or securities which by their terms are convertible into or exchangeable for shares of Preferred Stock, stock dividends or issuance of rights, options or warrants referred to hereinabove in this Section 11, hereafter made by the Company to holders of its Preferred Stock, shall not be taxable to such shareholders.

(n) The Company covenants and agrees that it shall not, at any time after the Distribution Date and so long as the Rights have not been redeemed pursuant to Section 23 hereof or exchanged pursuant to Section 24 hereof, (i) consolidate with, (ii) merge with or into, or (iii) sell or transfer (or permit any Subsidiary to sell or transfer), in one transaction or a series of related transactions, assets or earning power aggregating 50% or more of the assets or earning power of the Company and its Subsidiaries taken as a whole, to any other Person or Persons if (x) at the time of or immediately after such consolidation, merger or sale there are any rights, warrants or other instruments outstanding or agreements or arrangements in effect which would substantially diminish or otherwise eliminate the benefits intended to be afforded by the Rights, or (y) prior to, simultaneously with or immediately after such consolidation, merger or sale the shareholders of a Person who constitutes, or would constitute, the "Principal Party" for the purposes of Section 13(a) hereof shall have received a distribution of Rights previously owned by such Person or any of its Affiliates and Associates. The Company further covenants and agrees that after the Distribution Date it will not, except as permitted by Section 23 or Section 27 hereof, take (or permit any Subsidiary to take) any action if at the time such action is taken it is reasonably foreseeable that such action will substantially diminish or otherwise eliminate the benefits intended to be afforded by the Rights.

(o) In the event the Company shall at any time after the date of this Agreement and prior to the Distribution Date (i) declare or pay any dividend on the outstanding Common Stock payable in shares of Common Stock or (ii) effect a subdivision, combination or consolidation of the outstanding shares of Common Stock (by reclassification or otherwise than

by payment of dividends in shares of Common Stock) into a greater or lesser number of shares of Common Stock, then in any such case (A) the number of one one-thousandths of a share of Preferred Stock purchasable after such event upon proper exercise of each Right shall be determined by multiplying the number of one one-thousandths of a share of Preferred Stock so purchasable immediately prior to such event by a fraction, the numerator of which is the number of shares of Common Stock outstanding immediately prior to such event and the denominator of which is the number of shares of Common Stock outstanding immediately after such event, and (B) each share of Common Stock outstanding immediately after such event shall have issued with respect to it that number of Rights which each share of Common Stock outstanding immediately prior to such event had issued with respect to it. The adjustments provided for in this Section 11(o) shall be made successively whenever such a dividend is declared or paid or such a subdivision, combination or consolidation is effected.

(p) The exercise of Rights under Section 11(a)(ii) shall only result in the loss of rights under Section 11(a)(ii) to the extent so exercised and shall not otherwise affect the rights of holders of Right Certificates under this Rights Agreement, including rights to purchase securities of the Principal Party following a Section 13 Event which has occurred or may thereafter occur, as set forth in Section 13 hereof. Upon exercise of a Right Certificate under Section 11(a)(ii), the Rights Agent shall return such Right Certificate duly marked to indicate that such exercise has occurred.

Section 12. Certificate of Adjusted Exercise Price or Number of Shares. Whenever an adjustment is made as provided in Section 11 or Section 13 hereof, the Company shall (a) promptly prepare a certificate setting forth such adjustment and a brief statement of the facts accounting for such adjustment, (b) promptly file with the Rights Agent and with each transfer agent for the Preferred Stock and the Common Stock a copy of such certificate and (c) mail a brief summary thereof to each holder of a Right Certificate in accordance with Section 26 hereof. The Rights Agent shall be fully protected in relying on any such certificate and on any adjustment contained therein and shall not be deemed to have knowledge of any such adjustment unless and until it shall have received such certificate.

Section 13. Consolidation, Merger or Sale or Transfer of Assets or Earning Power.

(a) In the event that, following the Stock Acquisition Date, directly or indirectly, (x) the Company shall consolidate with, or merge with and into, any other Person (other than a Subsidiary of the Company in a transaction which is not prohibited by Section 11(n) hereof), and the Company shall not be the continuing or surviving corporation of such consolidation or merger, (y) any Person (other than a Subsidiary of the Company in a transaction which is not prohibited by Section 11(n) hereof) shall consolidate with the Company, or merge with and into the Company and the Company shall be the continuing or surviving corporation of such merger and, in connection with such merger, all or part of the shares of Common Stock shall be changed into or exchanged for stock or other securities of any other Person or cash or any other property, or (z) the Company shall sell, mortgage or otherwise transfer (or one or more of its Subsidiaries shall sell, mortgage or otherwise transfer), in one transaction or a series of related transactions, assets or earning power aggregating 50% or more

of the assets or earning power of the Company and its Subsidiaries (taken as a whole) to any other Person or Persons (other than the Company or any Subsidiary of the Company in one or more transactions, each of which is not prohibited by Section 11(n) hereof), then, and in each such case, proper provision shall be made so that: (i) each holder of a Right, except as provided in Section 7(e) hereof, shall have the right to receive, upon the exercise thereof at the then current Exercise Price in accordance with the terms of this Agreement, such number of validly authorized and issued, fully paid and nonassessable shares of freely tradeable Common Stock of the Principal Party (as hereinafter defined in Section 13(b)), free and clear of rights of call or first refusal, liens, encumbrances or other adverse claims, as shall be equal to the result obtained by (1) multiplying the then current Exercise Price by the number of one one-thousandths of a share of Preferred Stock for which a Right is exercisable immediately prior to the first occurrence of a Section 13 Event, and dividing that product by (2) 50% of the Fair Market Value (determined pursuant to Section 11(d) hereof) per share of the Common Stock of such Principal Party on the date of consummation of such consolidation, merger, sale or transfer; (ii) such Principal Party shall thereafter be liable for, and shall assume, by virtue of such consolidation, merger, sale, mortgage or transfer, all the obligations and duties of the Company pursuant to this Agreement; (iii) the term "Company" shall thereafter be deemed to refer to such Principal Party, it being specifically intended that the provisions of Section 11 hereof shall apply to such Principal Party; and (iv) such Principal Party shall take such steps (including, but not limited to, the reservation of a sufficient number of shares of its Common Stock to permit exercise of all outstanding Rights in accordance with this Section 13(a) and the making of payments in cash and/or other securities in accordance with Section 11(a)(iii) hereof) in connection with such consummation as may be necessary to assure that the provisions hereof shall thereafter be applicable, as nearly as reasonably may be, in relation to its shares of Common Stock thereafter deliverable upon the exercise of the Rights.

(b) "Principal Party" shall mean

(i) in the case of any transaction described in clause (x) or (y) of the first sentence of Section 13(a), the Person that is the issuer of any securities into which shares of Common Stock of the Company are converted in such merger or consolidation, and if no securities are so issued, the Person that is the other party to the merger or consolidation; and

(ii) in the case of any transaction described in clause (z) of the first sentence of Section 13(a), the Person that is the party receiving the greatest portion of the assets or earning power transferred pursuant to such transaction or transactions;

provided, however, that in any such case, (x) if the Common Stock of such Person is not at such time and has not been continuously over the preceding 12-month period registered under Section 12 of the Exchange Act, and such Person is a direct or indirect Subsidiary or Affiliate of another Person the Common Stock of which is and has been so registered, "Principal Party" shall refer to such other Person; (y) in case such Person is a direct or indirect Subsidiary or Affiliate of more than one Person, the Common Stocks of two or more of which are and have been so registered, "Principal Party" shall refer to whichever of such Persons is the issuer of the

Common Stock having the greatest aggregate market value of shares outstanding; and (z) in case such Person is owned, directly or indirectly, by a joint venture formed by two or more Persons that are not owned, directly or indirectly, by the same Person, the rules set forth in (x) and (y) above shall apply to each of the chains of ownership having an interest in such joint venture as if such party were a "Subsidiary" of both or all of such joint venturers and the Principal Parties in each such chain shall bear the obligations set forth in this Section 13 in the same ratio as their direct or indirect interests in such Person bear to the total of such interests.

(c) The Company shall not consummate any such consolidation, merger, sale or transfer unless prior thereto (x) the Principal Party shall have a sufficient number of authorized shares of its Common Stock, which have not been issued or reserved for issuance, to permit the exercise in full of the Rights in accordance with this Section 13, and (y) the Company and each Principal Party and each other Person who may become a Principal Party as a result of such consolidation, merger, sale or transfer shall have executed and delivered to the Rights Agent a supplemental agreement providing for the terms set forth in Section 13(a) and (b) and further providing that, as soon as practicable after the date of any consolidation, merger, sale or transfer of assets mentioned in Section 13(a), the Principal Party at its own expense will:

(i) prepare and file a registration statement under the Securities Act with respect to the Rights and the securities purchasable upon exercise of the Rights on an appropriate form, use its best efforts to cause such registration statement to become effective as soon as practicable after such filing and use its best efforts to cause such registration statement to remain effective (with a prospectus that at all times meets the requirements of the Securities Act) until the Expiration Date;

(ii) use its best efforts to qualify or register the Rights and the securities purchasable upon exercise of the Rights under the blue sky laws of such jurisdictions as may be necessary or appropriate;

(iii) use its best efforts to list (or continue the listing of) the Rights and the securities purchasable upon exercise of the Rights on a national securities exchange or to meet the eligibility requirements for quotation on NASDAQ; and

(iv) deliver to holders of the Rights historical financial statements for the Principal Party and each of its Affiliates which comply in all material respects with the requirements for registration on Form 10 under the Exchange Act.

The provisions of this Section 13 shall similarly apply to successive mergers or consolidations or sales or other transfers.

Section 14. Fractional Rights and Fractional Shares.

(a) The Company shall not be required to issue fractions of Rights, except prior to the Distribution Date as provided in Section 11(o) hereof, or to distribute Right Certificates which evidence fractional Rights. If the Company elects not to issue such fractional Rights, the Company shall pay, in lieu of such fractional Rights, to the registered

holders of the Right Certificates with regard to which such fractional Rights would otherwise be issuable, an amount in cash equal to the same fraction of the Fair Market Value of a whole Right, as determined pursuant to Section 11(d) hereof.

(b) The Company shall not be required to issue fractions of shares of Preferred Stock (other than fractions which are integral multiples of one one-thousandth of a share of Preferred Stock) upon exercise of the Rights or to distribute certificates which evidence fractional shares of Preferred Stock (other than fractions which are integral multiples of one one-thousandth of a share of Preferred Stock). In lieu of fractional shares of Preferred Stock that are not integral multiples of one one-thousandth of a share of Preferred Stock, the Company may pay to the registered holders of Right Certificates at the time such Rights are exercised as herein provided an amount in cash equal to the same fraction of the Fair Market Value of one one-thousandth of a share of Preferred Stock. For purposes of this Section 14(b), the Fair Market Value of one one-thousandth of a share of Preferred Stock shall be determined pursuant to Section 11(d) hereof for the Trading Day immediately prior to the date of such exercise.

(c) The holder of a Right by the acceptance of the Rights expressly waives his right to receive any fractional Rights or any fractional shares upon exercise of a Right, except as permitted by this Section 14.

Section 15. Rights of Action. All rights of action in respect of this Agreement, other than rights of action vested in the Rights Agent pursuant to Sections 18 and 20 hereof, are vested in the respective registered holders of the Right Certificates (or, prior to the Distribution Date, the registered holders of the Common Stock); and any registered holder of any Right Certificate (or, prior to the Distribution Date, of the Common Stock), without the consent of the Right Agent or of the holder of any other Right Certificate (or, prior to the Distribution Date, of the Common Stock), may, on his own behalf and for his own benefit, enforce, and may institute and maintain any suit, action or proceeding against the Company to enforce, or otherwise act in respect of, his right to exercise the Right evidenced by such Right Certificate in the manner provided in such Right Certificate and in this Agreement. Without limiting the foregoing or any remedies available to the holders of Rights, it is specifically acknowledged that the holders of Rights would not have an adequate remedy at law for any breach of this Agreement and shall be entitled to specific performance of the obligations hereunder and injunctive relief against actual or threatened violations of the obligations hereunder of any Person subject to this Agreement.

Section 16. Agreement of Right Holders. Every holder of a Right, by accepting the same, consents and agrees with the Company and the Rights Agent and with every other holder of a Right that:

(a) prior to the Distribution Date, each Right will be transferable only simultaneously and together with the transfer of shares of Common Stock;

(b) after the Distribution Date, the Right Certificates are transferable only on

the registry books of the Rights Agent if surrendered at the office or offices of the Rights Agent designated for such purpose, duly endorsed or accompanied by a proper instrument of transfer;

(c) the Company and the Rights Agent may deem and treat the person in whose name a Right Certificate (or, prior to the Distribution Date, the associated Common Stock certificate) is registered as the absolute owner thereof and of the Rights evidenced thereby (notwithstanding any notations of ownership or writing on the Right Certificates or the associated Common Stock certificate made by anyone other than the Company or the Rights Agent) for all purposes whatsoever, and neither the Company nor the Rights Agent shall be affected by any notice to the contrary; and

(d) notwithstanding anything in this Agreement to the contrary, neither the Company nor the Rights Agent shall have any liability to any holder of a Right or other Person as the result of its inability to perform any of its obligations under this Agreement by reason of any preliminary or permanent injunction or other order, decree or ruling issued by a court of competent jurisdiction or by a governmental, regulatory or administrative agency or commission, or any statute, rule, regulation or executive order promulgated or enacted by any governmental authority prohibiting or otherwise restraining performance of such obligations; provided, however, that the Company must use its best efforts to have any such order, decree or ruling lifted or otherwise overturned as soon as possible.

Section 17. Right Certificate Holder Not Deemed a Shareholder. No holder, as such, of any Right Certificate shall be entitled to vote, receive dividends or be deemed for any purpose the holder of the shares of Preferred Stock or any other securities of the Company which may at any time be issuable on the exercise of the Rights represented thereby, nor shall anything contained herein or in any Right Certificate be construed to confer upon the holder of any Right Certificate, as such, any of the rights of a shareholder of the Company or any right to vote for the election of directors or upon any matter submitted to shareholders at any meeting thereof, or to give or withhold consent to any corporate action, or to receive notice of meetings or other actions affecting shareholders (except as provided in Section 25 hereof), or to receive dividends or subscription rights, or otherwise, until the Right or Rights evidenced by such Right Certificate shall have been exercised in accordance with the provisions hereof.

Section 18. Concerning the Rights Agent.

(a) The Company agrees to pay to the Rights Agent such compensation as shall be agreed to in writing between the Company and the Rights Agent for all services rendered by it hereunder and, from time to time, on demand of the Rights Agent, its reasonable expenses and counsel fees and disbursements and other disbursements incurred in the administration and execution of this Agreement and the exercise and performance of its duties hereunder. The Company also agrees to indemnify the Rights Agent for, and to hold it harmless against, any loss, liability, or expense, incurred without gross negligence, bad faith or willful misconduct on the part of the Rights Agent, for anything done or omitted by the Rights Agent in connection with the acceptance and administration of this Agreement, including the costs and expenses of defending against any claim of liability arising therefrom, directly or

indirectly. The provisions of this Section 18(a) shall survive the expiration of the Rights and the termination of this Agreement.

(b) The Rights Agent shall be protected and shall incur no liability for or in respect of any action taken, suffered or omitted by it in connection with its administration of this Agreement in reliance upon any Right Certificate or certificate for Common Stock, Preferred Stock, or other securities of the Company, instrument of assignment or transfer, power of attorney, endorsement, affidavit, letter, notice, direction, consent, certificate, statement, or other paper or document believed by it to be genuine and to be signed and executed by the proper Person or Persons.

(c) The Rights Agent shall not be liable for consequential damages under any provision of this Agreement or for any consequential damages arising out of any act or failure to act hereunder.

Section 19. Merger or Consolidation or Change of Name of Rights Agent.

(a) Any corporation into which the Rights Agent or any successor Rights Agent may be merged or with which it may be consolidated, or any corporation resulting from any merger or consolidation to which the Rights Agent or any successor Rights Agent shall be a party, or any corporation succeeding to the corporate trust or shareholder services business of the Rights Agent or any successor Rights Agent, shall be the successor to the Rights Agent under this Agreement without the execution or filing of any paper or any further act on the part of any of the parties hereto, provided that such corporation would be eligible for appointment as a successor Rights Agent under the provisions of Section 21 hereof. In case at the time such successor Rights Agent shall succeed to the agency created by this Agreement, any of the Right Certificates shall have been countersigned but not delivered, any such successor Rights Agent may adopt the countersignature of the predecessor Rights Agent and deliver such Right Certificates so countersigned; and in case at that time any of the Right Certificates shall not have been countersigned, any successor Rights Agent may countersign such Right Certificates either in the name of the predecessor or in the name of the successor Rights Agent; and in all such cases such Right Certificates shall have the full force provided in the Right Certificates and in this Agreement.

(b) In case at any time the name of the Rights Agent shall be changed and at such time any of the Right Certificates shall have been countersigned but not delivered, the Rights Agent may adopt the countersignature under its prior name and deliver Right Certificates so countersigned; and in case at that time any of the Right Certificates shall not have been countersigned, the Rights Agent may countersign such Right Certificates either in its prior name or in its changed name; and in all such cases such Right Certificates shall have the full force provided in the Right Certificates and in this Agreement.

Section 20. Duties of Rights Agent. The Rights Agent undertakes the duties and obligations expressly imposed by this Agreement upon the following terms and conditions, by all of which the Company and the holders of Right Certificates, by their acceptance thereof,

shall be bound:

(a) The Rights Agent may consult with legal counsel selected by it (who may be legal counsel for the Company), and the opinion of such counsel shall be full and complete authorization and protection to the Rights Agent as to any action taken or omitted by it in good faith and in accordance with such opinion.

(b) Whenever in the performance of its duties under this Agreement the Rights Agent shall deem it necessary or desirable that any fact or matter (including, without limitation, the identity of any Acquiring Person and the determination of "Fair Market Value") be proved or established by the Company prior to taking or suffering any action hereunder, such fact or matter (unless other evidence in respect thereof shall be herein specifically prescribed) may be deemed to be conclusively proved and established by a certificate signed by a person believed by the Rights Agent to be the Chairman of the Board, a Vice Chairman of the Board, the President, a Vice President, the Treasurer, any Assistant Treasurer, the Secretary or an Assistant Secretary of the Company and delivered to the Rights Agent. Any such certificate shall be full authorization to the Rights Agent for any action taken or suffered in good faith by it under the provisions of this Agreement in reliance upon such certificate.

(c) The Rights Agent shall be liable hereunder only for its own gross negligence, bad faith or willful misconduct.

(d) The Rights Agent shall not be liable for or by reason of any of the statements of fact or recitals contained in this Agreement or in the Right Certificates (except its countersignature thereof) or be required to verify the same, but all such statements and recitals are and shall be deemed to have been made by the Company only.

(e) The Rights Agent shall not be under any responsibility in respect of the validity of this Agreement or the execution and delivery hereof (except the due execution hereof by the Rights Agent) or in respect of the validity or execution of any Right Certificate (except its countersignature thereof); nor shall it be responsible for any breach by the Company of any covenant or condition contained in this Agreement or in any Right Certificate; nor shall it be responsible for any change in the exercisability of the Rights (including the Rights becoming void pursuant to Section 7(e) hereof) or any adjustment required under the provisions of Sections 11, 13 or 23(c) hereof or responsible for the manner, method or amount of any such adjustment or the ascertaining of the existence of facts that would require any such adjustment (except with respect to the exercise of Rights evidenced by Right Certificates after receipt of a certificate describing any such adjustment furnished in accordance with Section 12 hereof), nor shall it be responsible for any determination by the Board of Directors of the Company of the Fair Market Value of the Rights or Preferred Stock pursuant to the provisions of Section 14 hereof; nor shall it by any act hereunder be deemed to make any representation or warranty as to the authorization or reservation of any shares of Common Stock or Preferred Stock to be issued pursuant to this Agreement or any Right Certificate or as to whether any shares of Common Stock or Preferred Stock will, when so issued, be validly authorized and issued, fully paid and nonassessable.

(f) The Company agrees that it will perform, execute, acknowledge and deliver or cause to be performed, executed, acknowledged and delivered all such further and other acts, instruments and assurances as may reasonably be required by the Rights Agent for the carrying out or performing by the Rights Agent of the provisions of this Agreement.

(g) The Rights Agent is hereby authorized and directed to accept instructions with respect to the performance of its duties hereunder and certificates delivered pursuant to any provision hereof from any person believed by the Rights Agent to be the Chairman of the Board, any Vice Chairman of the Board, the President, a Vice President, the Secretary, an Assistant Secretary, the Treasurer or an Assistant Treasurer of the Company, and is authorized to apply to such officers for advice or instructions in connection with its duties, and it shall not be liable for any action taken or suffered to be taken by it in good faith in accordance with instructions of any such officer. Any application by the Rights Agent for written instructions from the Company may, at the option of the Rights Agent, set forth in writing any action proposed to be taken or omitted by the Rights Agent under this Agreement and the date on or after which such action shall be taken or such omission shall be effective. The Rights Agent shall not be liable for any action taken by, or omission of, the Rights Agent in accordance with a proposal included in such application on or after the date specified in such application (which date shall not be less than five Business Days after the date any officer of the Company actually receives such application, unless any such officer shall have consented in writing to an earlier date) unless, prior to taking any such action (or the effective date in the case of an omission), the Rights Agent shall have received written instructions in response to such application specifying the action to be taken or omitted.

(h) The Rights Agent and any shareholder, director, officer or employee of the Rights Agent may buy, sell or deal in any of the Rights or other securities of the Company or become pecuniarily interested in any transaction in which the Company may be interested, or contract with or lend money to the Company or otherwise act as fully and freely as though it were not the Rights Agent under this Agreement. Nothing herein shall preclude the Rights Agent from acting in any other capacity for the Company or for any other legal entity.

(i) The Rights Agent may execute and exercise any of the rights or powers hereby vested in it or perform any duty hereunder either itself or by or through its attorneys or agents, and the Rights Agent shall not be answerable or accountable for any act, omission, default, neglect or misconduct of any such attorneys or agents or for any loss to the Company or to the holders of the Rights resulting from any such act, omission, default, neglect or misconduct, provided reasonable care was exercised in the selection and continued employment thereof.

(j) No provision of this Agreement shall require the Rights Agent to expend or risk its own funds or otherwise incur any financial liability in the performance of any of its duties hereunder or in the exercise of its rights if there shall be reasonable grounds for believing that repayment of such funds or adequate indemnification against such risk or liability is not reasonably assured to it.

(k) If, with respect to any Right Certificate surrendered to the Rights Agent for exercise or transfer, the certificate attached to the form of assignment or form of election to purchase, as the case may be, has either not been completed or indicates an affirmative response to clause (1) or clause (2) thereof, the Rights Agent shall not take any further action with respect to such requested exercise or transfer without first consulting with the Company.

Section 21. Change of Rights Agent. The Rights Agent or any successor Rights Agent may resign and be discharged from its duties under this Agreement upon thirty (30) days' notice in writing mailed to the Company by first class mail. The Company may remove the Rights Agent or any successor Rights Agent (with or without cause) upon thirty (30) days' notice in writing, mailed to the Rights Agent or successor Rights Agent, as the case may be, and to each transfer agent of the Common Stock and Preferred Stock by registered or certified mail, and to the holders of the Right Certificates by first-class mail. If the Rights Agent shall resign or be removed or shall otherwise become incapable of acting, the Company shall appoint a successor to the Rights Agent. If the Company shall fail to make such appointment within a period of thirty (30) days after giving notice of such removal or after it has been notified in writing of such resignation or incapacity by the resigning or incapacitated Rights Agent or by the holder of a Right Certificate (who shall, with such notice, submit his Right Certificate for inspection by the Company), then the incumbent Rights Agent or the registered holder of any Right Certificate may apply to any court of competent jurisdiction for the appointment of a new Rights Agent. Any successor Rights Agent, whether appointed by the Company or by such a court, shall be (a) a corporation organized and doing business under the laws of the United States or of the Commonwealth of Massachusetts or the State of New York (or of any other state of the United States so long as such corporation is authorized to do business as a banking institution in the Commonwealth of Massachusetts or the State of New York), in good standing, which is authorized under such laws to exercise stock transfer or corporate trust powers and is subject to supervision or examination by federal or state authority and which has at the time of its appointment as Rights Agent a combined capital and surplus of at least $50,000,000 or (b) an Affiliate of a corporation described in clause (a) of this sentence. After appointment, the successor Rights Agent shall be vested with the same powers, rights, duties and responsibilities as if it had been originally named as Rights Agent without further act or deed; but the predecessor Rights Agent shall deliver and transfer to the successor Rights Agent any property at the time held by it hereunder, and execute and deliver any further assurance, conveyance, act or deed necessary for the purpose. Not later than the effective date of any such appointment, the Company shall file notice thereof in writing with the predecessor Rights Agent and each transfer agent of the Common Stock and the Preferred Stock, and mail a notice thereof in writing to the registered holders of the Right Certificates. Failure to give any notice provided for in this Section 21, however, or any defect therein, shall not affect the legality or validity of the resignation or removal of the Rights Agent or the appointment of the successor Rights Agent, as the case may be.

Section 22. Issuance of New Right Certificates. Notwithstanding any of the provisions of this Agreement or of the Rights to the contrary, the Company may, at its option, issue new Right Certificates evidencing Rights in such form as may be approved by its Board of Directors

to reflect any adjustment or change in the Exercise Price per share and the number or kind or class of shares of stock or other securities or property purchasable under the Right Certificates made in accordance with the provisions of this Agreement. In addition, in connection with the issuance or sale of shares of Common Stock following the Distribution Date and prior to the redemption or expiration of the Rights, the Company (a) shall, with respect to shares of Common Stock so issued or sold pursuant to the exercise of stock options or under any employee plan or arrangement, or upon the exercise, conversion or exchange of securities hereafter issued by the Company, and (b) may, in any other case, if deemed necessary or appropriate by the Board of Directors of the Company, issue Right Certificates representing the appropriate number of Rights in connection with such issuance or sale; provided, however, that (i) no such Right Certificate shall be issued if, and to the extent that, the Company shall be advised by counsel that such issuance would create a significant risk of material adverse tax consequences to the Company or the person to whom such Right Certificate would be issued, and (ii) no such Right Certificate shall be issued if, and to the extent that, appropriate adjustments shall otherwise have been made in lieu of the issuance thereof.

Section 23. Redemption and Termination.

(a) The Board of Directors of the Company may, at its option, redeem all but not less than all of the then outstanding Rights at a redemption price of $0.01 per Right, appropriately adjusted to reflect any dividend declared or paid on the Common Stock in shares of Common Stock or any subdivision or combination of the outstanding shares of Common Stock or similar event occurring after the date of this Agreement (such redemption price, as adjusted from time to time, being hereinafter referred to as the "Redemption Price"). The Rights may be redeemed only until the earliest to occur of (i) 5:00 P.M., Boston, Massachusetts time, on the tenth Business Day after the Stock Acquisition Date or (ii) the Final Expiration Date.

(b) Immediately upon the action of the Board of Directors of the Company ordering the redemption of the Rights, and without any further action and without any notice, the right to exercise the Rights will terminate and the only right thereafter of the holders of Rights shall be to receive the Redemption Price for each Right so held. Promptly after the action of the Board of Directors ordering the redemption of the Rights, the Company shall give notice of such redemption to the Rights Agent and the holders of the then outstanding Rights by mailing such notice to the Rights Agent and to all such holders at their last addresses as they appear upon the registry books of the Rights Agent or, prior to the Distribution Date, on the registry books of the Transfer Agent for the Common Stock. Any notice which is mailed in the manner herein provided shall be deemed given, whether or not the holder receives the notice. Each such notice of redemption will state the method by which the payment of the Redemption Price will be made. Neither the Company nor any of its Affiliates or Associates may redeem, acquire or purchase for value any Rights at any time in any manner other than that specifically set forth in this Section 23 or Section 24 hereof or in connection with the purchase of shares of Common Stock prior to the Distribution Date.

(c) The Company may, at its option, pay the Redemption Price in cash, shares

of Common Stock (based on the Fair Market Value of the Common Stock as of the time of redemption) or any other form of consideration deemed appropriate by the Board of Directors.

Section 24. Exchange.

(a) The Board of Directors of the Company may, at its option, at any time on or after the occurrence of a Section 11(a)(ii) Event, exchange all or part of the then outstanding and exercisable Rights (which shall not include Rights that have become void pursuant to the provisions of Section 7(e) hereof) for shares of Common Stock at an exchange ratio of one share of Common Stock per Right, appropriately adjusted to reflect any stock split, stock dividend or similar transaction occurring after the date hereof (such exchange ratio being hereinafter referred to as the "Exchange Ratio"). Notwithstanding the foregoing, the Board of Directors shall not be empowered to effect such exchange at any time after any Person (other than an Exempt Person), together with all Affiliates and Associates of such Person, becomes the Beneficial Owner of 50% or more of the Common Stock of the Company.

(b) Immediately upon the action of the Company ordering the exchange of any Rights pursuant to subsection (a) of this Section 24 and without any further action and without any notice, the right to exercise such Rights shall terminate and the only right thereafter of a holder of such Rights shall be to receive that number of shares of Common Stock equal to the number of such Rights held by such holder multiplied by the Exchange Ratio. The Company shall promptly give notice of any such exchange in accordance with Section 26 hereof; provided, however, that the failure to give, or any defect in, such notice shall not affect the validity of such exchange. Each such notice of exchange will state the method by which the exchange of the shares of Common Stock for Rights will be effected and, in the event of any partial exchange, the number of Rights which will be exchanged. Any partial exchange shall be effected pro rata based on the number of Rights (other than Rights which have become void pursuant to the provisions of Section 7(e) hereof) held by each holder of Rights.

(c) In any exchange pursuant to this Section 24, the Company, at its option, may substitute Preferred Stock (or preferred stock equivalent, as such term is defined in Section 11(b) hereof) for Common Stock exchangeable for Rights, at the initial rate of one one-thousandth of a share of Preferred Stock (or preferred stock equivalent) for each share of Common Stock, as appropriately adjusted to reflect adjustments in the voting rights of the Preferred Stock pursuant to the terms thereof, so that the fraction of a share of Preferred Stock delivered in lieu of each share of Common Stock shall have the same voting rights as one share of Common Stock.

(d) In the event that there shall not be sufficient shares of Common Stock or Preferred Stock (or preferred stock equivalent) issued but not outstanding or authorized but unissued to permit any exchange of Rights as contemplated in accordance with this Section 24, the Company shall take all such action as may be necessary to authorize additional shares of Common Stock or Preferred Stock (or preferred stock equivalent) for issuance upon exchange of the Rights.

(e) The Company shall not be required to issue fractions of Common Stock or to distribute certificates which evidence fractional shares of Common Stock. If the Company elects not to issue such fractional shares of Common Stock, the Company shall pay, in lieu of such fractional shares of Common Stock, to the registered holders of the Right Certificates with regard to which such fractional shares of Common Stock would otherwise be issuable, an amount in cash equal to the same fraction of the Fair Market Value of a whole share of Common Stock. For the purposes of this paragraph (e), the Fair Market Value of a whole share of Common Stock shall be the closing price of a share of Common Stock (as determined pursuant to the second sentence of Section 11(d)(i) hereof) for the Trading Day immediately prior to the date of exchange pursuant to this Section 24.

Section 25. Notice of Certain Events.

(a) In case the Company shall propose, at any time after the Distribution Date, (i) to pay any dividend payable in stock of any class to the holders of Preferred Stock or to make any other distribution to the holders of Preferred Stock (other than a regular periodic cash dividend out of earnings or retained earnings of the Company), or (ii) to offer to the holders of Preferred Stock rights or warrants to subscribe for or to purchase any additional shares of Preferred Stock or shares of stock of any class or any other securities, rights or options, or (iii) to effect any reclassification of its Preferred Stock (other than a reclassification involving only the subdivision of outstanding shares of Preferred Stock), or (iv) to effect any consolidation or merger into or with, or to effect any sale, mortgage or other transfer (or to permit one or more of its Subsidiaries to effect any sale, mortgage or other transfer), in one transaction or a series of related transactions, of 50% or more of the assets or earning power of the Company and its Subsidiaries (taken as a whole) to, any other Person (other than a Subsidiary of the Company in one or more transactions each of which is not prohibited by Section 11(n) hereof), or (v) to effect the liquidation, dissolution or winding up of the Company, (vi) to declare or pay any dividend on the Common Stock payable in Common Stock or to effect a subdivision, combination or consolidation of the Common Stock (by reclassification or otherwise than by payment of dividends in Common Stock) then in each such case, the Company shall give to each holder of a Right Certificate and to the Rights Agent, in accordance with Section 26 hereof, a notice of such proposed action, which shall specify the record date for the purposes of such stock dividend, distribution of rights or warrants, or the date on which such reclassification, consolidation, merger, sale, transfer, liquidation, dissolution, or winding up is to take place and the date of participation therein by the holders of the shares of Common Stock and/or Preferred Stock, if any such date is to be fixed, and such notice shall be so given in the case of any action covered by clause (i) or (ii) above at least twenty (20) days prior to the record date for determining holders of the shares of Preferred Stock for purposes of such action, and in the case of any such other action, at least twenty (20) days prior to the date of the taking of such proposed action or the date of participation therein by the holders of the shares of Common Stock and/or Preferred Stock, whichever shall be the earlier.

(b) In case any Section 11(a)(ii) Event shall occur, then, in any such case, the Company shall as soon as practicable thereafter give to each registered holder of a Right Certificate and to the Rights Agent, in accordance with Section 26 hereof, a notice of the

occurrence of such event, which shall specify the event and the consequences of the event to holders of Rights under Section 11(a)(ii) hereof.

Section 26. Notices. Notices or demands authorized by this Agreement to be given or made by the Rights Agent or by the holder of any Right Certificate to or on the Company shall be sufficiently given or made if sent by first-class mail, postage prepaid, addressed (until another address is filed in writing with the Rights Agent) as follows:

T Cell Sciences, Inc.
115 4th Avenue
Needham, MA 02194

Subject to the provisions of Section 21, any notice or demand authorized by this Agreement to be given or made by the Company or by the holder of any Right Certificate to or on the Rights Agent shall be sufficiently given or made if sent by first-class mail, postage prepaid, addressed (until another address is filed in writing with the Company) as follows:

State Street Bank and Trust Company
c/o Boston Financial Data Services, Inc.
Two Heritage Drive
Quincy, MA 02171
Attention: Administration

Notices or demands authorized by this Agreement to be given or made by the Company or the Rights Agent to the holder of any Right Certificate (or, prior to the Distribution Date, to the holder of any certificate representing shares of Common Stock) shall be sufficiently given or made if sent by first-class mail, postage prepaid, addressed to such holder at the address of such holder as shown on the registry books of the Company.

Section 27. Supplements and Amendments. Prior to the Distribution Date, the Company and the Rights Agent shall, if the Company so directs, supplement or amend any provision of this Agreement as the Company may deem necessary or desirable without the approval of any holders of certificates representing shares of Common Stock. From and after the Distribution Date, the Company and the Rights Agent shall, if the Company so directs, supplement or amend this Agreement without the approval of any holder of Right Certificates in order (i) to cure any ambiguity, (ii) to correct or supplement any provision contained herein which may be defective or inconsistent with any other provisions herein, (iii) to shorten or lengthen any time period hereunder, or (iv) to change or supplement the provisions hereof in any manner which the Company may deem necessary or desirable and which shall not adversely affect the interests of the holders of Right Certificates (other than an Acquiring Person or any Affiliate or Associate of an Acquiring Person); provided, however, that from and after the Distribution Date this Agreement may not be supplemented or amended to lengthen, pursuant to clause (iii) of this sentence, (A) a time period relating to when the Rights may be redeemed at such time as the Rights are not then redeemable or (B) any other time period unless such lengthening is for the purpose of protecting, enhancing or clarifying the

rights of, and the benefits to, the holders of Rights. Upon the delivery of such certificate from an appropriate officer of the Company which states that the proposed supplement or amendment is in compliance with the terms of this Section 27, the Rights Agent shall execute such supplement or amendment. Prior to the Distribution Date, the interests of the holders of Rights shall be deemed coincident with the interests of the holders of Common Stock. Notwithstanding any other provision hereof, the Rights Agent's consent must be obtained regarding any amendment or supplement pursuant to this Section 27 which alters the Rights Agent's rights or duties.

Section 28. Successors. All the covenants and provisions of this Agreement by or for the benefit of the Company or the Rights Agent shall bind and inure to the benefit of their respective successors and assigns hereunder.

Section 29. Determinations and Actions by the Board of Directors. For all purposes of this Agreement, any calculation of the number of shares of Common Stock outstanding at any particular time, including for purposes of determining the particular percentage of such outstanding shares of Common Stock of which any Person is the Beneficial Owner, shall be made in accordance with the last sentence of Rule 13d-3(d)(1)(i) of the Rules under the Exchange Act as in effect on the date hereof. The Board of Directors of the Company shall have the exclusive power and authority to administer this Agreement and to exercise all rights and powers specifically granted to the Board or to the Company, or as may be necessary or advisable in the administration of this Agreement, including without limitation, the right and power to (i) interpret the provisions of this Agreement and (ii) make all determinations deemed necessary or advisable for the administration of this Agreement (including a determination to redeem or not redeem the Rights or to amend the Agreement). All such actions, calculations, interpretations and determinations (including, for purposes of clause (y) below, all omissions with respect to the foregoing) which are done or made by the Board of Directors in good faith shall (x) be final, conclusive and binding on the Company, the Rights Agent, the holders of the Rights and all other parties, and (y) not subject any member of the Board of Directors to any liability to the holders of the Rights or to any other person.

Section 30. Benefits of this Agreement. Nothing in this Agreement shall be construed to give to any person or corporation other than the Company, the Rights Agent and the registered holders of the Right Certificates (and, prior to the Distribution Date, the Common Stock) any legal or equitable right, remedy or claim under this Agreement; but this Agreement shall be for the sole and exclusive benefit of the Company, the Rights Agent and the registered holders of the Right Certificates (and, prior to the Distribution Date, registered holders of the Common Stock).

Section 31. Severability. If any term, provision, covenant or restriction of this Agreement is held by a court of competent jurisdiction or other authority to be invalid, void or unenforceable, the remainder of the terms, provisions, covenants and restrictions of this Agreement shall remain in full force and effect and shall in no way be affected, impaired or invalidated.

Section 32. Governing Law. This Agreement, each Right and each Right Certificate issued hereunder shall be deemed to be a contract made under the laws of the State of Delaware and for all purposes shall be governed by and construed in accordance with the laws of such State applicable to contracts to be made and to be performed entirely within Delaware.

Section 33. Counterparts. This Agreement may be executed in any number of counterparts and each of such counterparts shall for all purposes be deemed to be an original, and all such counterparts shall together constitute but one and the same instrument.

Section 34. Descriptive Headings. Descriptive headings of the several Sections of this Agreement are inserted for convenience only and shall not control or affect the meaning or construction of any of the provisions hereof.

[Remainder of page intentionally left blank.]

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be duly executed and their respective corporate seals to be hereunto affixed and attested, all as of the day and year first above written.

ATTEST:

T CELL SCIENCES, INC.

By: _____

By: _____
Name:
Title:

ATTEST:

STATE STREET BANK AND
TRUST COMPANY, as Rights Agent

By: _____

By: _____
Name:
Title:

Exhibit A

VOTE OF DIRECTORS ESTABLISHING
Series C-1 JUNIOR PARTICIPATING CUMULATIVE
PREFERRED STOCK

of

T CELL SCIENCES, INC.

Pursuant to Section 151 of the General Corporation Law of the State of Delaware:

VOTED, that pursuant to authority conferred upon and vested in the Board of Directors by the Third Restated Certificate of Incorporation, as amended as of the date hereof (the "Certificate of Incorporation"), of T Cell Sciences, Inc. (the "Corporation"), the Board of Directors hereby establishes and designates a series of Class C Preferred Stock of the Corporation, and hereby fixes and determines the relative rights and preferences of the shares of such series, in addition to those set forth in the Certificate of Incorporation, as follows:

Section 1. Designation and Amount. The shares of such series shall be designated as "Series C-1 Junior Participating Cumulative Preferred Stock" (the "Series C-1 Preferred Stock"), and the number of shares initially constituting such series shall be 350,000; provided, however, that if more than a total of 350,000 shares of Series C-1 Preferred Stock shall be issuable upon the exercise of Rights (the "Rights") issued pursuant to the Shareholder Rights Agreement dated as of November 10, 1994, between the Corporation and State Street Bank and Trust Company, as Rights Agent (the "Rights Agreement"), the Board of Directors of the Corporation, pursuant to Section 151(g) of the General Corporation Law of the State of Delaware, shall direct by resolution or resolutions that a certificate be properly executed, acknowledged, filed and recorded, in accordance with the provisions of Section 103 thereof, providing for the total number of shares of Series C-1 Preferred Stock authorized to be issued to be increased (to the extent that the Certificate of Incorporation then permits) to the largest number of whole shares (rounded up to the nearest whole number) issuable upon exercise of such Rights.

Section 2. Dividends and Distributions.

(A) (i) Subject to the rights of the holders of any shares of any series of preferred stock (or any similar stock) ranking prior and superior to the Series C-1 Preferred Stock with respect to dividends, the holders of shares of Series C-1 Preferred Stock, in preference to the holders of shares of common stock and of any other junior stock, shall be entitled to receive, when, as and if declared by the Board of Directors out of funds legally available for the purpose, quarterly dividends payable in cash on the first day of March, June, September and December in each year (each such date being referred to herein as a "Quarterly Dividend Payment Date"), commencing on the first Quarterly Dividend Payment Date after the first issuance of a share or fraction of a share of Series C-1

Preferred Stock, in an amount per share (rounded to the nearest cent) equal to the greater of (a) $1.00 or (b) subject to the provisions for adjustment hereinafter set forth, 1000 times the aggregate per share amount of all cash dividends, and 1000 times the aggregate per share amount (payable in kind) of all non-cash dividends or other distributions other than a dividend payable in shares of common stock or a subdivision of the outstanding shares of common stock (by reclassification or otherwise), declared on the common stock since the immediately preceding Quarterly Dividend Payment Date, or, with respect to the first Quarterly Dividend Payment Date, since the first issuance of any share or fraction of a share of Series C-1 Preferred Stock. The multiple of cash and non-cash dividends declared on the common stock to which holders of the Series C-1 Preferred Stock are entitled, which shall be 1000 initially but which shall be adjusted from time to time as hereinafter provided, is hereinafter referred to as the "Dividend Multiple." In the event the Corporation shall at any time after November 10, 1994 (the "Rights Declaration Date") (i) declare or pay any dividend on common stock payable in shares of common stock, or (ii) effect a subdivision or combination or consolidation of the outstanding shares of common stock (by reclassification or otherwise than by payment of a dividend in shares of common stock) into a greater or lesser number of shares of common stock, then in each such case the Dividend Multiple thereafter applicable to the determination of the amount of dividends which holders of shares of Series C-1 Preferred Stock shall be entitled to receive shall be the Dividend Multiple applicable immediately prior to such event multiplied by a fraction, the numerator of which is the number of shares of common stock outstanding immediately after such event and the denominator of which is the number of shares of common stock that were outstanding immediately prior to such event.

(ii) Notwithstanding anything else contained in this paragraph (A), the Corporation shall, out of funds legally available for that purpose, declare a dividend or distribution on the Series C-1 Preferred Stock as provided in this paragraph (A) immediately after it declares a dividend or distribution on the common stock (other than a dividend payable in shares of common stock); provided that, in the event no dividend or distribution shall have been declared on the common stock during the period between any Quarterly Dividend Payment Date and the next subsequent Quarterly Dividend Payment Date, a dividend of $1.00 per share on the Series C-1 Preferred Stock shall nevertheless be payable on such subsequent Quarterly Dividend Payment Date.

(B) Dividends shall begin to accrue and be cumulative on outstanding shares of Series C-1 Preferred Stock from the Quarterly Dividend Payment Date next preceding the date of issue of such shares of Series C-1 Preferred Stock, unless the date of issue of such shares is prior to the record date for the first Quarterly Dividend Payment Date, in which case dividends on such shares shall begin to accrue from the date of issue of such shares, or unless the date of issue is a Quarterly Dividend Payment Date or is a date after the record date for the determination of holders of shares of Series C-1 Preferred Stock entitled to receive a quarterly dividend and before such Quarterly Dividend Payment Date, in either of which events such dividends shall begin to accrue and be cumulative from such Quarterly Dividend Payment Date. Accrued but unpaid dividends shall not bear interest. Dividends paid on the shares of Series C-1 Preferred Stock in an amount less than the total amount of such dividends at the time accrued and payable on such shares shall be allocated pro rata on a share-by-share basis among all such shares at the time outstanding. The Board of Directors may fix in accordance with applicable law a record date for the determination of holders of shares of Series C-1 Preferred Stock entitled to receive payment of a dividend or distribution declared

thereon, which record date shall be not more than such number of days prior to the date fixed for the payment thereof as may be allowed by applicable law.

Section 3. Voting Rights. In addition to any other voting rights required by law, the holders of shares of Series C-1 Preferred Stock shall have the following voting rights:

(A) Subject to the provision for adjustment hereinafter set forth, each share of Series C-1 Preferred Stock shall entitle the holder thereof to 1000 votes on all matters submitted to a vote of the stockholders of the Corporation. The number of votes which a holder of a share of Series C-1 Preferred Stock is entitled to cast, which shall initially be 1000 but which may be adjusted from time to time as hereinafter provided, is hereinafter referred to as the "Vote Multiple." In the event the Corporation shall at any time after the Rights Declaration Date (i) declare or pay any dividend on common stock payable in shares of common stock, or (ii) effect a subdivision or combination or consolidation of the outstanding shares of common stock (by reclassification or otherwise than by payment of a dividend in shares of common stock) into a greater or lesser number of shares of common stock, then in each such case the Vote Multiple thereafter applicable to the determination of the number of votes per share to which holders of shares of Series C-1 Preferred Stock shall be entitled shall be the Vote Multiple immediately prior to such event multiplied by a fraction, the numerator of which is the number of shares of common stock outstanding immediately after such event and the denominator of which is the number of shares of common stock that were outstanding immediately prior to such event.

(B) Except as otherwise provided herein or by law, the holders of shares of Series C-1 Preferred Stock and the holders of shares of common stock and the holders of shares of any other capital stock of this Corporation having general voting rights, shall vote together as one class on all matters submitted to a vote of stockholders of the Corporation.

(C) Except as otherwise required by applicable law or as set forth herein, holders of Series C-1 Preferred Stock shall have no special voting rights and their consent shall not be required (except to the extent they are entitled to vote with holders of common stock as set forth herein) for taking any corporate action.

Section 4. Certain Restrictions.

(A) Whenever dividends or distributions payable on the Series C-1 Preferred Stock as provided in Section 2 are in arrears, thereafter and until all accrued and unpaid dividends and distributions, whether or not declared, on shares of Series C-1 Preferred Stock outstanding shall have been paid in full, the Corporation shall not:

(i) declare or pay dividends on, make any other distributions on, or redeem or purchase or otherwise acquire for consideration any shares of stock ranking junior (either as to dividends or upon liquidation, dissolution or winding up) to the Series C-1 Preferred Stock;

(ii) declare or pay dividends on or make any other distributions on any shares of stock

ranking on a parity (either as to dividends or upon liquidation, dissolution or winding up) with the Series C-1 Preferred Stock, except dividends paid ratably on the Series C-1 Preferred Stock and all such parity stock on which dividends are payable or in arrears in proportion to the total amounts to which the holders of all such shares are then entitled;

(iii) except as permitted in subsection 4(A)(iv) below, redeem, purchase or otherwise acquire for consideration shares of any stock ranking on a parity (either as to dividends or upon liquidation, dissolution or winding up) with the Series C-1 Preferred Stock, provided that the Corporation may at any time redeem, purchase or otherwise acquire shares of any such parity stock in exchange for shares of any stock of the Corporation ranking junior (either as to dividends or upon dissolution, liquidation or winding up) to the Series C-1 Preferred Stock; or

(iv) purchase or otherwise acquire for consideration any shares of Series C-1 Preferred Stock, or any shares of any stock ranking on a parity (either as to dividends or upon liquidation, dissolution or winding up) with the Series C-1 Preferred Stock, except in accordance with a purchase offer made in writing or by publication (as determined by the Board of Directors) to all holders of such shares upon such terms as the Board of Directors, after consideration of the respective annual dividend rates and other relative rights and preferences of the respective series and classes, shall determine in good faith will result in fair and equitable treatment among the respective series or classes.

(B) The Corporation shall not permit any subsidiary of the Corporation to purchase or otherwise acquire for consideration any shares of stock of the Corporation unless the Corporation could, under subsection (A) of this Section 4, purchase or otherwise acquire such shares at such time and in such manner.

Section 5. Reacquired Shares. Any shares of Series C-1 Preferred Stock purchased or otherwise acquired by the Corporation in any manner whatsoever shall be retired and cancelled promptly after the acquisition thereof. All such shares shall upon their cancellation become authorized but unissued shares of preferred stock and may be reissued as part of a new series of preferred stock to be created by resolution or resolutions of the Board of Directors, subject to the conditions and restrictions on issuance set forth herein.

Section 6. Liquidation, Dissolution or Winding Up. Upon any liquidation (voluntary or otherwise), dissolution or winding up of the Corporation, no distribution shall be made (x) to the holders of shares of stock ranking junior (either as to dividends or upon liquidation, dissolution or winding up) to the Series C-1 Preferred Stock unless, prior thereto, the holders of shares of Series C-1 Preferred Stock shall have received an amount equal to accrued and unpaid dividends and distributions thereon, whether or not declared, to the date of such payment, plus an amount equal to the greater of (1) $1000.00 per share or (2) an aggregate amount per share, subject to the provision for adjustment hereinafter set forth, equal to 1000 times the aggregate amount to be distributed per share to holders of common stock, or (y) to the holders of stock ranking on a parity (either as to dividends or upon liquidation, dissolution or winding up) with the Series C-1 Preferred Stock, except

distributions made ratably on the Series C-1 Preferred Stock and all other such parity stock in proportion to the total amounts to which the holders of all such shares are entitled upon such liquidation, dissolution or winding up. In the event the Corporation shall at any time after the Rights Declaration Date (i) declare or pay any dividend on common stock payable in shares of common stock, or (ii) effect a subdivision or combination or consolidation of the outstanding shares of common stock (by reclassification or otherwise than by payment of a dividend in shares of common stock) into a greater or lesser number of shares of common stock, then in each such case the aggregate amount per share to which holders of shares of Series C-1 Preferred Stock were entitled immediately prior to such event under clause (x) of the preceding sentence shall be adjusted by multiplying such amount by a fraction, the numerator of which is the number of shares of common stock outstanding immediately after such event and the denominator of which is the number of shares of common stock that were outstanding immediately prior to such event.

Neither the consolidation of nor merging of the Corporation with or into any other corporation or corporations, nor the sale or other transfer of all or substantially all of the assets of the Corporation, shall be deemed to be a liquidation, dissolution or winding up of the Corporation within the meaning of this Section 6.

Section 7. Consolidation, Merger, etc. In case the Corporation shall enter into any consolidation, merger, combination or other transaction in which the shares of common stock are exchanged for or changed into other stock or securities, cash and/or any other property, then in any such case the shares of Series C-1 Preferred Stock shall at the same time be similarly exchanged or changed in an amount per share (subject to the provision for adjustment hereinafter set forth) equal to 1000 times the aggregate amount of stock, securities, cash and/or any other property (payable in kind), as the case may be, into which or for which each share of common stock is changed or exchanged, plus accrued and unpaid dividends, if any, payable with respect to the Series C-1 Preferred Stock. In the event the Corporation shall at any time after the Rights Declaration Date (i) declare or pay any dividend on common stock payable in shares of common stock, or (ii) effect a subdivision or combination or consolidation of the outstanding shares of common stock (by reclassification or otherwise than by payment of a dividend in shares of common stock) into a greater or lesser number of shares of common stock, then in each such case the amount set forth in the preceding sentence with respect to the exchange or change of shares of Series C-1 Preferred Stock shall be adjusted by multiplying such amount by a fraction, the numerator of which is the number of shares of common stock outstanding immediately after such event and the denominator of which is the number of shares of common stock that were outstanding immediately prior to such event.

Section 8. Redemption. The shares of Series C-1 Preferred Stock shall not be redeemable.

Section 9. Ranking. Unless otherwise provided in the Certificate of Incorporation or a Certificate of Vote of Directors Establishing a Class of Stock relating to a subsequently-designated series of preferred stock of the Corporation, the Series C-1 Preferred Stock shall rank junior to any other series of the Corporation's preferred stock subsequently issued, as to the payment of dividends and the distribution of assets on liquidation, dissolution or winding up and shall rank senior to the common stock.

Section 10. Amendment. The Certificate of Incorporation and this Certificate of Vote of Directors shall not be amended in any manner which would materially alter or change the powers, preferences or special rights of the Series C-1 Preferred Stock so as to affect them adversely without the affirmative vote of the holders of two-thirds or more of the outstanding shares of Series C-1 Preferred Stock, voting separately as a class.

Section 11. Fractional Shares. Series C-1 Preferred Stock may be issued in whole shares or in any fraction of a share that is one one-thousandth (1/1000th) of a share or any integral multiple of such fraction, which shall entitle the holder, in proportion to such holder's fractional shares, to exercise voting rights, receive dividends, participate in distributions and to have the benefit of all other rights of holders of Series C-1 Preferred Stock. In lieu of fractional shares, the Corporation may elect to make a cash payment as provided in the Rights Agreement for fractions of a share other than one one-thousandth (1/1000th) of a share or any integral multiple thereof.

Exhibit B

[Form of Right Certificate]

Certificate No. R- _____ Rights

NOT EXERCISABLE AFTER NOVEMBER 10, 2004 OR EARLIER IF NOTICE OF REDEMPTION IS GIVEN. THE RIGHTS ARE SUBJECT TO REDEMPTION, AT THE OPTION OF T CELL SCIENCES, INC., AT $0.01 PER RIGHT ON THE TERMS SET FORTH IN THE SHAREHOLDER RIGHTS AGREEMENT BETWEEN T CELL SCIENCES, INC. AND STATE STREET BANK AND TRUST COMPANY, AS RIGHTS AGENT, DATED AS OF NOVEMBER 10, 1994 (THE "RIGHTS AGREEMENT"). UNDER CERTAIN CIRCUMSTANCES SPECIFIED IN SECTION 7(e) OF THE RIGHTS AGREEMENT, RIGHTS BENEFICIALLY OWNED BY AN ACQUIRING PERSON OR AN ASSOCIATE OR AFFILIATE OF AN ACQUIRING PERSON (AS SUCH TERMS ARE DEFINED IN THE RIGHTS AGREEMENT) AND ANY SUBSEQUENT HOLDER OF SUCH RIGHTS MAY BECOME NULL AND VOID.

Right Certificate

T CELL SCIENCES, INC.

This certifies that _____, or registered assigns, is the registered owner of the number of Rights set forth above, each of which entitles the owner thereof, subject to the terms, provisions and conditions of the Shareholder Rights Agreement dated as of November 10, 1994 (the "Rights Agreement") between T CELL SCIENCES, INC. (the "Company") and STATE STREET BANK AND TRUST COMPANY, as Rights Agent (the "Rights Agent"), to purchase from the Company at any time after the Distribution Date (as such term is defined in the Rights Agreement) and prior to the close of business on November 10, 2004 at the office or offices of the Rights Agent designated for such purpose, or its successors as Rights Agent, one one-thousandth of a fully paid, non-assessable share of the Series C-1 Junior Participating Cumulative Preferred Stock (the "Preferred Stock") of the Company, at a purchase price of $16.00 per one one-thousandth of a share (the "Exercise Price"), upon presentation and surrender of this Right Certificate with the Form of Election to Purchase and the related Certificate duly executed. The number of Rights evidenced by this Right Certificate (and the number of shares which may be purchased upon exercise thereof) set forth above, and the Exercise Price per share set forth above, are the number and Exercise Price as of_____, based on the Preferred Stock as constituted at such date.

Upon the occurrence of a Section 11(a)(ii) Event (as such term is defined in the Rights Agreement), if the Rights evidenced by this Right Certificate are beneficially owned by (i) an Acquiring Person or an Affiliate or Associate of any such Person (as such terms are defined in the Rights Agreement), (ii) a transferee of any such Acquiring Person, Associate or Affiliate, or (iii) under certain circumstances specified in the Rights Agreement, a transferee of a Person who, after such transfer, became an Acquiring Person or an Affiliate or Associate of an Acquiring Person, such Rights shall become null and void and no holder hereof shall have any right with respect to such Rights from and after the occurrence of such Section 11(a)(ii) Event.

As provided in the Rights Agreement, the Exercise Price and the number of shares of Preferred Stock or other securities which may be purchased upon the exercise of the Rights evidenced by this Right Certificate are subject to modification and adjustment upon the happening of certain events.

This Right Certificate is subject to all of the terms, provisions and conditions of the Rights Agreement, which terms, provisions and conditions are hereby incorporated herein by reference and made a part hereof and to which Rights Agreement reference is hereby made for a full description of the rights, limitations of rights, obligations, duties and immunities hereunder of the Rights Agent, the Company and the holders of the Right Certificates, which limitations of rights include the temporary suspension of the exercisability of such Rights under the specific circumstances set forth in the Rights Agreement. Copies of the Rights Agreement are on file at the principal office of the Company and the designated office of the Rights Agent and are also available upon written request to the Company or the Rights Agent.

This Right Certificate, with or without other Right Certificates, upon surrender at the office or offices of the Rights Agent designated for such purpose, may be exchanged for another Right Certificate or Certificates of like tenor and date evidencing Rights entitling the holder to purchase a like aggregate number of shares of Preferred Stock as the Rights evidenced by the Right Certificate or Certificates surrendered shall have entitled such holder to purchase. If this Right Certificate shall be exercised in part, the holder shall be entitled to receive upon surrender hereof another Right Certificate or Certificates for the number of whole Rights not exercised. If this Right Certificate shall be exercised in whole or in part pursuant to Section 11(a)(ii) of the Rights Agreement, the holder shall be entitled to receive this Right Certificate duly marked to indicate that such exercise has occurred as set forth in the Rights Agreement.

Under certain circumstances, subject to the provisions of the Rights Agreement, the Board of Directors of the Company at its option may exchange all or any part of the Rights evidenced by this Certificate for shares of the Company's Common Stock or Preferred Stock at an exchange ratio (subject to adjustment) of one share of Common Stock or one one-thousandth of a share of Preferred Stock per Right.

Subject to the provisions of the Rights Agreement, the Rights evidenced by this Certificate may be redeemed by the Board of Directors of the Company at its option at a redemption price of $0.01 per Right (payable in cash, Common Stock or other consideration deemed appropriate by the Board of Directors).

The Company is not obligated to issue fractional shares of stock upon the exercise of any Right or Rights evidenced hereby (other than fractions which are integral multiples of one one-thousandth of a share of Preferred Stock, which may, at the election of the Company, be evidenced by depositary receipts). If the Company elects not to issue such fractional shares, in lieu thereof a cash payment will be made, as provided in the Rights Agreement.

No holder of this Right Certificate, as such, shall be entitled to vote or receive dividends or be deemed for any purpose the holder of shares of Preferred Stock, Common Stock or any other securities of the Company which may at any time be issuable on the exercise hereof, nor shall anything contained in the Rights Agreement or herein be construed to confer upon the holder hereof, as such, any of the rights of a stockholder of the Company or any right to vote for the election of directors or upon any matter submitted to stockholders at any meeting thereof, or to give or withhold consent to any corporate action, or to receive notice of meetings or other actions affecting stockholders (except as provided in the Rights Agreement), or to receive dividends or subscription rights, or otherwise, until the Right or Rights evidenced by this Right Certificate shall have been exercised as provided in the Rights Agreement.

This Right Certificate shall not be valid or obligatory for any purpose until it shall have been countersigned by an authorized signatory of the Rights Agent.

WITNESS the facsimile signature of the proper officers of the Company and its corporate seal.

[Corporate Seal]

T CELL SCIENCES, INC.

Attested:

By _____
[Secretary or Assistant Secretary]

By _____
Name:
Title: [Chairman, Vice Chairman, President or Vice President]

Countersigned:

STATE STREET BANK
AND TRUST COMPANY,
as Rights Agent

Authorized Signatory

Date of countersignature:

[Form of Reverse Side of Right Certificate]

FORM OF ASSIGNMENT

(To be executed by the registered holder if such holder desires to transfer the Right Certificate.)

FOR VALUE RECEIVED _____ hereby sells, assigns and transfers unto _____ (Please print name and address of transferee) _____ this Right Certificate, together with all right, title and interest therein, and does hereby irrevocably constitute and appoint _____ Attorney, to transfer the within Right Certificate on the books of the within-named Company, with full power of substitution.

Dated: _____

_____
Signature

Signature Guaranteed: _____

CERTIFICATE

The undersigned hereby certifies by checking the appropriate boxes that:

(1) the Rights evidenced by this Right Certificate ____ are ____ are not being transferred by or on behalf of a Person who is or was an Acquiring Person or an Affiliate or Associate of any such Person (as such terms are defined in the Rights Agreement); and

(2) after due inquiry and to the best knowledge of the undersigned, the undersigned __ did __ did not directly or indirectly acquire the Rights evidenced by this Right Certificate from any Person who is, was or became an Acquiring Person or an Affiliate or Associate of any such Person.

Dated: _____ _____
Signature

NOTICE

The signature to the foregoing Assignment and Certificate must correspond to the name as written upon the face of this Right Certificate in every particular, without alteration or enlargement or any change whatsoever.

FORM OF ELECTION TO PURCHASE

(To be executed if holder desires to
exercise the Right Certificate.)

To T CELL SCIENCES, INC.:

The undersigned hereby irrevocably elects to exercise _____ Rights represented by this Right Certificate to purchase the shares of Preferred Stock issuable upon the exercise of the Rights (or such other securities of the Company or of any other person which may be issuable upon the exercise of the Rights) and requests that certificates for such shares be issued in the name of:

Please insert social security
or other identifying taxpayer number: _____

_____
(Please print name and address)

_____

If such number of Rights shall not be all the Rights evidenced by this Right Certificate or if the Rights are being exercised pursuant to Section 11(a)(ii) of the Rights Agreement, a new Right Certificate for the balance of such Rights shall be registered in the name of and delivered to:

Please insert social security
or other identifying taxpayer number: _____

_____
(Please print name and address)

_____

_____

Dated: _____

_____
Signature

Signature Guaranteed: _____

CERTIFICATE

The undersigned hereby certifies by checking the appropriate boxes that:

(1) the Rights evidenced by this Right Certificate ____ are ____ are not being exercised by or on behalf of a Person who is or was an Acquiring Person or an Affiliate or Associate of any such Person (as such terms are defined in the Rights Agreement); and

(2) after due inquiry and to the best knowledge of the undersigned, the undersigned __ did __ did not directly or indirectly acquire the Rights evidenced by this Right Certificate from any Person who is, was or became an Acquiring Person or an Affiliate or Associate of any such Person.

Dated: _____ _____

Signature

NOTICE

The signature to the foregoing Election to Purchase and Certificate must correspond to the name as written upon the face of this Right Certificate in every particular, without alteration or enlargement or any change whatsoever.

Exhibit 10.4

VIRUS RESEARCH INSTITUTE, INC.

1992 Equity Incentive Plan
Amended and Restated as of May 10, 1996

Section 1. Purpose. The purpose of the Virus Research Institute, Inc. 1992 Equity Incentive Plan, as amended and restated (the "Plan"), is to attract and retain officers, employees, directors and consultants to provide an incentive for them to assist the Company to achieve long-range performance goals and to enable them to participate in the long-term growth of the Company.

Section 2. Definitions.

"Act" means the Securities Exchange Act of 1934, as amended.

"Affiliate" means any business entity in which the Company owns directly or indirectly 50% or more of the total combined voting power or has a significant financial interest as determined by the Committee.

"Award" means any Option or Restricted Stock awarded under the Plan.

"Board" means the Board of Directors of the Company.

"Change of Control" has the meaning set forth in Section 10.

"Code" means the Internal Revenue Code of 1986, as amended from time to time and any successor code and related rules, regulations and interpretations.

"Committee" means the Committee of the Board referred to in Section 3.

"Common Stock" or "Stock" means the Common Stock, $0.001 par value, of the Company, subject to adjustments pursuant to Section 5(b).

"Company" means Virus Research Institute, Inc.

"Designated Beneficiary" means the beneficiary designated by a Participant, in a manner determined by the Committee, to receive amounts due or exercise rights of the Participant in the event of the Participant's death. In the absence of an effective designation by a Participant, designated Beneficiary shall mean the Participant's estate.

"Disinterested Person" means an Independent Director who qualifies as a "disinterested person" under Rule 16b-3(c)(2)(i) promulgated under the Act, or any successor definition under said Rule.

"Fair Market Value" means (i) with respect to Common Stock, (x) if the Common Stock is listed or admitted for trading on any national securities exchange, the last sales price or the closing bid price if no sale occurred, of Common Stock on the principal securities exchange on which such class of stock is listed, (y) if the Common Stock is not listed or admitted for trading on any such exchange, the last reported sales price of Common Stock on the Nasdaq Stock Market, or any similar system of automatic quotation of securities prices then in common use, if so quoted, or (z) if not so quoted as described in clause (y), the mean between the high and the low asked quotations for the Common Stock as reported by the National Quotation Bureau Incorporated if at least two securities dealers have inserted both bid and asked quotations for such class of stock on at least five of the ten trading days preceding the day in question; or (ii) with respect to any other property, the fair market value of such property as determined by the Committee in good faith or in the manner established by the Committee from time to time. Notwithstanding the foregoing, the Fair Market Value of the Common Stock on the effective date of the Company's initial public offering shall be the offering price to the public of the Common Stock on such date.

"Incentive Stock Option" means an option to purchase shares of Common Stock awarded to a Participant under Section 6 which is intended to meet the requirements of Section 422 of the Code or any successor provision.

"Independent Director" means a member of the Board who is not also an employee of the Company.

"Nonstatutory Stock Option" means an option to purchase shares of Common Stock awarded to a Participant under Sections 6 or 7 which is not intended to be an Incentive Stock Option.

"Option" means an Incentive Stock Option or a Nonstatutory Stock Option.

"Participant" means a person selected by the Committee to receive an Award under the Plan.

"Restricted Period" means the period of time selected by the Committee during which an award of Restricted Stock may be forfeited to the Company.

"Restricted Stock" means shares of Common Stock subject to forfeiture awarded to a Participant under Section 8.

Section 3. Administration.

(a) Committee. The Plan shall be administered by a committee of not less than two Independent Directors as appointed by the Board from time to time (the "Committee"). Each member of the Committee shall be a Disinterested Person. On and after the date the Company becomes subject to Section 162(m) of the Code, each member of the Committee shall also be an "outside director" within the meaning of Section 162(m) of the Code and the regulations promulgated thereunder.

(b) Powers of Committee. The Committee shall have the power and authority to grant Awards consistent with the terms of the Plan, including the power and authority:

(i) to select the officers, employees and consultants of the Company to whom Awards may from time to time be granted;

(ii) to determine the time or times of grant, and the extent, if any, of Incentive Stock Options, Nonstatutory Stock Options and Restricted Stock Awards or any combination of the foregoing, granted to any one or more Participants;

(iii) to determine the number of shares of Common Stock to be covered by any Award;

(iv) to determine and modify from time to time the terms and conditions, including restrictions, not inconsistent with the terms of the Plan, of any Award, which terms and conditions may differ among individual Awards and Participants, and to approve the form of written instruments evidencing the Awards;

(v) to accelerate at any time the exercisability or vesting of all or any portion of any Award and/or include provisions in Awards providing for such acceleration;

(vi) subject to the provisions of Section 6(c), to extend at any time the period in which Options may be exercised;

(vii) to determine at any time whether, to what extent, and under what circumstances Common Stock and other amounts payable with respect to an Award shall be deferred either automatically or at the election of the Participant and whether and to what extent the Company shall pay or credit amounts constituting interest (at rates determined by the Committee) or dividends or deemed dividends on such deferrals; and

(viii) at any time to adopt, alter and repeal such rules, guidelines and practices for administration of the Plan and for its own acts and proceedings as it shall deem advisable; to interpret the terms and provisions of the Plan and any Award (including related written instruments); to make all determinations it deems advisable for the administration of the Plan; to decide all disputes arising in connection with the Plan; and to otherwise supervise the administration of the Plan.

All decisions and interpretations of the Committee shall be binding on all persons, including the Company and the Participants.

(c) Delegation of Authority to Grant Awards. The Committee, in its discretion, may delegate to the Chief Executive Officer or Chief Financial Officer of the Company all or part of the Committee's authority and duties with respect to Awards, including the granting thereof, to individuals who are not subject to the reporting and other provisions of Section 16 of the Act. The Committee may revoke or amend the terms of a delegation at any time but

such action shall not invalidate any prior actions of the Committee's delegate or delegates that were consistent with the terms of the Plan.

Section 4. Eligibility. All full and part-time officers and employees, and in the case of Awards other than Incentive Stock Options, consultants of the Company or any Affiliate capable of contributing significantly to the successful performance of the Company, other than a person who has irrevocably elected not to be eligible, are eligible to be Participants in the Plan. Independent Directors are also eligible to participate in the Plan but only to the extent provided in Section 7 below.

Section 5. Stock Available for Awards.

(a) Subject to adjustment under subsection (b), Awards may be made under the Plan for up to 1,751,176 shares of Common Stock. If any Award in respect of shares of Common Stock expires or is terminated unexercised or is forfeited for any reason or settled in a manner that results in fewer shares outstanding than were initially awarded, including, without limitation the surrender of shares in payment for the Award or any tax obligation thereon, the shares subject to such Award or so surrendered, as the case may be, to the extent of such expiration, termination, forfeiture or decrease, shall again be available for award under the Plan, subject, however, in the case of Incentive Stock Options, to any limitation required under the Code. Shares issued under the Plan may consist in whole or in part of authorized but unissued shares or treasury shares. Subject to such overall limitation, shares of Common Stock may be issued up to such maximum number pursuant to any type or types of Award; provided, however, that on and after the date the Company is subject to Section 162(m) of the Code, Options with respect to no more than 250,000 shares of Common Stock may be granted to any one individual Participant during any fiscal year period.

(b) If the Company effects a stock split, consolidation of shares or other recapitalization of its stock, the payment of a stock dividend, or any other increase or reduction in the number of shares of Common Stock outstanding without receiving compensation therefor in money, services or property, then at the discretion of the Board (i) the number, class, and price of shares of Common Stock subject to outstanding Options hereunder shall be appropriately adjusted by the Board in such a manner as to entitle each Optionee to receive upon exercise of an Option in full, for the same aggregate consideration, that number and class of shares which the Optionee would have received as a result of the event requiring the adjustment had the Optionee exercised the Option in full immediately prior to such event; and (ii) the number and class of shares reserved for issuance under the Plan shall be appropriately adjusted by the Board by substituting that number and class of shares of stock which stockholders of the Company would have received as a result of such event if they held all of the reserved shares immediately prior to such event; provided, however, that outstanding Options and Options to be issued under the Plan shall not be issued or exercisable for fractional shares, and the Board may determine in its discretion to adjust outstanding Options or shares reserved under the Plan to the nearest whole number of shares, or it may require payment of cash to an Optionee who exercises an Option for a fractional share in an amount reflecting the fair value of the fractional share as determined by the Board.

Section 6. Stock Options Granted to Officers. Employees and Consultants.

(a) Subject to the provisions of the Plan, the Committee may award Incentive Stock Options and Nonstatutory Stock Options and determine the number of shares to be covered by each Option, the option price therefor and the conditions and limitations applicable to the exercise of the Option. The terms and conditions of Incentive Stock Options shall be subject to and comply with Section 422 of the Code, or any successor provision, and any regulations thereunder and to the extent that any Option does not qualify as an Incentive Stock Option, it shall be deemed a Nonstatutory Stock Option.

(b) The Committee shall establish the option price at the time each Option is awarded, which price shall not be less than 100% of the Fair Market Value of the Common Stock on the date of award; provided, however, if an officer or employee owns or is deemed to own (by reason of the attribution rules applicable under Section 424(d) of the Code) more than 10% of the combined voting power of all classes of stock of the Company or any Affiliate and an Incentive Stock Option is granted to such officer or employee, the option price of such Incentive Stock Option shall be not less than 110% of the Fair Market Value on the grant date.

(c) The term of each Option shall be fixed by the Committee, but no Incentive Stock Option shall be exercisable more than ten years after the date the option is granted. If an officer or employee owns or is deemed to own (by reason of the attribution rules of Section 424(d) of the Code) more than 10% of the combined voting power of all classes of stock of the Company or any Affiliate and an Incentive Stock Option is granted to such officer or employee, the term of such option shall be no more than five years from the date of grant.

(d) Each Option shall be exercisable at such times and subject to such terms and conditions as the Committee may specify in the applicable Award or thereafter. The Committee may impose such conditions with respect to the exercise of Options, including conditions relating to applicable federal or state securities laws, as it considers necessary or advisable. The Committee may at any time accelerate the exercisability of all or any portion of any Option.

(e) Options may be exercised in whole or in part, by giving written notice of exercise to the Company, specifying the number of shares to be purchased. Payment of the purchase price may be made by one or more of the following methods:

(i) In cash, by certified, bank or personal check or other instrument acceptable to the Committee;

(ii) In the form of shares of Common Stock that are not then subject to restrictions under any Company plan and, unless otherwise permitted by the Committee, that have been held by the optionee for at least six months. Such surrendered shares shall be valued at Fair Market Value on the exercise date;

(iii) By the optionee delivering to the Company a properly executed exercise notice together with irrevocable instructions to a broker to promptly deliver to the Company cash or a check payable and acceptable to the Company to pay the

purchase price; provided that in the event the optionee chooses to pay the purchase price as so provided, the optionee and the broker shall comply with such procedures and enter into such agreements of indemnity and other agreements as the Committee shall prescribe as a condition of such payment procedure;

(iv) by any other means which the Board determines are consistent with the purpose of the Plan and with applicable laws and regulations including, without limitation, the provisions of Rule 16b-3 and Regulation T promulgated by the Federal Reserve Board; or

(v) by any combination of such methods of payment.

Payment instruments will be received subject to collection. The delivery of certificates representing the shares of Common Stock to be purchased pursuant to the exercise of an Option will be contingent upon receipt from the optionee (or a purchaser acting in his or her stead in accordance with the provisions of the Option) by the Company of the full purchase price for such shares and the fulfillment of any other requirements contained in the Option or applicable provisions of laws.

(f) To the extent required for "incentive stock option" treatment under Section 422 of the Code, the aggregate Fair Market Value (determined as of the time of grant) of the shares of Common Stock with respect to which Incentive Stock Options granted under this Plan and any other plan of the Company or its parent and subsidiary corporations become exercisable for the first time by an optionee during any calendar year shall not exceed $100,000. To the extent that any Option exceeds this limit, it shall constitute a Nonstatutory Stock Option.

Section 7. Stock Options Granted to Independent Directors.

(a) Automatic Grant of Options.

(i) Each Independent Director who is serving as a Director on the effective date of the Company's initial public offering shall be granted on such effective date a Nonstatutory Stock Option to acquire 10,000 shares of Common Stock.

(ii) Each Independent Director who is first elected to serve as a Director after the effective date of the Company's initial public offering shall be granted, on the day of his or her election, a Nonstatutory Stock Option to acquire 10,000 shares of Common Stock (an "Initial Director Option").

(iii) After each annual meeting of stockholders of the Company, beginning with the Company's 1998 annual meeting, each Independent Director who has not received an Initial Director Option during the preceding year and who is serving as Director of the Company on the first business day following such annual meeting of stockholders shall automatically be granted on such day a Nonstatutory Stock Option to acquire 2,000 shares of Common Stock.

(iv) The exercise price per share for the Common Stock covered by an Option granted under this Section 7 shall be equal to the Fair Market Value of the Common Stock on the date the Option is granted.

(b) Exercise; Termination.

(i) Except as provided in Section 10, an Option granted to an Independent Director under Section 7 shall be exercisable in four equal annual installments commencing on the date of grant. An Option issued under this Section 7 shall not be exercisable after the expiration of ten years from the date of grant.

(ii) If an Independent Director ceases to be a Director for any reason, an Option granted under this Section 7 to such Independent Director shall terminate immediately with respect to all shares of Common Stock for which it is not then exercisable. With respect to the remaining shares, such Option shall terminate 90 days after the date the Independent Director ceases to be a Director or at the expiration of the stated term of the Option, if earlier; provided, however, that if the Independent Director dies while a Director or within such 90-day period after ceasing to be a Director, such Option may be exercised for such remaining shares by the personal representative or legatee of the optionee for a period of six months from the date of death or until the expiration of the stated term of the Option, if earlier.

(iii) Options granted under this Section 7 may be exercised only by written notice to the Company specifying the number of shares to be purchased. Payment of the full purchase price of the shares to be purchased may be made by one or more of the methods specified in Section 6(e). An optionee shall have the rights of a stockholder only as to shares acquired upon the exercise of a Option and not as to unexercised Options.

(c) Limited to Independent Directors. The provisions of this Section 7 shall apply only to Options granted or to be granted to Independent Directors, and shall not be deemed to modify, limit or otherwise apply to any other provision of this Plan or to any Option issued under this Plan to a Participant who is not an Independent Director of the Company. To the extent inconsistent with the provisions of any other Section of this Plan, the provisions of this Section 7 shall govern the rights and obligations of the Company and Independent

Directors respecting Options granted or to be granted to Independent Directors. The provisions of this Section 7 which affect the price, date of exercisability, option period or amount of shares of Common Stock under an Option shall not be amended more than once in any six-month period, other than to conform with changes in the Code or ERISA.

Section 8. Restricted Stock.

(a) Subject to the provisions of the Plan, the Committee may award shares of Restricted Stock and determine the duration of the Restricted Period during which, and the conditions under which, the shares may be forfeited to the Company and the other terms and conditions of such Awards. Shares of Restricted Stock shall be issued at par value or for such other consideration as established by the Committee.

(b) Shares of Restricted Stock may not be sold, assigned, transferred, pledged or otherwise encumbered, except as permitted by the Committee, during the Restricted Period. Shares of Restricted Stock shall be evidenced in such manner as the Committee may determine. Any certificates issued in respect of shares of Restricted Stock shall be registered in the name of the Participant and unless otherwise determined by the Committee, deposited by the Participant, together with a stock power endorsed in blank, with the Company. At the expiration of the Restricted Period, the Company shall deliver such certificates to the Participant or if the Participant has died, to the Participant's Designated Beneficiary.

Section 9. General Provisions Applicable to Awards.

(a) Documentation. Each Award under the Plan shall be evidenced in writing delivered to the Participant specifying the terms and conditions thereof and containing such other terms and conditions not inconsistent with the provisions of the Plan as the Committee considers necessary or advisable to achieve the purposes of the Plan or comply with applicable tax and regulatory laws and accounting principles.

(b) Committee Discretion. Each type of Award may be made alone, in addition to or in relation to any other type of Award. The terms of each type of Award need not be identical, and the Committee need not treat Participants uniformly. Except as otherwise provided by the Plan or a particular Award, any determination with respect to an Award may be made by the Committee at the time of award or at any time thereafter.

(c) Termination of Employment. Unless otherwise provided in the option agreement or determined by the Committee, upon an optionee's termination of employment (or other business relationship) with the Company, the optionee's rights in his or her Options, (i) to the extent not exercisable at the time of termination, shall automatically expire and (ii) to the extent exercisable at the time of termination, shall expire 90 days after such termination of employment or at the expiration of the stated term of the Option, if earlier; provided, however, that if an optionee's employment was terminated by reason of death, his or her Options, to the extent exercisable, may be exercised by the personal representative or legatee of the optionee for a period of six months from the date of death or until expiration of the stated term of the Option, if earlier.

(d) Withholding.

(i) The Participant shall pay to the Company, or make provision satisfactory to the Committee for payment of any taxes required by law to be withheld in respect of Awards under the Plan no later than the date of the event creating the tax liability. The Company and its Affiliates may, to the extent permitted by law, deduct any such tax obligations from any payment of any kind otherwise due to the Participant.

(ii) In the Committee's discretion, such tax obligations may be paid in whole or in part in shares of Common Stock. A Participant may elect to have such tax withholding obligation satisfied, in whole or in part, by (i) authorizing the Company to withhold from shares of Common Stock to be issued pursuant to any Award a number of shares with an aggregate Fair Market Value (as of the date the withholding is effected) that would satisfy the withholding amount due, or (ii) transferring to the Company shares of Common Stock owned by the Participant with an aggregate Fair Market Value (as of the date the withholding is effected) that would satisfy the withholding amount due. With respect to any Participant who is subject to Section 16 of the Act, the following additional restrictions shall apply:

(A) the election to satisfy tax withholding obligations relating to an Award in the manner permitted by this Section 9(d)(ii) shall be made either (x) during the period beginning on the third business day following the date of release of quarterly or annual summary statements of sales and earnings of the Company and ending on the twelfth business day following such date, or (y) at least six months prior to the date as of which the receipt of such an Award first becomes a taxable event for Federal income tax purposes;

(B) such election shall be irrevocable;

(C) such election shall be subject to the consent or disapproval of the Committee; and

(D) the Common Stock withheld to satisfy tax withholding must pertain to an Award which has been held by the Participant for at least six months from the date of grant of the Award.

Notwithstanding the foregoing, the first sentence of Section 9(d)(ii)(A)(x) shall not be applicable until the Company has been subject to the reporting requirements of Section 13(a) of the Act for at least a year prior to the election and has filed all reports and statements required to be filed pursuant to that Section for that year.

(e) Foreign Nationals. Awards may be made to Participants who are foreign nationals or employed outside the United States on such terms and conditions different from those specified in the Plan as the Committee considers necessary or advisable to achieve the purposes of the Plan or comply with applicable laws.

(f) Amendment of Award. The Committee may amend, modify or terminate any outstanding Award, including substituting therefor another Award of the same or a different type, changing the date of exercise or realization and converting an Incentive Stock Option to a Nonstatutory Stock Option, provided that the Participant's consent to such action shall be required unless the Committee determines that the action, taking into account any related action, would not materially and adversely affect the Participant.

(g) Non-transferability of Awards. No Option shall be transferable by the optionee otherwise than by will or by the laws of descent and distribution and all Options shall be exercisable, during the optionee's lifetime, only by the optionee. Restricted Stock may not be sold, assigned, transferred, pledged or otherwise encumbered or disposed of except as specifically provided herein or in the written instrument evidencing the Award.

Section 10. Change of Control Provisions.

(a) "Change of Control" shall mean the occurrence of any one of the following events:

(i) any "person," as such term is used in Sections 13(d) and 14(d) of the Act (other than the Company, any of its subsidiaries, or any trustee, fiduciary or other person or entity holding securities under any employee benefit plan or trust of the Company or any of its subsidiaries), together with all "affiliates" and "associates" (as such terms are defined in Rule 12b-2 under the Act) of such person, shall become the "beneficial owner" (as such term is defined in Rule 13d-3 under the Act), directly or indirectly, of securities of the Company representing 25% or more of the combined voting power of the Company's then outstanding securities having the right to vote in an election of the Company's Board of Directors ("Voting Securities"); provided, however, that for purposes of this clause (i) a "Change of Control" shall not be deemed to have occurred (A) solely as a result of a person who is party to the Company's Second Amended and Restated Stockholders Agreement, dated as of April 1994 and amended from time to time thereafter, and who is deemed to beneficially own at the close of business on the effective date of the Company's initial public offering 25% or more of the combined voting power of all then outstanding Voting Securities; (B) as the result of an acquisition of securities directly from the Company; or (C) as the result of an acquisition of securities by the Company which, by reducing the number of shares of Common Stock or other Voting Securities outstanding, increases the proportionate voting power represented by the Voting Securities beneficially owned by any person to 25% or more of the combined voting power of all then outstanding Voting Securities; provided further however, that if any person referred to in clause (A), (B) or (C) of this sentence shall thereafter become the beneficial owner of any additional shares of Voting Securities (other than pursuant to clauses (B) or (C) or a stock split, stock dividend, or similar transaction), then a "Change of Control" shall be deemed to have occurred for purposes of this clause (i);

(ii) persons who, as of the effective date of the Company's initial public offering, constitute the Company's Board of Directors (the "Incumbent Directors") cease for any reason, including, without limitation, as a result of a tender offer, proxy contest, merger or similar transaction, to constitute at least a majority of the Board, provided that any person becoming a director of the Company subsequent to such effective date whose election or nomination for election was approved by a vote of at least a majority of the Incumbent Directors shall, for purposes of this Plan, be considered an Incumbent Director;

(iii) the stockholders of the Company shall approve (A) any consolidation or merger of the Company or any of its subsidiaries where the stockholders of the Company, immediately prior to the consolidation or merger, would not, immediately after the consolidation or merger, beneficially own (as such term is defined in Rule 1 3d-3 under the Act), directly or indirectly, shares representing in the aggregate 70% or more of the voting shares of the corporation issuing cash or securities in the consolidation or merger (or of its ultimate parent corporation, if any), (B) any sale, lease, exchange or other transfer (in one transaction or a series of transactions contemplated or arranged by any party as a single plan) of all or substantially all of the assets of the Company or (C) any plan or proposal for the liquidation or dissolution of the Company; or

(iv) when any "person" (as defined in (i) above) commences a tender offer for the outstanding shares of Common Stock of the Company.

(b) Upon the occurrence of a Change of Control, (i) each outstanding Option shall automatically become fully exercisable notwithstanding any provision to the contrary herein and (ii) each Restricted Stock Award shall be subject to such terms, if any, with respect to a Change of Control as have been provided by the Committee in connection with such Award.

(c) In the event of a Change of Control by reason of Section 1 0(a)(iii) above, the Board shall, in its discretion, take one or more of the following actions with regard to outstanding Options: (i) provide that such Options shall be assumed, or equivalent options shall be substituted, by the acquiring or succeeding corporation (or an affiliate thereof) (provided that any such options substituted for Incentive Stock Options shall meet the requirements of Section 424(a) of the Code), such that the Options (or equivalent substituted options) shall thereafter entitle the holder to receive upon exercise thereof the aggregate number and kind of securities and property as such holder would have been entitled to receive upon consummation of such transaction had he or she exercised the Option immediately prior to effectiveness of the transaction; (ii) upon prior written notice to the optionees, provide that all unexercised Options will terminate immediately prior to the consummation of such transaction unless any such Options are exercised by the optionee within a specified period following the date of such notice and prior to the consummation of the transaction; and/or (iii) make or provide for a cash payment to the optionees equal to the difference between (A) the value (as determined by the Board of Directors) of the consideration payable per share of Common Stock pursuant to the transaction (the "Transaction Price") times the number of shares of Common Stock subject to such outstanding Options (to the extent the exercise prices of such Options are not in excess

of the Transaction Price) and (B) the aggregate exercise price of all such outstanding Options in exchange for the termination of all outstanding Options.

Section 11. Miscellaneous.

(a) No Right To Employment. No person shall have any claim or right to be granted an Award, and the grant of an Award shall not be construed as giving a Participant the right to continued employment. The Company expressly reserves the right at any time to dismiss a Participant free from any liability or claim under the Plan, except as expressly provided in the applicable Award.

(b) No Rights As Stockholder. Subject to the provisions of the applicable Award, no Participant or Designated Beneficiary shall have any rights as a stockholder with respect to any shares of Common Stock to be distributed under the Plan until he or she becomes the holder thereof. A Participant to whom Common Stock is awarded shall be considered the holder of the Common Stock at the time of the Award except as otherwise provided in the applicable Award.

(c) Effective Date. Subject to the approval of the stockholders of the Company, the Plan became effective on October 19, 1992 and the restatement shall become effective on May 10, 1996.

(d) Amendment of Plan. The Board may amend, suspend or terminate the Plan or any portion thereof at any time; provided, however, that if and to the extent determined by the Committee to be required by the Act to ensure that Awards granted under the Plan are exempt under Rule 16b-3 promulgated under the Act, or that Incentive Stock Options granted under the Plan are qualified under Section 422 of the Code, Plan amendments shall be subject to approval by the Company stockholders.

(e) Governing Law. The provisions of the Plan shall be governed by and interpreted in accordance with the laws of Delaware.

Exhibit 10.5

T CELL SCIENCES, INC.
PERFORMANCE PLAN

PURPOSE

T Cell Sciences wishes to recognize the collective efforts of its permanent employees by awarding them with additional compensation upon the achievement of performance goals. The additional compensation will be determined at the end of each fiscal year based on the employee's salary grade level and the percentage of performance goals met during that fiscal year. The payout of this additional compensation will be determined and allocated in accordance with the Performance Plan, summarized below.

PERFORMANCE PLAN DESCRIPTION

(1) ELIGIBILITY & PARTICIPATION

All permanent employees (full and part time) of T Cell Sciences who have had permanent employment status for at least the last six months of a fiscal year are eligible for a Performance Plan payout for that fiscal year. The payout will a pro-rata amount based on the actual versus annualized permanent employment base pay for the fiscal year.

The Performance Plan payout will be a percentage of the employee's base pay received during the fiscal year (excluding any overtime pay or other special compensation) up to a set participation target for each salary ~r4de, as established from time to time by the Compensation Committee of the Board of Directors. The participation target for any individual employee may be set at a lower level in the discretion of the Chief Executive Officer or at a higher level with the approval of the Compensation Committee, from the participation targets then in effect for the employee's salary grade.

In the event an employee is promoted during a fiscal year into a salary grade level with a higher participation target, the payout will be calculated pro rata under the old and new targets based on the percentage of time the employee has been employed in each salary grade level.

Performance Plan payouts will normally be made after the end of each fiscal year when a determination is made of the percentage of payout due to all employees (see "Payout Determination" below). Payouts will be made only to employees who have a permanent employment status with the Company at the time of the payout, unless other arrangements have been approved in advance by the Chief Executive Officer for employees eligible for participation of targets of 10% or less or by the Compensation Committee for employees eligible for higher targets.

(2) PAYOUT DETERMINATION

The Performance Plan payouts are determined by the achievement of performance goals. In conjunction with the Company's budget process each fiscal year, the performance goals for each fiscal year are proposed by management, approved by the Compensation Committee and ratified by the Board of Directors. The goals for any fiscal year may be set in whole or part on company-wide, departmental and/or individual performance. The relative weight of each goal may vary for different departments or individuals, with the weight to be approved when the goals are approved.

At the end of each fiscal year, management of the Company will review with the Compensation Committee the performance against each goal set for that fiscal year. The Compensation Committee will determine the percentage of goals achieved which will be the percentage to be applied against each employee's applicable participation target. The percentage approved by the Compensation Committee will be ratified by the Board of Directors.

The approved participation target percentage will then be used to calculate each employee's payout. The Performance Plan payouts are to be paid in cash after any required deductions or withholdings.

(3) EFFECTIVE DATE AND AMENDMENTS

The Performance Plan supersedes the Company's Management Incentive Plan and is effective as of May 1, 1992, with the first payout to be made by December 31, 1992 for the eight month stub fiscal year. The Performance Plan may be amended, suspended or terminated at any time at the discretion of the Compensation Committee.

(4) NO CONTRACT OF EMPLOYMENT

The Performance Plan shall not be considered to create any contract of employment or any right of continued services between the Company and any employee.

T CELL SCIENCES INC.
PERFORMANCE PLAN

Effective as of May 1, 1992, and until amended in writing by the Compensation Committee, the participation targets for each salary grade will be as set forth below:

2 % - all non-exempt grades & exempt salary grades 1-5
5 % - exempt salary grade 6
10% - exempt salary grade 7-8
15% - exempt salary grades 9-10, non-executive officers
20% - executive officers

Exhibit 10.6

, 1993

Dear :

The Board of Directors (the "Board") of T Cell Sciences, Inc. (the "Company") has determined that appropriate steps should be taken to reinforce and encourage the continued attention and dedication of members of the Company's management, including yourself, to their responsibilities without distraction arising from the possibility of a Change in Control (as defined in Section 2) of the Company, although no such change is now contemplated.

In order to induce you to remain in the employ of the Company, the Company agrees that you shall receive the benefits set forth in this letter agreement (the "Agreement") in the event your employment with the Company is terminated subsequent to a "Change in Control" of the Company and under the circumstances described in Section 3 below.

1. Term of Agreement. This agreement shall commence on January 1, 1993 and each January 1 thereafter, the term of this Agreement shall automatically be extended for one additional year unless, not later than the October 31 of the preceding year, the Company shall have given notice that it does not wish to extend this Agreement. This Agreement shall cease to be operative and shall be of no further force and effect if your employment terminates for any reason prior to a Change in Control. Further, nothing contained herein shall restrict the ability of the Company to terminate your employment.

2. Change in Control. No benefits shall be payable hereunder if (i) there has been a Change in Control of the Company and your employment is thereafter terminated by you for other than Good Reason, or (ii) there has been a Change in Control of the Company and your employment is thereafter terminated for Cause by the Company, death, Disability, or Retirement.

(a) "Change in Control" of the Company shall have the meaning set forth in the Company's Stock Incentive Plan, except that the Board agrees not to override the occurrence of a Change in Control.

(b) "Disability" shall mean that as a result of your incapacity due to physical or mental illness, you are absent from your duties with the Company for a consecutive period of more than six (6) months, the Company may terminate your employment on account of "Disability".

(c) "Retirement" shall mean your voluntary termination of employment at age sixty-five (65) or any other early retirement arrangement established with your consent with respect to you.

(d) "Cause" shall mean the willful and continued engaging by you in gross misconduct materially and demonstrably injurious to the Company. No termination for Cause shall be effective until you have received a copy of a resolution duly adopted by the affirmative vote of not less than 75% of the entire membership of the Board at a meeting of the Board called and held for the purpose (after reasonable notice to you and an opportunity for you, together with your counsel, to be heard before the Board), finding that in the good faith opinion of the Board you were guilty of conduct set forth in the Section 4(a) and specifying the particulars thereof in detail.

(e) "Good Reason" shall mean:

(i) Change of Position. The assignment to you of any duties inconsistent with your position or status as an officer prior to the Change in Control or any alteration in the nature or status of your responsibilities to a lesser position by you.

(ii) Compensation and Benefits. (1) A reduction in your base salary, incentive compensation, or benefits or perquisites, as in effect immediately prior to the Change in Control; or (2) the failure by the Company to continue base salary increases, incentive compensation grants, benefits and perquisites in effect prior to the Change in Control.

(iii) Relocation. The relocation of the principal place of your employment prior to the Change in Control without your written consent.

(iv) Assumption of Agreement. If you elect to terminate your employment because of the failure of the Company to obtain the assumption of this Agreement as provided in Section 7.

3. Benefits Payable. If your employment is terminated following a Change in Control of the Company by you for Good Reason or by the Company other than for Cause, death, Disability or Retirement, then your benefits shall be those described in this Section 3.

(a) Your base salary shall be continued for a period of 12 months. These special severance payments shall be in lieu of any severance payments payable under any severance plan or policy of the Company.

(b) During the continuation of your salary payments, the Company shall continue health insurance benefits for you at its own expense. Thereafter, you shall be afforded the right to continue such insurance benefits as provided under the Consolidated Omnibus Budget Reconciliation Act of 1985 (COBRA).

(c) All stock incentive grants or options under the Company stock option plan or stock incentive plan shall be 100% vested.

(d) Nothing contained herein shall adversely affect your rights, if any, to receive payments under any other bonus, incentive compensation, deferred compensation plan or group term life insurance plan, long term disability plan or retirement plan of the Company.

6. No Mitigation. You shall not be required to mitigate the amount of any payment provided for in this Agreement by seeking other employment or otherwise, nor shall the amount of any payment provided for in this Agreement be reduced by any compensation earned by you as the result of employment by another employer after the date of termination, or otherwise.

7. Successors; Binding Agreement.

(a) The Company shall require any successor entity (whether direct or indirect, by purchase, merger, consolidation or otherwise) to all or substantially all of the business and/or assets of the Company to expressly assume this Agreement.

(b) This Agreement shall inure to the benefit of and be enforceable by your personal or legal representatives, executors, administrators, successors, heirs, distributees, devisees and legatees.

8. Notice. Notices and all other communications provided for herein shall be in writing and shall be deemed to have been duly given when delivered or mailed by United States registered mail, return receipt requested, postage prepaid, addressed to the Company at its principal office or to you at your address set forth on the first page of this Agreement, provided that all notices to the Company shall be directed to the attention of the President of the Company with a copy to the Secretary of the Company, or to such other address as either party may have furnished to the other in writing in accordance herewith, except that notices of change of address shall be effective only upon receipt.

9. Modification; Waiver. No provisions hereof may be modified, waived or discharged unless such waiver, modification or discharge is agreed to in writing signed by you and a duly authorized officer of the Company (other than you). No waiver by either party hereto of any condition or provision hereof to be performed by such other party shall be deemed a waiver of similar or dissimilar provisions or conditions at the same or at any other time. No agreements or representations, oral or otherwise, express or implied, with respect to the subject matter hereof have been made by either party which are not set forth expressly herein.

10. Validity. This Agreement shall be governed by and construed in accordance with the law of the State of Delaware. The invalidity or unenforceability of any provision hereof shall not affect the validity or enforceability of any other provision hereof, which shall remain in full force and effect.

11. Counterparts. This Agreement may be executed in one or more counterparts, each of which shall be deemed to be an original, but all of which together shall constitute one and the same instrument.

12. Arbitration. Any dispute or controversy arising in connection herewith shall be settled exclusively by arbitration to be held in New York in accordance with the rules of the American Arbitration Association then in effect. Notwithstanding the pendency of any such dispute or controversy, the Company shall continue to pay you your full compensation in effect when the notice giving rise to the dispute was given (including, without limitation, base salary and installments under any incentive plan) and continue you as a participant in all the employee pension, welfare, incentive, compensation or other similar plans, programs or policies of the Company in which you were participating when the notice giving rise to the dispute was given, until the dispute is finally resolved in accordance with this Section. Amounts paid to you under this paragraph are in addition to all other amounts due hereunder and shall not be offset against or reduce any other amounts due hereunder. Each party shall bear their own costs, including attorneys' fees of the arbitration; provided, however, that if you prevail on the claim, the Company shall reimburse you for all reasonable costs and attorneys' fees. Judgement may be entered on the arbitrator's award in any court of competent jurisdiction.

Sincerely,

T CELL SCIENCES, INC.

by: _____

Agreed to this _____ day of _____, 1993

_____

Exhibit 10.14

AMENDMENT TO LEASE
BETWEEN
MOULTON REALTY COMPANY
AND
VIRUS RESEARCH INSTITUTE, INC.

The lease ("Lease") dated December 9, 1991 between Michael J. Spinelli, Trustee of M.R.C. Realty Trust; Carol A. Hickey; Peter A. Spinelli, General Partner; and Spinelli Family Associates all doing business as Moulton Realty Company, as Landlord and Lessor, and Virus Research Institute, Inc., as Tenant and Lessee, demising the premises located at 61 Moulton Street, Cambridge, notice of which is recorded in the Middlesex South Registry of Deeds in Book 21695, Page 407, is hereby amended as follows:

1. The number of parking spaces demised to Tenant for its exclusive use is to be increased from 30 spaces to 43 spaces, effective December 1,1996. The parking spaces demised to the Tenant effective December 1, 1996 are shown on the new Schedule A annexed hereto, which the parties agree will substitute for the current Schedule A to the Lease, effective December 1, 1996.

2. The parties acknowledge that Tenant has exercised validly and effectively its right and option to extend the term of the Lease, as set forth in Article III(b) of the Lease, and that the term of the Lease now expires on November 30, 2001; provided however, that the base rent due during the five (5) year period commencing on December 1, 1996 to November 30, 2001 shall be $293,700.00 per year in monthly installments of $24,475.00.

3. Article III(b) of the Lease is amended to read as follows:

OPTION

"OPTION The Landlord hereby grants to the Tenant and its successors and assigns the right and option to extend the term of the Lease for a five-year period commencing on December 1, 2001 and ending an November 30, 2006, in accordance with the following terms and conditions:

If this Lease shall be in full force and effect at the expiration of the first extension term on November 30, 2001, then the Tenant shall have the right to extend this Lease for an additional period of five (5) years, beginning on December 1, 2001 and expiring November 30, 2006, as hereinafter set forth, providing that the Tenant shall give written notice to the Landlord at least six (6) months prior to expiration of said first extension term of this Lease of its election to exercise the aforesaid option. If the aforesaid option is exercised, the terms of this Lease shall be the same, except that the base rent hereunder shall be adjusted to equal the fair market rental of the demised premises, but in no event less than the base rent due in the fifth year of the first extension term of the Lease. If the parties are unable to agree on the fair market rental

then each shall appoint an arbitrator who shall be a licensed real estate broker or appraiser. If the two arbitrators are unable to agree on a fair market rental then the two arbitrators shall appoint a third arbitrator and a decision of the majority of the arbitrators shall be binding. In computing fair market rental for the purposes of this section, any portion of the Building which on September 1, 1996 is used and improved as office space and subsequently is converted to laboratory or similar use will, notwithstanding any such conversion, be treated and valued as office space in the condition it was in immediately prior to its conversion to laboratory or similar use. Both landlord and Tenant shall have the right, prior to conversion, to photograph or otherwise document and memorialize the condition of any office space intended to be converted to laboratory or similar use."

4. Landlord agrees to defend, indemnify and hold harmless Tenant, its officers, employees, agents, successors, and assigns (the "Indemnitees"), against and in respect of, any and all reasonable damages, losses, liabilities, expenses, costs, claims, actions, suits, proceedings, assessments, orders, judgments, fines, and penalties (including without limitation, reasonable legal, accounting, consulting, engineering, and other expenses), which may be incurred by any of the Indemnitees, or imposed upon or asserted against any of the indemnitees by any other party or parties (including, without limitation, a governmental entity), arising out of, in connection with, or relating to the subject matter of (a) any actual violation (or any alleged violation which appears to have a legitimate basis in fact) of any environmental or health and safety-related law, regulation, rule, ordinance or by-law, whether at the federal, state or local level, with respect to the demised premises or any facility or improvement or any operation or activity thereon, occurring or existing as of and/or prior to December 1, 1991, even if not discovered until after such date; or (b) the actual presence (or the alleged presence which appears to have a legitimate basis in fact) of any Hazardous Material, as defined below, on, in, under, adjacent to, or affecting the premises, occurring or existing as of and/or prior to December 1, 1991, even if not discovered until after such date. For purposes of this provision, "Hazardous Material" shall mean any pollutant, contaminant, toxic substance, hazardous waste, hazardous material, or hazardous substance, or any oil, petroleum, or petroleum product, as defined in or pursuant in the Resource Conservation and Recovery Act, as amended, the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, the Federal Clean Water Act, as amended, the Massachusetts Hazardous Waste Management Act, as amended, the Massachusetts Oil and Hazardous Material Release Prevention and Response Act, as amended, or any other federal, state, or local environmental law, regulation, ordinance, rule, or by-law.

Except as expressly amended by this Amendment, the Lease dated December 9, 1991 continues unmodified and in full force and effect.

Signed and sealed this ___ day of October, 1996.

MOULTON REALTY COMPANY

/s/ Michael J. Spinelli

Michael J. Spinelli
Trustee of M.R.C. Realty Trust

/s/ Carol A. Hickey

Carol A. Hickey

/s/ Peter A. Spinelli

Peter A. Spinelli, General Partner
Spinelli Family Associates

VIRUS RESEARCH INSTITUTE, INC.

By: /s/ [Illegible]

LEASE
between
MOULTON REALTY COMPANY
and
VIRUS RESEARCH INSTITUTE, INC.

THIS INDENTURE OF LEASE, made as of this 9th day of December, 1991, between MICHAEL J. SPINELLI, TRUSTEE OF M.R.C. REALTY TRUST, CAROL A. HICKEY, PETER A. SPINELLI, GENERAL PARTNER, SPINELLI FAMILY ASSOCIATES all doing business as MOULTON REALTY COMPANY having a principal place of business at 25 Moulton Street, Cambridge, County of Middlesex, Massachusetts, 02139, (hereinafter called the "Landlord"), and VIRUS RESEARCH INSTITUTE, INC. a corporation duly organized by law and having an usual place of business in Cambridge, in the County of Middlesex, Massachusetts (hereinafter called the "Tenant")

W I T N E S S E T H:

I. (a) The Landlord hereby leases to the Tenant the entire premises located at 61 Moulton Street, Cambridge, Middlesex County, Massachusetts which Leasehold is the existing Building shown on plan annexed hereto as Schedule A, said Building contains 17,800 square feet, together with parking shown on said plan.

(b) The premises described herein may be used for the purpose of conducting a research laboratory and uses incidental thereto, including sales, service, and manufacture of Tenant's products, general office use, as well as any other use authorized

under applicable zoning laws and ordinances in connection with its business. The Landlord's knowledge and belief is that there are no restrictions in the title to the premises which should prevent the intended use by the Tenant.

(c) Located on the premises are approximately thirty (30) parking spaces intended for the exclusive use of the Tenant more particularly described in Schedule A.

(d) The Tenant shall have the right of unobstructed access to the premises by motor vehicle and otherwise for use in connection with its business, including unobstructed access to the use of the truck dock, driveway and parking areas, and Tenant may install a movable trash disposal unit outside the building at a location agreed to by both parties. the premises are however subject to a right-of-way as shown on Schedule A.

II. The initial term of this Lease shall be for a period of five (5) years, commencing December 1, 1991, as hereafter defined.

III. (a) During the term of this Lease, the Tenant shall pay as base rent to the Landlord at the Landlord's address first written above, or such other place as the Landlord, by notice in writing to the Tenant, as follows:

(i) During the first year of the term, the sum of $135,000.00, payable in monthly installments of $11,250.00 per month, due on the first of each month;

(ii) During the second year of the term, the sum of $190,000.00, payable in monthly installments of $15,833.33 per month, due on the first of each month;

(iii) During the third year of the term, the sum of $210,000.00, payable in monthly installments of $17,500.00 per month, due on the first of each month; and

(iv) During the fourth and fifth year of the term, the sum of $270,000.00, payable in monthly installments of $22,500.00 per month, due on the first of the each month.

(b) OPTION. If this Lease shall be in full force and effect at the expiration of the initial term, then the LESSEE shall have the right to extend this Lease for an additional period of five (5) years, as hereinafter set forth, providing that the LESSEE shall give written notice to the Landlord at least six (6) months prior to expiration of the original term of this Lease of its election to exercise the aforesaid option. If the aforesaid option is exercised, the terms of this Lease shall be the same, except that the rent hereunder shall be adjusted to equal the fair market rental of the demised premises, but in no event less than the fifth year of the original Lease term. If the parties are unable to agree on the fair market rental then each shall appoint an arbitrator who shall be a licensed real estate broker or appraiser. If the two arbitrators are unable to agree on a fair market rental then the two arbitrators shall appoint a third arbitrator and a decision of the majority of the arbitrators shall be binding. However, in the event that the

fair market rental is not determined within sixty (60) days of the election to exercise the option, then the said option shall thereupon terminate

(c) The Landlord shall promptly pay and discharge all real estate taxes and betterment assessments levied or assessed upon the premises during the term of the Lease, except that the Landlord may elect to have such betterment assessments payable over the longest period permitted by law.

(d) The Tenant shall pay as additional rent to Landlord, 100% of the real estate taxes levied against the premises. The Tenant shall make payment within thirty (30) days after receiving a copy of the paid tax bill together with appropriate proof of payment, prorated on a 365-day year per diem basis for any partial calendar year during the term of the Lease. Landlord represents and warrants to Tenant that as of the date of this Lease, the premises are assessed and maintained as a single and separate tax parcel or lot by the City of Cambridge. Throughout the term of this Lease, Landlord shall cause the premises to be assessed and maintained as such a separate tax parcel or lot so that bills for real estate taxes shall issue solely with respect to real estate taxes applicable to the premises.

(e) The Landlord shall promptly pay and discharge all real estate taxes and betterment assessments levied or assessed upon the premises during the term of the Lease, except that the Landlord may elect to have such betterment assessments payable

over the longest period permitted by law. Tenant shall not be required to pay any portion of any increases in said taxes which are attributable to an increase in the assessed valuation of the land or buildings, of which the demised premises are a part, arising out of improvements (including new construction) made to premises or adjacent Landlord land or buildings unless such improvements are made by Tenant during the term of the Lease.

(f) If any abatement refund or rebate shall be received for any tax year, an appropriate adjustment shall thereafter be made in the amount paid by the Tenant. If Landlord undertakes such abatement process, the cost of such proceedings, and of any appeal therefrom, shall be charged first against any abatement received, and the net proceeds credited to the Tenant.

IV. (a) On or after the effective Commencement Date of the Lease, the Tenant shall have the right and may install at its own expense alterations to the interior of the building as may be reasonably desirable or necessary for the conduct of its business. Such work shall be done in a good and workmanlike manner, after submission of plans and specifications to the Landlord for approval in writing, which approval shall not be unreasonably withheld or delayed. At the time of the approval of the Landlord, the parties shall determine whether or not said improvements shall be considered as an integral part of Landlord's building and become part of Landlord's property, whereupon Tenant shall have no obligation to remove same upon

termination of this Lease.

(b) Promptly following the Commencement Date, Tenant shall perform the following work with the premises: all working electrical outlets, a fresh coat of paint to all wall surfaces in this space, 26 new gas and vacuum lines to the benches in the main laboratory and tissue culture facility (the "Work"). Such work shall be done by contractor(s) selected by Tenant, subject to Landlord's reasonable approval. As a Tenant allowance (the "Allowance"), Landlord will reimburse Tenant for up to $16,000.00 of all reasonable documented costs incurred by Tenant in connection with the Work, by giving Tenant a rental credit or paying Tenant the amount of the Allowance promptly after substantial completion of the Work.

V. The Landlord agrees that during said term and so long as Tenant's occupancy continues:

(a) to be responsible for keeping the buildings presently on the premises structurally sound and, without limiting the generality of the foregoing, the Landlord will keep the roof and outside walls weather and watertight and free from leaks and make all structural repairs and replacements reasonably necessary to the Tenant's occupancy of the building and to its foundation, roof, structural parts and utility connections from exterior wall to street; and

(b) to maintain parking lot and driveways.

(c) to be responsible for delivering the premises to

Tenant in good order, condition and repair at the commencement of the term.

(d) To the Landlord's best knowledge all activities at the premises by Landlord and prior tenants and occupants thereof have been undertaken in full compliance with all applicable environmental and hazardous substance laws.

(e) Landlord has disclosed to Tenant all threatened or pending litigation or administrative actions relating to the use or disposal of hazardous substances at the premises.

(f) Landlord has delivered to Tenant true and complete copies of all reports, analyses, studies and other written materials which are in the possession, custody or control of Landlord concerning the presence or possible presence of hazardous substances at the premises.

(g) To the Landlord's best knowledge there are no underground storage tanks at the premises.

(h) To the Landlord's best knowledge there are no transformers, capacitors, switches, or other equipment at the premises which contain PCBs.

(i) Landlord shall indemnify, defend and save harmless Tenant, its officers, directors, employees, contractors, servants and agents, from and against all loss, costs, damages, claims, proceedings, demands, liabilities, penalties, fines and expenses, including without limitation reasonable attorney's fees, consultant's fees, litigation costs, and cleanup costs, asserted against or incurred by Tenant, its officers, directors,

employees, contractors, servants and agents at any time and from time to time by reason or arising out of the presence of any hazardous substances at the premises caused by the Landlord, its servants, agents or employees.

(j) The Landlord represents that there is handicap access to the building from the street and handicap bathroom facilities. In the event that either Federal or State law requires that an elevator be installed on the premises then the parties agree that the cost for installation for said elevator will be born equally by said parties.

VI. Tenant agrees during said term and so long as Tenant's occupancy continues:

(a) to be responsible for all maintenance and repairs of the heating system, plumbing system, electrical system, central air conditioning system (if any), interior mains and conduits for utilities, stairways and stairwells. Landlord will repair, as required, all of above prior to Commencement date and warrants that the existing systems and utilities will be in good repair and working order on such date.

(b) to pay when due all charges by public authority or utility for heat, water, electricity, telephone, gas and other services rendered to the premises;

(c) to remove promptly snow, ice and foreign substances from the stairs, parking lot areas designated for Tenant's use, and to maintain landscaping adjacent to the within Leasehold;

(d) will be responsible for replacing any glass which may be damaged or broken with glass of the same quality;

(e) to save the Landlord harmless from all loss and damage occasioned by any nuisance made or suffered on the premises caused by the omission, fault, negligence, or other misconduct of the Tenant as well as from any claim or damage arising from neglect in not removing snow and ice from stairs or parking lots assigned for Tenant's exclusive use on the premises, and from any other injury, loss or damage to any person or property on said premises caused by the omission, fault, negligence or other misconduct of the Tenant; provided, however, that the above obligations do not apply when the injury or damage was caused or contributed to by the negligent acts or omissions of the Landlord, its agents, employees or contractors.

(f) Tenant will not generate, store, dispose of, or otherwise handle any hazardous substances on the premises in violation of any applicable environmental or hazardous substance law.

(g) Tenant will promptly inform Landlord of any environmental releases of hazardous substances that are reportable to governmental authorities under applicable environmental or hazardous substances laws. Tenant covenants and agrees that no asbestos, asbestos-containing materials, or PCB compounds will be used in the development of, or any alteration or additions to, any portion of the premises.

(h) Tenant shall indemnify, defend and save harmless

Landlord, its officers, directors, employees, contractors, servants and agents, from and against all loss, costs, damages, claims, proceedings, demands, liabilities, penalties, fines and expenses, including without limitation reasonable attorney's fees, consultants' fees, litigation costs, and cleanup costs, asserted against or incurred by Landlord, its officers, directors, employees, contractors, servants and agents at any time and from time to time resulting from the presence of any hazardous substances on the premises during the term of this Lease arising after Tenant's taking possession of the premises and resulting solely from (i) the action or inaction of the Tenant, its officers, directors, employees, contractors, servants and agents, or (ii) Tenant's generation, storage, treatment, handling, transportation, disposal or release of any hazardous substance at or near the premises, or (iii) the violation of any applicable law governing hazardous substances by tenant, its officers, directors, employees, contractors, servants or agents. the indemnities and duties to defend set forth in this Paragraph shall survive the termination of this Lease. Parties agree to undertake to update the previous 21E Report to establish that the presence of any hazardous waste is within the acceptable limits determined by the Commonwealth of Massachusetts. If as a result of said updated study any remedial action is required by the Commonwealth of Massachusetts, said work will be taken at the expense of the prior Tenant and/or Landlord.

(i) not to overload or deface the premises or the

building or commit or suffer any strip or waste thereon, and not to conduct any trade or occupation or to make any use of the premises or to do any act or thing thereon or in the buildings that shall create a nuisance or be contrary to any law of the Commonwealth of Massachusetts or ordinance or by-law for the time being in force in the City of Cambridge, or which shall be injurious to any person or property, or that shall make void or voidable any fire insurance thereon or on the buildings, but proper conduct of Tenant's business shall not be deemed a violation of this covenant; nor make any alterations, additions or improvements without the consent of the Landlord, providing however, the Landlord may set forth in its consent conditions or criteria to be complied with by the Lessee;

(j) not to assign this lease or to make any sublease for the whole or any part of the demised premises without the prior written approval of the Landlord which approval shall not be unreasonably withheld or delayed. In the event of any assignment or sublease of the demises premises, any and all rents payable under such assignment or sublease shall be payable directly to the Landlord as payment toward the rent and other sums do hereunder; provided, however, that if the rents and other sums payable or such sub-lease shall exceed those rents and other sums due hereunder, then the Landlord shall be entitled to retain such overage. For purposes of calculating any excess rent or other consideration payable by Tenant to Landlord in connection with any subletting or assignment, tenant shall be entitled to

"net out" (i.e., retain) the value of any improvements to the premises made by Tenant at its expense allocable over the remaining term of the Lease. If any consideration is paid to the Lessee hereunder for any assignment or sublease, such consideration shall be paid to the Lessor hereunder. Notwithstanding anything in this Paragraph to the contrary, the prior approval of the of the Landlord shall not be required for the assignment of the Lease to any corporation or business entity into or with which the Tenant is merged or consolidated or to which substantially all of the Tenant's assets or corporate stock are transferred provided that in any of such events (i) following any such transfer Tenant has, (or in the case of a merger or consolidation the successor to Tenant has) a creditworthiness adequate to meet its obligations hereunder; (ii) proof reasonably satisfactory to Landlord of such creditworthiness shall have been delivered to Landlord prior to the effective date of any such transfer or transaction; and (iii) in the case of a merger or consolidation, the successor agrees directly with Landlord, by written instrument in form reasonably satisfactory to Landlord, to be bound by all the obligations of Tenant hereunder, including, without limitation, the covenant against further assignment and subletting.

(k) to permit the Landlord or its agents to examine said premises at reasonable times, subject to reasonable notice and Tenant's reasonable security precaution and subject to applicable governmental regulations, if any, and during the six

months prior to the expiration of said term to show said premises to prospective purchasers and tenants, and keep affixed in suitable places, not obstructing the Tenant's signs or displays, notices for letting or selling; and

(l) at the expiration or earlier termination of said term promptly to remove Tenant's personal property, and, if the Landlord reasonably so requests or the Tenant so elects, to remove any movable trade fixtures or Tenant installed equipment; to repair any damage caused by such removal; and, to peaceably yield up said premises clean and neat and in repair as aforesaid, damage by reasonable wear and tear and damage by fire and casualties only excepted. Any such personal property, fixtures or equipment not so removed shall at the expiration of thirty (30) days from such expiration or termination and ten (10) days notice to Tenant become the property of the Landlord.

VII. (a) In case of taking by eminent domain of ten (10%) percent or more of the total floor area of the building or buildings at the time on the premises the Tenant may by notice to the Landlord within thirty (30) days thereafter terminate this Lease as of the date when the Tenant is required to vacate the portions taken. In case of taking by eminent domain of said premises or any portion thereof, if this Lease is not so terminated, the Landlord shall repair or rebuild any building presently on said premises so as to restore the same or what may remain thereof in case of partial taking, as nearly as possible

to its condition prior to the taking, the work to be commenced within four (4) weeks after the date when the Tenant is required to vacate the portions taken and to be completed with due diligence, except for delays due to governmental regulations, unusual scarcity of or inability to obtain labor or materials, or any other cause beyond Landlord's control. The Landlord reserves and excepts all rights to damages to said premises and buildings and the leasehold hereby created accruing in case of taking or act of public or other authority, and the Tenant hereby grants to the Landlord all of the Tenant's rights to such damages and agrees to deliver such further instruments of assignment thereof as the Landlord from time to time may reasonably request. Tenant, however, reserves its rights to damages for trade fixtures and relocation expenses. The Landlord shall, however, pay to the Tenant from such damages when received the amounts, if any, by which the same were increased by reason of inclusion therein of any award for fixtures and equipment which Tenant is entitled to remove.

During such repair or rebuilding, a just proportion of the rent shall be abated until what remains of the premises shall have been restored to proper condition for use and occupation and thereafter a just proportion of the rent according to the nature and extent of the taking shall be permanently abated. The Landlord and Tenant hereby agree that if they are unable to agree upon the amount of reduction in rent because of such taking, a board of three appraisers shall be appointed, one by each party

and the third by the two so chosen and the findings of such board of appraisers shall bind each party. The expense of such appraisal, including counsel fees, shall be shared equally by each party.

(b) In case said building is damaged by fire or other casualty or action of public authority in consequence thereof or incidents of war, earthquake, action of the elements, explosion or otherwise, the Tenant shall promptly notify the Landlord. If the premises are so badly damaged that they cannot be restored and made tenantable by the exercise of reasonable diligence within ninety (90) days after the commencement of work, or if they are damaged to the extent of twenty-five (25%) percent or more of the insurable value, then the Tenant may terminate this Lease upon ten (10) days' notice in writing given to the Landlord within thirty (30) days after such damage occurs or, at Tenant's option, thirty (30) days after advice from Landlord regarding cost and time of repair, whereupon the Tenant shall surrender the premises, and the Landlord, if the Tenant is not at the time in default hereunder, shall refund to the Tenant any unearned rent paid in advance by the Tenant, calculated from the date of the damage. If the Lease is not so terminated or if the premises are damaged to a lesser extent, the Landlord will repair the damaged premises and the buildings thereon as nearly as reasonably possible to its or their condition prior to such damage, the work to be commenced within thirty (30) days and completed with due diligence, except for delays due to governmental regulation or

unusual scarcity of or inability to obtain labor or materials, and thereupon shall be entitled, to the extent of the cost of repairs, to the proceeds of any insurance against such damage. In case the premises or the buildings thereon are rendered untenantable by such damage, a just proportion of the rent hereinbefore reserved according to the nature and extent of the injury shall be abated until the repair or rebuilding is completed, and the premises shall have been put in proper condition for use and occupation. The Landlord and Tenant hereby agree that if they are unable to agree upon the amount of reduction in rent because of such damage a board of three appraisers shall be appointed, one by each party and the third by the two so chosen, and the findings of such board of appraisers shall bind each party. The expense of such appraisal shall be shared equally by each party.

Notwithstanding the foregoing provisions of this Lease, if the premises shall be substantially damaged by fire or other casualty or action of public authority in consequence thereof or incidents of war, earthquake, action of the elements, explosion or otherwise, within twelve (12) months of the expiration of the term or any extension hereof, either party may terminate this Lease as of the date of such damage, by written notice to the other within ten (10) days of the occurrence of such damage, except that if, prior to or within thirty (30) days after such damage during the original term of this Lease the Tenant, having the right do so, shall have elected to extend, pursuant to

paragraph IV above, the provisions of this paragraph shall not apply.

VIII. The Landlord and Tenant hereby further agree that:

(a) if any sum or sums due as rent as herein provided shall be unpaid when due and shall remain unpaid for a period of ten (10) days after notice in writing of such default has been given by the Landlord to the Tenant; provided, however, if the Landlord has on three (3) separate occasions during the term of the Lease been required to give Tenant such written notice of failure to pay rent and is thereafter again required to give such notice to Tenant, then Tenant shall be given no further opportunity to cure such default and this Lease shall immediately terminate and Landlord may thereafter enter in and upon said Leasehold and repossess the same; or

(b) if the Tenant or Landlord shall violate or be in default in its observance or performance of any covenant, condition and agreement herein contained other than default in the payment of rent, and shall have failed to remedy such violation or default within thirty (30) days after notice in writing of such breach or default has been given by one to the other (or, if the nature of such breach or default is such that it cannot be remedied within such thirty (30) day period, if the defaulting party has failed to commence remedial action within said thirty (30) days and thereafter continued such action with

due diligence); or

(c) if the estate hereby created shall be taken on execution or by other process of law in any action against the Tenant; or

(d) if the Tenant shall be declared a bankrupt or insolvent according to law (or if the Tenant makes any assignment for the benefit of creditors); or

(e) if a receiver shall be appointed of the Tenant's property and not be removed within sixty (60) days; then, and in any such case (notwithstanding any license of any former breach or waiver of the benefit hereof or consent in a former instance):

Then the non-defaulting party, may, as applicable, at its option, terminate this Lease or, as the case may be, the Landlord shall have the right thereafter, while Tenant's default continues, to enter into and upon the premises or any part thereof in the name of the whole, and repossess the same as of its former estate (after notice and in accordance with applicable law), and expel the Tenant and those claiming through or under it and remove its or their effects without being deemed guilty of any manner of trespass, without prejudice to any other remedies, and thereupon this Lease shall terminate.

In case of such termination or termination by legal proceeding by Landlord for default, the Tenant will pay to the Landlord sums equal to the rent reserved hereunder (as hereinabove defined) at the same time and in the same installments as herein provided, or if the premises hereby

demised shall have been relet, for which the Landlord will use its reasonable efforts to accomplish, sums equal to the excess of said rent reserved hereunder over the sums actually received by the Landlord, except that there shall be first credited against the obligations of Tenant under this subdivision any sum actually paid by Tenant to Landlord.

If the Tenant or Landlord shall default under provision VIII(b) above, the Landlord or Tenant, as applicable, without being under any obligation to do so and without thereby waiving such default or any of its other remedies hereunder, at its sole option, may remedy such default for the account and at the expense of the Tenant or Landlord, as applicable. Any such sums shall be paid to the Landlord by the Tenant as additional rent, or in the event of Tenant payments to cure a Landlord default, the Tenant may deduct same from rental due and owing by way of set-off to the extent of such payments.

IX. Tenant shall be responsible, with respect to the demised premises of which the within Leasehold is a part for the cost of:

(a) comprehensive general liability insurance covering all Tenant's general liability obligations under this lease, with limits of $3,000,000/$5,000,000 on personal injury or death and limits of $500,000.00 on property damage in a company qualified to do business in Massachusetts, insuring Landlord as well as Tenant against injury to persons or property.

(b) insurance upon the premises against fire and loss

or damage by other risks embraced by Extended Coverage Endorsement, so called, naming Landlord as insured, in an amount equal to the full insurable value of the premises with insurance companies authorized to do business in Massachusetts. Such policies may contain an eighty (80%) percent co-insurance clause.

(c) Landlord shall be named in all insurance policies.

(d) The cost of said insurance shall be paid by the Tenant within ten (10) days after presentation of bill from Landlord to Tenant setting forth the cost of the aforesaid insurance, whether such insurance shall be paid annually or in monthly installments.

(e) Each of the parties hereto hereby waives any and all rights of recovery against the other or against any other tenant or occupant of the building, or against the officers, employees, agents, representatives, customers and business visitors of such other party of such other tenant or occupant of the building, for loss of or damage to such waiving party of its property or the property of others under its control, arising from any cause insured against under the standard form of fire insurance policy with all permissible extensions and endorsements covering additional periods or under any other policy of insurance carried by such waiving party in lien thereof. Such waivers shall be effective only so long as the same is permitted by each party's insurance carrier without the payment of additional premium.

X. (a) No consent or waiver, express or implied, by the Landlord or the Tenant to or of any breach of any agreement or duty of the other shall be construed as a consent or waiver of any other breach of the same or any other agreement or duty. This agreement is the entire agreement between the parties and modification or alteration of this Lease shall be binding unless signed by both parties. This Lease shall be governed and construed in accordance with the laws of the Commonwealth of Massachusetts, and if any provisions shall to any extent be invalid, the remainder shall not be affected.

(b) The following addresses for communications and payments, unless otherwise specified, by one party addressed to the other shall be sufficient: for the Landlord - 25 Moulton Street, Cambridge, Massachusetts; and for the Tenant - 61 Moulton Street, Cambridge, Massachusetts. Any communication, except payment of rent, which is not delivered personally and receipted, shall be deemed duly served if in writing, mailed by certified mail so addressed, postage prepaid, return receipt requested and such notices shall be deemed given when posted by the U.S. Postal Service.

(c) The obligations and benefits of this Lease shall run with the land and this Lease shall be binding upon and inure to the benefit of the parties hereto and their respective successors and assigns; except that the Landlord shall be liable hereunder only for obligations and liabilities accruing or

arising while, or out of facts or situations occurring while, the Landlord is the owner of the premises, and for indemnifications, obligations and liabilities incurred by the Landlord under or pursuant to the Lease provisions.

(d) The Landlord agrees that the Tenant, upon paying rents and all other charges herein provided and performing the Tenant's agreements hereunder, shall lawfully and quietly hold, occupy and enjoy said demised premises during the term of this Lease or until the same is terminated as herein provided, and neither the Lease nor Tenant's right to remain in exclusive possession shall be affected or disturbed by reason of transfer of title to premises through foreclosure or otherwise or by reason of any Landlord default under any mortgage or deed of trust.

(e) This Lease, and all rights of Tenant hereunder, are and shall be subject and subordinate to all mortgages which now or hereafter affect the premises, whether or not such mortgages shall also cover other lands and/or buildings and/or leases, to each and every advance made hereafter to be made under such mortgages, and to all renewals, modifications, replacements and extensions of such leases and such mortgages and all consolidations of such mortgages, Landlord agrees to use reasonable efforts to obtain and deliver to Tenant following the execution of this Lease a so called non-disturbance and attornment agreement from the existing mortgages.

Landlord hereby represents and warrants to Tenant,

as of the date of this Lease and as of the Commencement Date, that (i) Landlord is not in default under any mortgage which encumbers the premises, (ii) this Lease and the permitted uses hereunder do not and will not constitute a violation of any such mortgage, and (iii) all consents or approvals required by the terms of any such mortgage for this Lease have been duly obtained by the Landlord.

XI. The Tenant shall have the right, at its expense, to install a sign or signs on the demised premises at such locations as may be reasonably necessary to make known the location of its business. Tenant shall obtain written consent of Landlord before erecting any sign, which consent shall not be unreasonably withheld. Upon termination of this Lease, Tenant shall promptly remove the said signs at its own expense and repair any damage to premises caused by the signs.

XII. Landlord and Tenant represent and warrant to each other that the only brokers in this transaction are Spaulding & Slye Colliers and Peter Elliot Co., Inc. and that Landlord will pay the brokerage commission due said brokers as per the agreement between the Landlord and said brokers. Landlord and Tenant agree to defend and indemnify each other against any claims, losses, damages. liabilities or expenses (including reasonable attorney's fees) arising out of the breach of any of their respective foregoing representations.

XIII. Landlord represents that in 1986 it engaged the services of a professional environmental engineering firm to conduct a so-called hazardous waste site assessment of the Premises. A copy has been provided to the Tenant. Landlord further represents, and Tenant acknowledges, that Landlord is engaging the services of a professional environmental engineering firm to update such 1986 site assessment. Since such update will require both a physical inspection of the premises as well as the testing and analysis of samples to be taken from some test well borings on the Premises, if necessary. Landlord estimates that it may take four to six weeks for such update to be completed. Upon Landlord's receipt of such update, Landlord shall deliver a copy thereof to Tenant. If such update shows no material change in condition of the premises, Landlord and Tenant agrees to rely on such update. If, however, such update discloses any material change in the condition of the premises the Landlord agrees to Indemnify Tenant with material change in condition as provided in Article V, Section I. Said Indemnification shall apply only to any change in the condition of the premises up to December 9, 1991.

XIV. The Tenant shall deliver to the Landlord within the time of the execution of the within Lease the sum of $11,250.00 as a deposit to secure perform of all covenants and payment of all sums due under the terms of the within Lease or the extensions or renewals thereof. At the conclusion of the Lease

term or any extension thereof, Landlord shall be accountable to the Tenant regarding said security deposit and Landlord further agrees to pay interest on said sum at the rate of five percent (5%) per annum payable at the conclusion of the initial term of the Lease and if the within Lease is extended, interest shall be computed during such extended period and shall be paid at the end of said extended period.

WITNESS the execution hereof, in duplicate, under seal, all as of the day and year first above written.

MOULTON REALTY COMPANY

/s/ Michael J. Spinelli

Michael J. Spinelli
Trustee of M.R.C. Realty Trust

/s/ Carol Ann Hickey

Carol Ann Hickey

/s/ Peter A. Spinelli

Peter A. Spinelli, General Partner
Spinelli Family Associates

VIRUS RESEARCH INSTITUTE, INC.

By: /s/ John W. Littlechild

John W. Littlechild
Its President

SCHEDULE A

[GRAPHIC: Plot Plan]

PLOT PLAN OF LAND
IN
CAMBRIDGE, MASS

VRI004 (4/30/93)

AMENDMENT TO LICENSE AGREEMENT

This amendment is entered into between the President and Fellows of Harvard College (hereinafter HARVARD) having offices at the Office for Technology and Trademark Licensing, 124 Mt. Auburn Street, Suite 440, Cambridge, Massachusetts, 02138 and Virus Research Institute (hereinafter LICENSEE), a corporation, having offices at 61 Moulton Street, Cambridge, MA 02139.

WHEREAS HARVARD and LICENSEE have entered into a License Agreement effective as of May 1, 1992 with respect to certain patents and technology directed to cholerae (the "License Agreement");

WHEREAS the parties desire to amend such License Agreement.

NOW THEREFORE, in consideration of the foregoing premises, and the mutual promises and other good and valuable consideration, the parties agree as follows:

1. Section 1.4 of the License Agreement is deleted in its entirety and rewritten as follows:

-- "NET SALES" means the total received by LICENSEE from sale of LICENSED PRODUCTS less transportation charges and insurance, sales taxes, use taxes, excise taxes, value added taxes, customs duties or other imports, to the extent itemized on invoice, normal and customary quantity and cash discounts (to the extent allowed), allowances and credits on account of rejection or return of LICENSED PRODUCTS. In the event that a LICENSED PRODUCT includes, a component which has therapeutic and/or prophylactic activity ("Active Component(s)") covered by a PATENT RIGHT (Patented Component(s)) and Active Components not covered by a PATENT RIGHT (Unpatented Component(s)) (such PRODUCT being a Combined Product), then NET SALES shall be the amount which is normally received by LICENSEE from a sale of the Patented Component(s) when sold separately in an arm's length transaction with an unaffiliated third party. If the Patented Component(s) are not sold separately, then NET SALES upon which royalty is paid shall be the NET SALES of the Combined Product multiplied by a

fraction, the numerator of which is the cost for producing the Patented Components and the denominator of which is the cost for producing the Combined Product.

2. Add the following Section 1.6 to the License Agreement.

--1.6 The term "SUBLICENSEE" shall mean any non-AFFILIATE third party licensed by LICENSEE to make, have made, use or sell any product or use any process under PATENT RIGHTS.--

3. Paragraphs 2.2(c), 2.2(d), 2.2(e) and 2.2(f) of the License Agreement are deleted in the entirety.

4. Paragraph 2.2(g) of the License Agreement is renumbered as Paragraph 2.2(c).

5. The following paragraph is added to the License Agreement as Paragraph 2.5.

--2.5 LICENSEE has provided HARVARD with a development plan for developing and obtaining regulatory approval of the LICENSED PRODUCT selected by LICENSEE, which development plan includes milestones.

LICENSEE shall exert reasonable efforts under the circumstances to achieve such milestones. In the event LICENSEE subsequently indicates in writing to HARVARD that such milestones cannot be met or fails to meet such milestones, LICENSEE shall promptly notify HARVARD, and LICENSEE and HARVARD shall promptly enter into good faith negotiations to reconsider such milestones. In the event that the parties cannot agree to the milestones within sixty (60) days after beginning good faith negotiations, the matter shall be submitted to arbitration to determine the milestones and the time period therefor which should be met pursuant to this Section. The arbitrator in setting and determining milestones shall consider the state of technology; the efforts exerted by LICENSEE, the business circumstances of LICENSEE and the public interest objectives to HARVARD'S licensing program; and technical and regulatory problems. Thereafter, LICENSEE shall exert reasonable efforts to achieve such milestones.

In the event that LICENSEE cannot meet the milestones set by arbitration because of technological or regulatory problems, HARVARD shall not unreasonably deny an extension of time to meet

the milestones, upon a showing by LICENSEE that it has made good faith reasonable efforts to meet the milestones.

If LICENSEE (i) falls to meet the milestones established by agreement of the parties and (ii) fails to obtain extensions of such milestones established by arbitration and (111) LICENSEE has not exerted good faith reasonable efforts to meet such milestones, as its sole and exclusive remedy HARVARD shall have the right to terminate or convert the licenses to non-exclusive licenses by providing to LICENSEE sixty (60) days prior written notice.

Notwithstanding anything else to the contrary, in the event that LICENSEE and/or its AFFILIATE(s) and/or SUBLICENSEE(s) have expended at least two hundred fifty thousand dollars ($250,000) in research and developing a LICENSED PRODUCT and LICENSEE intends to continue development of a LICENSED PRODUCT, the rights and licenses granted hereunder shall not terminate and shall be converted to a non-exclusive right and license, and further provided that LICENSEE or a SUBLICENSEE or an entity on its behalf spends at least one hundred thousand dollars ($100,000) per year in pursuing development of PRODUCT for commercial sale.

LICENSEE shall ensure that for any PRODUCT being developed or commercialized by a SUBLICENSEE, such SUBLICENSEE shall assume the obligations imposed on LICENSEE under this paragraph.

The efforts of an AFFILIATE, SUBLICENSEE or collaborator of LICENSEE shall be considered as efforts of LICENSEE. - -

6. Rewrite Paragraph 3.2 of the License Agreement in its entirety to read as follows:

--3.2 LICENSEE shall pay HARVARD, during the term of the license granted in Section 2.1, (i) a royalty of four percent (4%) of the NET SALES of the LICENSED PRODUCTS sold by LICENSEE and its AFFILIATES to commercial organizations, and two percent (2%) of the NET SALES of the LICENSED PRODUCTS sold by LICENSEE and its AFFILIATES to non-profit or government agencies, or (ii) twenty-five percent (25%) of royalties received by LICENSEE or its AFFILIATES from a SUBLICENSEE for all LICENSED PRODUCTS covered by a PATENT RIGHT licensed to LICENSEE, and twenty-five percent (25%) of upfront license and license maintenance fees received from a SUBLICENSEE for a license under PATENT RIGHTS, in the case where the SUBLICENSEE is a commercial organization, and ten percent (10%) of such royalties and fees where the SUBLICENSEE, is a government or non-profit organization.--

7. Delete Paragraph 4.1 of the License Agreement in its entirety.

8. Rewrite Paragraph 4.2 of the License Agreement in its entirety to read as follows:

--4.2 LICENSEE shall provide written annual reports within sixty (60) days after June 30 of each calendar year which shall include but not be limited to: reports of progress on research and development, regulatory approvals, manufacturing, sublicensing, marketing and sales during the preceding twelve (12) months as well as plans for the coming year. --

9. Rewrite Paragraph 8.4 of the License Agreement in its entirety to read as follows:

--8.4 In the event that the licenses granted to LICENSEE under this Agreement are terminated, any granted sub-licenses shall remain in full force and effect as a direct license from HARVARD to the SUBLICENSEE, provided that the SUBLICENSEE is not then in breach of its sub-license agreement and the SUBLICENSEE agrees to be bound (as a licensee) to HARVARD (as a licensor) under the terms and conditions of the sub-license agreement. --

10. In Paragraph 9.3(a) of the License Agreement, delete the last sentence in its entirety.

11. Delete Paragraphs 9.3(b), 9.3(c), 9.3(d) and 9.3(e) of the License Agreement and in lieu thereof insert the following:

(b) LICENSEE'S indemnification under (a) above shall not apply to any liability, damage, loss or expense to the extent to apply to any liability, damage, loss or expense to the extent that it is attributable to the negligent activities or willful misconduct of the Indemnitees.

(c) HARVARD shall notify LICENSEE promptly of any claim or threatened claim under this Paragraph 9.3 and shall fully cooperate with all reasonable requests of LICENSEE with respect thereto.

(d) LICENSEE agrees, at its own expense, to provide attorneys reasonably acceptable to HARVARD to defend against any actions brought or filed against any party indemnified hereunder with respect to the subject of indemnity contained herein, whether or not such actions are rightfully brought and LICENSEE shall have the right to control the defense, settlement or compromise of any such claim or action.

(e) At such time as any PRODUCT is being commercially distributed or sold (other than for research purposes or for the purpose of obtaining regulatory approvals) by LICENSEE, or by an AFFILIATE, SUBLICENSEE or agent of LICENSEE (hereunder "Other Seller"), LICENSEE shall itself or in the alternative shall ensure that Other Seller either (i) at its sole cost and expense, procure(s) and maintain(s) comprehensive general liability insurance in amounts not less than $2,000,000 per incident and $2,000,000 annual aggregate and naming the Indemnitees as additional insureds or (ii) pay(s) for the procurement and maintenance by HARVARD of insurance in the amounts and in the form set forth in this paragraph. Such comprehensive general liability insurance shall provide (i) product liability coverage and (ii) broad form contractual liability coverage for LICENSEE'S indemnification under Paragraph 9.3(a) of this Agreement. LICENSEE shall ensure that if LICENSEE or the Other Seller elects to self-insure all or part of the limits described above (including deductibles or retentions which are in excess of $250,000 annual aggregate) such self-insurance program must be acceptable to HARVARD and the Risk Management Foundation. The minimum amounts of insurance coverage required under this Paragraph 9.3(c) shall not be construed to create a limit of LICENSEE'S liability with respect to its indemnification under Paragraph 9.3(a) of this Agreement. At such time, or at any time, LICENSEE can request that HARVARD ascertain whether Risk Management Foundation has in effect Uniform Indemnification and Insurance Provisions more favorable than those of this Agreement, in which event LICENSEE and HARVARD shall amend this Agreement to include such more favorable provisions.

(f) LICENSEE shall provide HARVARD with written evidence of such insurance upon request of HARVARD. LICENSEE shall provide HARVARD with written notice of at least thirty (30) days prior to the cancellation, non-renewal or material change in such insurance; if LICENSEE does not obtain replacement insurance providing comparable coverage within such thirty (30) days period, HARVARD shall have the right to terminate this Agreement effective at the end of such thirty (30) day period by written notice to LICENSEE.

(g) LICENSEE shall itself maintain, or shall ensure that Other Seller maintains or that payments are made for the maintenance by HARVARD of, as the case may be, such comprehensive general liability insurance beyond the expiration or termination of this Agreement during (i) the period that any LICENSED PRODUCT is being commercially distributed or sold (other than for research purposes or the purpose of obtaining regulatory approvals) by Other Seller and (ii) a reasonable period after the period referred to in (g) (i) above which shall in no event

be less than ten (10) years. The obligations of (g)(ii) above can be satisfied by the purchase of insurance by LICENSEE or a third party which covers claims resulting from occurrences during such period of (g)(ii) above for LICENSED PRODUCT commercially distributed or sold by LICENSEE or Other Seller during the period referred to in (g)(i) above.

12. Except as modified herein, the License Agreement and the terms, conditions and obligations thereof remain in full force and effect as originally written.

IN WITNESS WHEREOF, the parties hereto intending to be bound have set their hands and seal effective as of the date first above written.

PRESIDENT AND FELLOWS OF HARVARD COLLEGE	VIRUS RESEARCH INSTITUTE
By: /s/ Joyce Brinton	BY: /s/ [ILLEGIBLE]
Joyce Brinton, Director	
TITLE: Office for Technology and Trademark Licensing Harvard University	TITLE: President
DATE: 7/9/93	DATE: 7/23/93

LICENSE AGREEMENT

This Agreement is made and entered into between the President and Fellows of Harvard College (hereinafter HARVARD) having offices at the Office for Technology and Trademark Licensing, 124 Mt. Auburn Street, Suite 440, Cambridge, Massachusetts, 02138 and Virus Research Institute (hereinafter LICENSEE), a corporation of Cambridge, MA, having offices at 61 Moulton Street, Cambridge, MA 02139

Whereas HARVARD and The General Hospital Corporation (GENERAL) doing business as Massachusetts General Hospital are or will be the Owners by assignment, of the entire right, title and interest in the following United States patent applications, and in the foreign patent applications corresponding thereto, and in the inventions described and claimed therein and any patents issuing thereon, and whereas GENERAL and HARVARD have agreed to cooperate in the patent and license administration of such patent applications:

U.S.S.N. 629,602 - "Improved Vaccines"; filed December 18, 1990; Inventors: John Mekalanos and Samuel Miller.

U.S.S.N. 629,102 - "Vibrio Cholerae Strains Defective in irgA Expression and Cholera Vaccines Derived Therefrom"; filed December 18, 1990; Inventors: John Mekalanos and Stephen Calderwood.

U.S.S.N. 000,000 - "Doubly-Attenuated Strain of Vibrio Cholerae to Deliver Heterlogous Antigens for Vaccination" to be filed in 1992; Inventors: John Mekalanos and Stephen Calderwood (serial number and filing date to be inserted when available;

Whereas GENERAL has agreed HARVARD is its sole licensing agent for these jointly owned patent applications; and

Whereas HARVARD is the Owner by assignment of the entire right, title and interest in the following United States Patents or Patent Applications and in the foreign patent applications corresponding thereto, and in the inventions described and contained therein:

U.S.S.N. 043,907 - "Cholera Vaccines"; filed April 29, 1987 and its CIP USSN 5,098,998, filed April 29, 1988; Inventors: John Mekalanos and Ronald Taylor.

U.S. 4,882,278 - "Non-Toxic Vibrio Cholera Mutants"; issued November 21, 1989; Inventor: John Mekalanos.

U.S.S.N 000,000 - "Peruvian Strain of Cholera Vaccine"; to be filed in 1992; Inventor: John Mekalanos (serial number and filing date to be inserted when available); and

Whereas HARVARD and GENERAL are the Owners by assignment from the inventors of the BIOLOGICAL MATERIAL as defined in Appendix B and have the right to license the BIOLOGICAL MATERIAL; and

Whereas HARVARD and the GENERAL are committed to a policy that ideas or creative works produced at HARVARD and the GENERAL should be used for the greatest possible public benefit; and

Whereas HARVARD accordingly believes that every reasonable incentive should be provided for the prompt introduction of such ideas into public use, all in a manner consistent with the public interest; and

Whereas LICENSEE is desirous of obtaining an exclusive worldwide license in order to practice the above referenced inventions covered by PATENT RIGHTS and to use the BIOLOGICAL MATERIAL in the United States and in certain foreign countries, and to manufacture, use and sell in the commercial market the products made in accordance therewith; and

Whereas HARVARD is desirous of granting such a license to LICENSEE in accordance with the terms of this Agreement. Now therefore, in consideration of the foregoing premises, the parties agree as follows:

ARTICLE I

DEFINITIONS

1.1 PATENT RIGHTS shall mean any and all United States patents or patent applications listed above and attached hereto in Appendix A, the inventions described and claimed therein, and any divisions, continuations, continuations-in-part directed to subject matter specifically described in the application and patents listed in Appendix A, patents issuing thereon or reissues thereof; and any and all foreign patents and patent applications corresponding thereto; which will be automatically incorporated in and added to this Agreement and shall periodically be added to Appendix A and made a part thereof. To the extent HARVARD's obligations to third parties permit, PATENT RIGHTS shall also include all IMPROVEMENT INVENTIONS. IMPROVEMENT INVENTIONS shall mean any inventions or discoveries that enhance, substitute for, or are useful with the products, procedures or processes described in PATENT RIGHTS to the extent they are (i) dominated by any claims of a pending and/or issued patent or

patent application which is then included in the PATENT RIGHTS, and HARVARD's ownership interest in any United States or foreign patents and patent application thereon, and (ii) made (i.e., conceived and reduced to practice) by Dr. John Mekalanos solely or jointly with others directly supervised in his laboratory at Harvard Medical School. IMPROVEMENT INVENTIONS shall not include inventions assignable to GENERAL.

1.2 LICENSED PRODUCTS shall mean products covered in whole or in part by an issued, unexpired claim or a pending claim contained in PATENT RIGHTS which has not been declared invalid by a court of competent jurisdiction.

1.3 LICENSED PROCESSES shall mean processes covered in whole or in part by an issued, unexpired claim or a pending claim contained in PATENT RIGHTS which has not been declared invalid by a court of competent jurisdiction.

1.4 NET SALES shall mean the amount billed or invoiced on sales of LICENSED PRODUCTS less:

(a) Customary trade, quantity or cash discounts and non-affiliated brokers' or agents' commissions actually allowed and taken;

(b) Amounts repaid or credited by reason of rejection or return; and/or

(c) To the extent separately stated on purchase orders, invoices or other documents of sale, taxes levied on and/or other governmental charges made as to production, sale, transportation, delivery or use and paid by or on behalf of LICENSEE.

1.5 AFFILIATES shall mean any company, corporation, or business (i) in which LICENSEE directly or indirectly owns or controls at least fifty percent (50%) of the voting stock, or (ii) which directly or indirectly owns or controls at least fifty percent (50%) of the voting stock of LICENSEE or (iii) the majority ownership of which is directly or indirectly under common control with LICENSEE.

1.6 BIOLOGICAL MATERIAL shall mean the materials supplied by HARVARD and GENERAL (identified in Appendix B).

1.7 TECHNOLOGY shall mean any and all information or PATENT RIGHTS, or BIOLOGICAL MATERIAL supplied by HARVARD and GENERAL to LICENSEE.

GRANT

2.1 For the term of this Agreement, HARVARD hereby grants to LICENSEE and LICENSEE accepts, subject to the terms and conditions hereof, a worldwide license under PATENT RIGHTS and a worldwide license to use the BIOLOGICAL MATERIAL, to make and have made, to use and have used, to sell and have sold the LICENSED PRODUCTS, and to practice the LICENSED PROCESSES. Such license shall include the right to grant sublicenses. In order to provide LICENSEE with a period of exclusivity, HARVARD agrees it will not grant licenses to others except as required under Paragraph 2.2 (a) or as permitted in paragraph 2.2 (b). LICENSEE agrees during the period of exclusivity of this license in the United States that any LICENSED PRODUCT produced for sale in the United States will be manufactured substantially in the United States.

2.2 The granting and acceptance of this license is subject to the following conditions:

(a) HARVARD's "Statement of Policy in Regard to Inventions, Patents and Copyrights" dated March 17, 1986, Public Law 96-517, Public Law 98-620 and HARVARD's and GENERAL's obligations under agreements with other sponsors of research. Any right granted in this Agreement greater than that permitted under Public Law 96-517 or Public Law 98-620 shall be subject to modification as may be required to conform to the provisions of that statute.

(b) HARVARD's and GENERAL's right to make and to use and to grant non-exclusive licenses to make and to use, for academic research purposes only and for GENERAL's internal inpatient care purposes and not for any commercial purpose, the subject matter described and claimed in PATENT RIGHTS, or the BIOLOGICAL MATERIAL.

(c) LICENSEE shall use reasonable effort to effect introduction of the LICENSED PRODUCTS into the commercial market as soon as practicable, consistent with sound and reasonable business practices and judgment; thereafter, until the expiration of this Agreement, LICENSEE shall endeavor to keep LICENSED PRODUCTS reasonably available to the public.

(d) HARVARD shall have the right to terminate or render non-exclusive any license granted hereunder if in HARVARD's reasonable judgement, LICENSEE:

(i) has not, within five years from the date of this Agreement, commenced clinical trials of a LICENSED PRODUCT or LICENSED PROCESS in the country or countries where licensed; and/or

(ii) is not, within one year of the date of this Agreement, demonstrably engaged in on-going research, development, or marketing or licensing programs as appropriate, directed toward commercial use of the LICENSED PRODUCT or LICENSED PROCESSES.

In making this determination HARVARD shall take into account the normal course of such programs conducted with sound and reasonable business practices and judgment and shall take into account the reports provided hereunder by LICENSEE.

(e) All sublicenses granted by LICENSEE hereunder shall include a requirement that the sublicensee use its good faith efforts to bring the subject matter of the sublicense into commercial use as quickly as is reasonably possible consistent with sound and reasonable business practices and judgement and shall bind the sublicensee to meet LICENSEE's obligations to HARVARD under this Agreement. Royalties charged for sublicenses by LICENSEE shall not be in excess of normal trade practice. Copies of all sublicense agreements shall be provided to HARVARD.

(f) In the event that LICENSEE is in default of its obligations under Section 2.2 (c) or (e) or Article III, and such default remains unresolved following notice as provided in Section 8.2 or LICENSEE fails to meet the milestones specified in Section 2.2 (d) and HARVARD does not thereafter exercise it right to terminate this license, and LICENSEE is thereafter unable or unwilling to grant sublicenses, either as suggested by HARVARD or a potential sublicensee or otherwise, HARVARD may directly license such potential sublicensee unless LICENSEE reasonably satisfies HARVARD that such sublicense would be contrary to sound and reasonable business practice, and that the granting of such sublicense would not materially increase the availability to the public of products manufactured under this license.

(g) HARVARD shall have the right to terminate this Agreement if LICENSEE does not have commitments for a minimum of one million dollars ($1,000,000) of investment capital within six (6) months of the signing of this Agreement, and three million dollars ($3,000,000) of total funding within thirty-six (36) months of the signing of this Agreement.

2.3 HARVARD hereby grants to LICENSEE the right to extend the licenses granted or to be granted in paragraph 2.1 to an AFFILIATE subject to the terms and conditions hereof.

2.4 All rights reserved to the United States Government and others under Public Law 96-517 and 98-620 shall remain and shall in no way be affected by this Agreement.

ARTICLE III

ROYALTIES

3.1 LICENSEE shall pay to HARVARD a non-refundable license fee in the sum of $200,000 in two equal installments, the first upon execution of this Agreement, and the second six months after the signing of this Agreement.

3.2 LICENSEE shall pay HARVARD, during the term of the license granted in Section 2.1, a royalty of four percent (4%) of the NET SALES of all LICENSED PRODUCTS sold by LICENSEE and its AFFILIATES or sublicensees to commercial organizations, and two percent (2%) of the NET SALES of all LICENSED PRODUCTS sold by LICENSEE and its AFFILIATES or sublicensees to non-profit or government agencies. In the case of sublicenses, LICENSEE shall also pay to HARVARD twenty-five percent (25%) of non-royalty sublicense income (e.g., license issue fees, license maintenance fees, etc.) from commercial organizations, and ten percent (10%) of all such income from government or non-profit organizations. If this license is converted to a non-exclusive one and if other non-exclusive licenses are granted, this royalty shall not exceed the royalty being paid by other licensees during the term of the non-exclusive license. On sales between LICENSEE and its AFFILIATES or sublicensees for resale, the royalty shall be paid on the resale.

3.3 HARVARD shall have the right to terminate or render non-exclusive this license in the event that LICENSEE does not pay to HARVARD at least the following amounts in license maintenance fees and/or minimum royalties:

First calendar year	-$10,000
Next calendar year	-$15,000
Next calendar year and each year thereafter.	-$20,000

In the event that actual royalties are not at least equal to the above amounts for the specified periods, LICENSEE shall have the right to pay any difference between such minimum amounts and the actual royalties paid in satisfaction of its obligations under this Section 3.3.

3.4 In the event that LICENSEE is required to pay royalties to one or more third parties under patents other than PATENT RIGHTS covering LICENSED PRODUCTS or LICENSED PROCESSES, LICENSEE shall be entitled to a credit against royalties due HARVARD in an amount equal to fifty percent (50%) of royalties paid to such third parties, provided that in no event shall the royalties otherwise due HARVARD be reduced by more than one-half.

3.5 In the event that the royalties paid to HARVARD are so significant a factor in the return realized by LICENSEE as to diminish LICENSEE's capability to respond to competitive pressures in the market, HARVARD agrees to consider a reasonable reduction in the royalty paid to HARVARD as to each LICENSED PRODUCT for the period during which such market condition exists. Factors determining the size of the reduction will include profit margin on LICENSED PRODUCTS and on analogous products, prices of competitive products, total prior sales by LICENSEE, and LICENSEE's expenditures on LICENSED PRODUCT development.

ARTICLE IV

REPORTING

4.1 Prior to signing this Agreement, LICENSEE has provided to HARVARD a written research and development plan under which LICENSEE intends to bring the subject matter of the licenses granted hereunder into commercial use upon execution of this Agreement. Such plan includes projections of sales and proposed marketing efforts.

4.2 LICENSEE shall provide written annual reports within sixty (60) days after June 30 of each calendar year which shall include but not be limited to: reports of progress on research and development, regulatory approvals, manufacturing, sublicensing, marketing and sales during the preceding twelve (12) months as well as plans for the coming year. If progress differs from that anticipated in the plan provided under Section 4.1, LICENSEE shall explain the reasons for the difference and propose a modified plan for HARVARD's review and approval. LICENSEE shall also provide any reasonable additional data HARVARD requires to evaluate LICENSEE's performance.

4.3 LICENSEE shall report to HARVARD the date of first sale of LICENSED PRODUCTS (or results of LICENSED PROCESSES) in each country within thirty (30) days of occurrence.

4.4 Commencing with the calendar year half in which Net Sales first occur, LICENSEE agrees to submit to HARVARD within sixty (60) days after the calendar half years ending June 30 and December 31, reports setting forth for the preceding six (6) month period the amount of the LICENSED PRODUCTS sold by LICENSEE, its AFFILIATES and sublicensees in each country, the NET SALES thereof, and the amount of royalty due thereon and with each such royalty

any non-royalty sublicense income and pay the amount of royalty due. Such report shall be certified as correct by an officer of LICENSEE and shall include a detailed listing of all deductions from NET SALES, sublicensee income or from royalties as specified herein. Such report shall also specify which PATENT RIGHTS are used in or by each LICENSED PRODUCT generating royalty income. If no royalties are due to HARVARD for any reporting period, the written report shall so state. If royalties for any calendar year do not equal or exceed the minimum royalties established in paragraph 3.3, LICENSEE shall include the balance of the minimum royalty with the payment for the half year ending December 31. All royalties due hereunder shall be payable in United States dollars. Conversion of foreign currency to U.S. dollars shall be made at the conversion rate existing in the United States on the, last business day in the reporting period as reported in the Wall Street Journal. All such reports shall be maintained in confidence by HARVARD, except as required by law, including Public Law 96-517 and 98-620.

4.5 If by law, regulation, of fiscal policy of a particular country, conversion into United States dollars or transfer of funds of a convertible currency to the United States is restricted or forbidden, LICENSEE shall give HARVARD prompt notice in writing and shall pay the royalty and other amounts due through such means or methods as are lawful in such country as HARVARD may reasonably designate. Failing the designation by HARVARD of such lawful means or methods within thirty (30) days after such notice is given to HARVARD, LICENSEE shall deposit such royalty payment in local currency to the credit of HARVARD in a recognized banking institution designated by HARVARD, or if none is designated by HARVARD within the thirty (30) day period described above, in a recognized banking institution selected by LICENSEE and identified in a written notice to HARVARD by LICENSEE, and such deposit shall fulfill all obligations of LICENSEE to HARVARD with respect to such royalties.

ARTICLE V

RECORD KEEPING

5.1 LICENSEE shall keep, and shall require its AFFILIATES and sublicensees to keep accurate and correct records of LICENSED PRODUCTS made, used or sold under this Agreement, appropriate to determine the amount of royalties due hereunder to HARVARD. Such records shall be retained for at least three (3) years following a given reporting period. They shall be available during normal business hours for inspection at the expense of HARVARD by HARVARD's Internal Audit Department or by a Certified Public Accountant selected by HARVARD and approved by LICENSEE for the sole purpose of verifying reports and payments hereunder. Such accountant shall not disclose to

HARVARD any information other than information relating to accuracy of reports and payments made under this Agreement. In the event that any such inspection shows an under reporting and underpayment in excess of five percent (5%) for any twelve (12) month period, then LICENSEE shall pay the cost of such examination.

ARTICLE VI

DOMESTIC AND FOREIGN PATENT FILING AND MAINTENANCE

6.1 LICENSEE shall reimburse HARVARD for all reasonable expenses HARVARD and GENERAL have incurred and shall incur for the preparation, filing, prosecution and maintenance of PATENT RIGHTS for which HARVARD or GENERAL has not been, and is not eligible to be reimbursed by any third party. HARVARD and GENERAL shall take responsibility for the preparation, filing, prosecution and maintenance of any and all patent applications and patents included in PATENT RIGHTS using patent counsel reasonably acceptable to LICENSEE, provided however that HARVARD and GENERAL shall first consult with LICENSEE as to the preparation, filing, prosecution and maintenance of such patent applications and patents and shall furnish to LICENSEE copies of documents relevant to any such preparation, filing, prosecution or maintenance.

6.2 HARVARD, GENERAL, and LICENSEE shall cooperate fully in the preparation, filing, prosecution and maintenance of PATENT RIGHTS and of all patents and patent applications licensed to LICENSEE hereunder, executing all papers and instruments or requiring members of HARVARD and GENERAL to execute such papers and instruments so as to enable HARVARD and GENERAL to apply for, to prosecute and to maintain patent applications and patents in HARVARD's and/or GENERAL's name in any country. Each party shall provide to the other prompt notice as to all matters which come to its attention and which may affect the preparation, filing, prosecution or maintenance of any such patent applications or patents.

6.3 If LICENSEE elects not to pay the expenses of a patent application or patent included within PATENT RIGHTS in a particular country, LICENSEE shall notify HARVARD not less than sixty (60) days prior to such action and shall thereby surrender its rights under such patent or patent application in such country. LICENSEE agrees that it shall not exercise this right for the purpose of avoiding the payment of royalties otherwise due in such country.

ARTICLE VII

INFRINGEMENT

7.1 With respect to any PATENT RIGHTS under which LICENSEE is exclusively licensed pursuant to this Agreement, LICENSEE or its sublicensee shall have the right to prosecute in its own name and at its own expense any infringement of such patent, so long as such license is exclusive at the time of the commencement of such action. HARVARD agrees to notify LICENSEE promptly of each infringement of such patents of which HARVARD is or becomes aware. Before LICENSEE or its sublicensees commences an action with respect to any infringement of such patents, LICENSEE shall give careful consideration to the views of HARVARD and to potential effects on the public interest in making its decision whether or not to sue and in the case of a LICENSEE sublicense, shall report such views to the sublicensee.

7.2 If LICENSEE or its sublicensee elects to commence an action as described above and HARVARD and/or GENERAL is a legally indispensable party to such action, HARVARD and/or GENERAL shall have the right to assign to LICENSEE all of HARVARD's and/or GENERAL's right, title and interest in each patent which is a part of the PATENT RIGHTS and is the subject of such action (subject to all HARVARD's and/or GENERAL's obligations to the government and others having rights in such patent). In the event that HARVARD and/or GENERAL makes such an assignment, such assignment shall be irrevocable, and such action by LICENSEE on that patent or patents shall thereafter be brought or continued without HARVARD and/or GENERAL as a party' if HARVARD and/or GENERAL is no longer an indispensable party. Notwithstanding any such assignment to LICENSEE by HARVARD and/or GENERAL and regardless of whether HARVARD and/or GENERAL is or is not an indispensable party, HARVARD and/or GENERAL shall cooperate fully with LICENSEE, at LICENSEE's expense, in connection with any such action. In the event that any patent is assigned to LICENSEE by HARVARD and/or GENERAL, pursuant to this paragraph, such assignment shall require LICENSEE to continue to meet its obligations under this Agreement as if the assigned patent or patent application were still licensed to LICENSEE.

7.3 If LICENSEE or its sublicensee elects to commence an action as described above, LICENSEE may reduce, by up to 50%, the royalty due to HARVARD earned under the patent subject to suit by the amount of the expenses and costs of such action, including attorney fees. In the event that such expenses and costs exceed the amount of royalties withheld by LICENSEE for any calendar year, LICENSEE may to that extent reduce the royalties due to HARVARD from LICENSEE in succeeding calendar years, but never by more than 50% of the royalty due in any one year.

7.4 Recoveries or reimbursements from such action shall first be applied to reimburse LICENSEE and HARVARD and GENERAL for litigation costs not paid from royalties (if any) and then to reimburse HARVARD for royalties withheld. Any remaining recoveries or reimbursements shall be distributed two-thirds to LICENSEE and one-third to HARVARD.

7.5 In the event that LICENSEE and its sublicensee, if any, elect not to exercise their right to prosecute an infringement of the PATENT RIGHTS pursuant to the above paragraphs. HARVARD and/or GENERAL may do so at its own expense, controlling such action and retaining all recoveries therefrom.

ARTICLE VIII

TERMINATION OF AGREEMENT

8.1 This Agreement, unless extended or terminated as provided herein, shall remain in effect for the life of the last to expire of PATENT RIGHTS licensed hereunder.

8.2 In the event that one party to this Agreement shall be in default in the performance of any obligations under this Agreement, and if the default has not been remedied within ninety (90) days after the date of notice in writing of such default, the party giving such notice may terminate this Agreement by written notice.

8.3 In the event that LICENSEE shall cease to carry on its business, HARVARD shall have the right to terminate this entire Agreement by giving LICENSEE written notice of such termination.

8.4 Any sublicenses granted by LICENSEE under this Agreement shall provide for termination or assignment to HARVARD, at the option of HARVARD, of LICENSEE's interest therein upon termination of this Agreement.

8.5 LICENSEE shall have the right to terminate this Agreement by giving thirty (30) days advance written notice to HARVARD to that effect. Upon termination, a final report shall be submitted and any royalty payments and unreimbursed patent expenses due to HARVARD become immediately payable.

8.6 Sections 8.5, 9.2, 9.3 and 9.4 of this Agreement shall survive termination.

ARTICLE IX

GENERAL

9.1 HARVARD represents and warrants that the entire right, title, and interest in the patent applications or patents comprising the PATENT RIGHTS have been or will be assigned to it and/or GENERAL and that HARVARD has the authority to issue the licenses under said PATENT RIGHTS set forth herein. HARVARD does not warrant the validity of the PATENT RIGHTS licensed hereunder and makes no representations whatsoever with regard to the scope of the licensed PATENT RIGHTS or that such PATENT RIGHTS may be exploited by LICENSEE, an AFFILIATE, or sublicensee without infringing other patents.

9.2 EXCEPT AS PROVIDED IN SECTION 9.1, HARVARD EXPRESSLY DISCLAIMS ANY AND ALL IMPLIED OR EXPRESS WARRANTIES AND MAKES NO EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS OF THE TECHNOLOGY, LICENSED PROCESSES OR LICENSED PRODUCTS CONTEMPLATED BY THIS AGREEMENT.

9.3 (a) LICENSEE shall indemnify, defend and hold harmless HARVARD and GENERAL and their directors, governing board members, trustees, officers, faculty, medical and professional staff, employees, students, and agents and their respective successors, heirs and assigns (the "Indemnitees"), against any liability, damage, loss or expenses (including reasonable attorneys' fees and expenses of litigation) incurred by or imposed upon the Indemnities or any one of them in connection with any claims, suits, actions, demands or judgments arising out of any theory of product liability (including, but not limited to, actions in the form of tort, warranty, or strict liability) concerning any product, process or service used or sold pursuant to any right or license granted under this Agreement. LICENSEE's indemnification under this Section shall apply to any liability, damage, loss or expense whether or not it is attributable to the negligent activities of the Indemmties.

(b) LICENSEE agrees, at its own expense, to provide attorneys reasonably acceptable to HARVARD to defend against any actions brought or filed against any party indemnified hereunder with respect to the subject of indemnity contained herein, whether or not such actions are rightfully brought.

(c) At such time as any such product, process, service is being commercially distributed or sold (other than for the purpose of obtaining regulatory approvals) by LICENSEE or by a sublicensee, AFFILIATE or agent of LICENSEE, LICENSEE shall, at its sole cost and expense, procure and maintain comprehensive general liability insurance in amounts not less $2,000,000 per incident and $2,000,000 annual aggregate and naming the Indemnitees as additional insureds. During clinical trials of any such product, process or service, LICENSEE shall, at its sole cost and expense, procure and maintain

comprehensive general liability insurance in such equal or lesser amount as HARVARD shall require, naming the Indemnitees as additional insureds. Such comprehensive general liability insurance shall provide (i) product liability coverage and (ii) broad form contractual liability coverage for LICENSEE's indemnification under this Agreement. If LICENSEE elects to self-insure all or part of the limits described above (including deductibles or retentions which are in excess of $250,000 annual aggregate) such self-insurance program must be acceptable to HARVARD and the Risk Management Foundation of the Harvard Medical Institutions, Inc. The minimum amounts of insurance coverage required shall not be construed to create a limit of LICENSEE's liability with respect to its indemnification under this Agreement.

(d) LICENSEE shall provide HARVARD with written evidence of such insurance upon request of HARVARD. LICENSEE shall provide HARVARD with written notice at least fifteen (15) days prior to the cancellation, non-renewal or material change in such insurance; if LICENSEE does not obtain replacement insurance providing comparable coverage within such fifteen (15) day period, HARVARD shall have the right to terminate this Agreement effective at the end of such fifteen (15) day period without notice or any additional waiting periods.

(e) LICENSEE shall maintain such comprehensive general liability insurance beyond the expiration or termination of this Agreement during (i) the period that any product, process, or service, relating to, or developed pursuant to, this Agreement is being commercially distributed or sold by LICENSEE or by a sublicensee, AFFILIATE or agent of LICENSEE and (ii) a reasonable period after the period referred to in (e) (i) above which in no event shall be less than fifteen (15) years.

9.4 LICENSEE shall not use HARVARD's or GENERAL's name or any adaptation of it in any advertising, promotional or sales literature without the prior written assent of HARVARD or GENERAL, as the case may be.

9.5 Without the prior written approval of HARVARD, the entire license granted pursuant to this Agreement shall not be transferred by LICENSEE to any party other than to a successor to the business interest of LICENSEE relating to the PATENT RIGHTS. This Agreement shall be binding upon the successors, legal representatives and assignees of HARVARD and LICENSEE.

9.6 The interpretation and application of the provisions of this Agreement shall be governed by the laws of the Commonwealth of Massachusetts.

9.7 LICENSEE agrees to comply with all applicable laws and regulations. In particular, it is understood and acknowledged that the transfer of certain commodities and technical data is subject to United States laws and regulations controlling the export of such commodities and technical data, including all Export Administration Regulations of the United States Department of Commerce. These laws and regulations, among other things, prohibit or require a

license for the export of certain types of technical data to certain specified countries. LICENSEE hereby agrees and gives written assurance that it will comply with all United States laws and regulations controlling the export of commodities and technical data, that it will be solely responsible for any violation of such by LICENSEE or its AFFILIATES or sublicensees, and that it will defend and hold HARVARD and GENERAL harmless in the event of any legal action of any nature occasioned by such violation.

9.8 Written notices required to be given under this Agreement shall be addressed as follows:

If to HARVARD:
Office of Technology and
Trademark Licensing
Harvard University
124 Mt. Auburn Street
Suite 440
Cambridge, MA 02138

CC:
Office of Technology Licensing
and Industry Sponsored Research
333 Longwood Ave.
Boston, MA 02115

Director
Office of Technology Affairs
Massachusetts General Hospital
13th Street, Building 149
Charlestown, MA 02129

If to LICENSEE:
Virus Research Institute
61 Moulton Street
Cambridge, MA 02139
Attn: John Littlechild, President

or such other address as either party may request in writing.

9.9 Should a court of competent jurisdiction later consider any provision of this Agreement to be invalid, illegal, or unenforceable, it shall be considered severed from this Agreement. All other provisions, rights and obligations shall continue without regard to the severed provision, provided that the remaining provisions of this Agreement are in accordance with the intention of the parties.

9.10 In the event of any controversy or claim arising out of or relating to any provision of this Agreement or the breach thereof, the parties shall try to settle such conflicts amicably between themselves. Subject to the limitation stated in the final sentence of this section, any such conflict which the parties are unable to resolve shall be settled through arbitration conducted in accordance with the rules of the American Arbitration Association. The demand for arbitration shall be filed within a reasonable time after the controversy or claim has arisen, and in no event after the date upon which institution of legal proceedings based on such controversy or claim would be barred by the applicable statute of limitation. Such arbitration shall be held in Boston, Massachusetts. The award through arbitration shall be final and binding. Either party may enter any such award in a court having jurisdiction or may make application to such court for judicial acceptance of the award and an order of enforcement, as the case may be. Notwithstanding the foregoing, either party may, without recourse to arbitration, assert against the other party a third-party claim or cross-claim in any action brought by a third party, to which the subject matter of this Agreement may be relevant.

9.11 This Agreement constitutes the entire understanding between the parties and neither party shall be obligated by any condition or representation other than those expressly stated herein or as may be subsequently agreed to by the parties hereto in writing.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed by their duly authorized representatives.

The effective date of this Agreement is May 1, 1992.

PRESIDENT AND FELLOWS OF HARVARD COLLEGE

By: /s/ Joyce Brinton

Joyce Brinton, Director
Office for Technology and Trademark Licensing
Harvard University

Name and Title:

Virus Research Institute

By: /s/ [ILLEGIBLE]

Name and Title: President

APPENDIX A

U.S.S.N. 629,602 - "Improved Vaccines"; filed December 18, 1990; Inventors: John Mekalanos and Samuel Miller.

U.S.S.N. 629,102 - "Vibrio Cholerae Strains Defective in irgA Expression and Cholera Vaccines Derived Therefrom"; filed December 18, 1990; Inventors: John Mekalanos and Stephen Calderwood.

U.S.S.N. 000,000 - "Doubly-Attenuated Strain of Vibrio Cholerae to Deliver Heterlogous Antigens for Vaccination" to be filed in 1992; Inventors: John Mekalanos and Stephen Calderwood (serial number and filing date to be inserted when available).

U.S.S.N. 043,907 - "Cholera Vaccines"; filed April 29, 1987 and its CIP USSN 5,098,998, filed April 29, 1988; Inventors John Mekalanos and Ronald Taylor.

U.S. 4,882,278 - "Non-Toxic Vibrio Cholera Mutants"; issued November 21, 1989; Inventor: John Mekalanos.

U.S.S.N. 000,000 - "Peruvian Strain of Cholera Vaccine"; to be filed in 1992; Inventor: John Mekalanos (serial number and filing date to be inserted when available).

Appendix B

Biological Materials

1. All strain and plasmid inventions described in the following patents, patent applications and unfiled patent applications.

   a. U.S. Patent No. 4,882,278
   b. U.S. Patent Application Serial No. 629,602
   c. U.S. Patent Application Serial No. 629,102
   d. U.S. Patent Application Serial No. 043,907
   e. Unfiled Patent Application entitled "Doubly-Attenuated Strain of Vibrio Cholerae to Deliver Heterologous Antigens for Vaccination"
   f. Unfiled Patent Application entitled "Cholera Vaccine Strains derived from a 1992 Peruvian Isolate of Vibrio Cholerae and other El Tor Strains"

2. The following, recently constructed Vibrio Cholerae Strains

   a. Peru 1,2,3,4 and 5; each derived from wild-type C6709
   b. Bang 1,2,3,4 and 5; each derived from wild-type P27459
   c. Bah 1,2,3,4 and 5; each derived from wild-type E7946
   d. Any additional Vibrio Cholerae strains derived from items 2(a)- 2(c) above.

3. All progeny, mutants, derivatives and replications of the biological materials in Sections 1 and 2 above which are developed by Dr. John Mekalanos solely or jointly with others directly supervised in his laboratory at Harvard Medical School, but only to the extent that Harvard is able to license such biological materials consistent with its obligations to third parties.

LICENSE AND CLINICAL TRIALS AGREEMENT

Agreement ("AGREEMENT"), effective as of February 27, 1995 ("Effective Date") between VIRUS RESEARCH INSTITUTE, INC., a Delaware corporation, with its principal place of business at 61 Moulton Street, Cambridge, Massachusetts 02138 (hereinafter referred to as "VRI") and the JAMES N. GAMBLE INSTITUTE OF MEDICAL RESEARCH, an Ohio non-profit corporation, with its principal place of business at 2141 Auburn Avenue, Cincinnati, Ohio 45219 (hereinafter referred to as "GAMBLE").

WITNESSETH:

WHEREAS, GAMBLE is the owner of certain rights in technology as defined herein; and

WHEREAS, GAMBLE desires to have such rights utilized to promote the public interest by granting a license thereunder;

WHEREAS, VRI is engaged in the development, production, marketing and sale of products similar to the technology which is the subject of this AGREEMENT and has the strategic commitment to facilitate the transfer of such technology for the public interest; and

WHEREAS, VRI desires to obtain a license to said rights upon the terms and conditions hereinafter set forth;

WHEREAS, VRI desires to utilize GAMBLE's services with respect to the conduct of certain of the clinical trials and laboratory services needed to obtain FDA approval for GAMBLE'S rotavirus vaccines.

NOW THEREFORE, in consideration of the mutual covenants herein contained and intending to be legally bound hereby, the parties hereto agree as follows:

1. DEFINITIONS.

1.1 "Invention(s)" shall mean rotavirus vaccines, developed from rotavirus strain 89-12, including that which was safety tested by Lou Potash, Ph.D. of PRI/DynCorp for GAMBLE and received by GAMBLE on 12/2/93 or modification of rotavirus strain 89-12 generated by natural or site-directed mutagenesis, that stimulate neutralizing antibody to multiple serotypes of human rotavirus, and methods for vaccinating humans against rotavirus illness caused by rotaviruses of different serotypes using rotavirus strain 89-12 and for expanding the titers and memory of the cells that express the pre-existing neutralizing antibodies induced following primary vaccination against rotavirus disease using solely rotavirus strain 89-12. The Invention(s) include inactivated vaccines using rotavirus strain 89-12.

1.2 "Technical Information" shall mean vaccine production information and the results of the safety and identity testing conducted by Lou Potash, Ph.D., of PRI/DynCorp and received by GAMBLE on 12/2/93 and information regarding the history, culture, adaptation and attenuation of rotavirus strain 89-12; and scientific, technical and medical information related to 89-12, generated by or on behalf of GAMBLE or obtained from Dr. Potash as part of the quality assurance process during the term of this AGREEMENT.

1.3 "Patent Rights" shall mean any current or fixture United States or foreign patent applications which are set forth in Appendix A attached hereto and arising from Inventions owned by or assigned to GAMBLE, together with any divisions and continuations (related to rotavirus strain 89-12) continuations-in-part (related solely to rotavirus strain 89-12 and improvements thereto), patents issuing

thereon and reissues thereof and extensions thereof; provided that in the case of future patent applications and patents, inclusion in Patent Rights shall be subject to reimbursement by VRI to GAMBLE of the cost of Research and Development with respect thereto. Nothing in this Agreement gives VRI rights to Improvements in a vaccine which does not employ rotavirus strain 89-12.

1.4 "Licensed Products" shall mean any product which is covered in whole or in part by a Valid Claim in the Patent Rights and/or which incorporates or utilizes to a significant degree Technical Information.

1.5 "Licensed Process" shall mean any process which is covered in whole or in part by a Valid Claim in the Patent Rights and/or which incorporates or utilizes to a significant degree Technical Information.

1.6 "Territory" shall mean the entire world.

1.7 "Net Sales" shall mean the gross revenue received by VRI, its Affiliates from the sales of Licensed Products or Licensed Processes to independent third parties less:

(a) Transportation charges or allowances separately stated and invoiced;

(b) Trade, quantity, cash, rebates or other allowances and discounts and brokers', distributors', or agents' commissions actually allowed and taken;

(c) Credits or allowances made or given on account of rejects or returns;

(d) Medicare and Medicaid disallowed reimbursements;

(e) Taxes levied on and/or other governmental charges made as to production, sale, transportation, delivery or use and paid by or on behalf of Licensee.

Licensed Products shall be considered "sold" when invoiced.

1.8 "Sublicensee" shall mean any corporation, partnership or business organization which is not an Affiliate to which VRI grants a license to enable said party to sell Licensed Products or utilize Licensed Processes.

1.9 "Affiliate" shall mean any corporation or other business entity controlled by, controlling, or under common control with VRI. For this purpose "control" means direct or indirect beneficial ownership of at least fifty percent (50%) interest in the income or stock of such corporation or other business.

1.10 "Valid Claim" shall mean a claim of an issued patent or pending patent application which has not been pending for more than five (5) years from the relevant U.S. priority date, January 3, 1992, which has not lapsed or become abandoned or been declared invalid or unenforceable by a court of competent jurisdiction or an administrative agency from which no appeal can be or is taken.

2. GRANT

2.1 GAMBLE hereby grants to VRI the exclusive right and license under Patent Rights and Technical Information to make, have made, use, lease, have leased, sell, and have sold the Licensed Products and to practice the Licensed Processes in the Territory for the term of this AGREEMENT unless this AGREEMENT is sooner terminated according to the terms hereof. VRI shall have the right to extend the grant set forth in this Section 2.1 to its Affiliates.

2.2 Notwithstanding the provision of Section 2.1, GAMBLE shall retain the right to make, use and practice the Invention(s) and the Technical Information for its own non-commercial, research purposes. GAMBLE shall have the right to convey to other non-profit organizations at no charge other than shipping fees, the Invention(s) and Technical Information for use in non-commercial, basic research, provided that such organizations have entered into agreements in substantially the form attached as Appendix B.

2.3 VRI agrees that any Licensed Products subject to obligations under Public Laws 96-517 or 98-620 and which are intended for sale in the United States shall be manufactured substantially in the United States. In the event that VRI determines that compliance with the foregoing obligation is commercially impracticable, GAMBLE agrees that it will cooperate with VRI in attempting to obtain from the U.S. Government a waiver of such obligation.

2.4 (a) VRI will have the right, subject to the terms of this AGREEMENT, to enter into sublicensing agreements with any other entity (other than an Affiliate to whom the license may be extended in accordance with Section 2.1) for the rights, privileges and licenses granted hereunder.

(b) VRI agrees that any sublicenses granted by it shall provide that the obligations to GAMBLE contained in the following provisions of this AGREEMENT shall be binding upon the Sublicensee: Sections 2.4 (c), 8 and 10. VRI further agrees to attach a copies of such provisions to each sublicense agreement.

(c) VRI agrees to forward to GAMBLE a copy of any and all fully executed sublicense agreements within thirty (30) days of execution thereof, and further agrees to forward to GAMBLE annually a copy of such reports received by VRI from its Sublicensee during the preceding twelve (12) month period under the sublicenses as shall be pertinent to a royalty accounting under said sublicense agreements. VRI may delete from copies of sublicense agreements provided to GAMBLE hereunder commercial, research and development, manufacturing, financial and other provisions unrelated to VRI's or the Sublicensee's obligations to GAMBLE.

(d) In the event that this AGREEMENT is terminated prior to its normal expiration, any sublicense granted by VRI shall remain in full force and effect from and after that date as a direct license between GAMBLE and the Sublicensee, to the extent that the royalty obligations of VRI in individual countries have not ceased pursuant to the terms of this AGREEMENT and the Sublicensee's agreement to be bound by the terms and conditions set forth in this AGREEMENT.

2.5 (a) In addition to the license granted herein, GAMBLE grants to VRI an exclusive option to obtain a world-wide, exclusive royalty-bearing license to any improvement(s) on the Invention(s) that (i) are not subject to prior commitments to other parties; (ii) relate to the diagnosis, treatment and/or prevention of human rotavirus illnesses employing strain 89-12; (iii) which are not specifically included in the Invention(s) or Patent Rights; and (iv) provide a significant commercial advantage, herein collectively ("Improvements").

(b) Such option shall extend for a period of sixty (60) days from the date VRI receives written notice from GAMBLE disclosing such Improvement. During such sixty (60) day period,

GAMBLE shall reasonably make available to VRI any other information in its possession or control which would be useful to VRI in evaluating the improvement. In the event VRI decides to exercise its option, VRI shall do so by notifying GAMBLE in writing during such sixty (60) day period. Upon exercise of VRI's option, GAMBLE and VRI shall enter into a license agreement containing substantially the same provisions as the applicable provisions of this AGREEMENT except for the initial license fee which shall be at least an amount sufficient to reimburse GAMBLE for its costs relating to the development of the Improvement, plus GAMBLE's actual patent costs relating thereto.

(c) The written notice to GAMBLE of VRI's exercise of its option hereunder shall include instructions to GAMBLE as to whether VRI wishes GAMBLE to have a patent application prepared and filed with respect to any such improvement VRI shall pay for all patent costs relating to any Improvement to which VRI exercises its option.

(d) In the event that VRI does not exercise its option hereunder or if the parties have not entered into a license agreement as described in Section 2.5 (b)(1) above at the close of sixty (60) days from VRI's notice of exercise, GAMBLE shall be free to offer a license for the Improvement on terms of its own choosing to a third party, provided the terms are not more favorable than those terms offered to VRI. VRI will grant a sublicense under Patent Rights to such third party, if required, royalty-free, to permit such party to develop and sell such Improvement.

2.6 As soon as reasonably possible following the Effective Date of this AGREEMENT, but in no event later than thirty (30) days alter the Effective Date, GAMBLE shall provide to VRI copies of all Technical Information directly relating to the Invention(s) in its possession and control on the Effective Date. In addition, GAMBLE shall transfer to VRI all supplies of rotavirus strain 89-12 and the master and working cellbanks except as may be necessary for GAMBLE to conduct such basic research as may be agreed upon by the parties. Upon termination of this AGREEMENT, as a result of a breach by VRI or by VRI pursuant to Section 7.4, VRI shall return all Technical Information to GAMBLE.

3. CLINICAL TRIALS AND DUE DILIGENCE

3.1 (a) GAMBLE and VRI will cooperate with one another to complete all pre-clinical studies necessary for the continued support of the Investigational New Drug application ("IND") filed with the U.S. Food and Drug Administration (FDA) and for foreign equivalents filed with respect to a Licensed Product. VRI shall consult with GAMBLE, shall provide GAMBLE with drafts of the regulatory submission prior to its filing, and shall not unreasonably refuse to comply with any request by GAMBLE for any changes thereto, but all regulatory filings shall be submitted in the name of VRI and VRI shall have the final authority with respect to their content. GAMBLE shall cooperate with VRI in responding to any comments of the FDA with respect to its regulatory filing.

(b) Following approval under FDA regulations that clinical trials may commence under the IND for which approval has been granted, GAMBLE, recognizing the need for expeditious handling of all matters for which GAMBLE is responsible herein, agrees that GAMBLE will use reasonable efforts to promptly conduct the clinical trials and necessary laboratory work provided for in the IND, subject to the following:

(1) In consultation with and subject to the approval of VRI, GAMBLE will use reasonable efforts to design and draft the protocols with respect to Phase I clinical trials;

(2) In consultation with, and subject to the approval of VRI, GAMBLE will use reasonable efforts to design and draft the protocols with respect to Phase II clinical trials;

(3) GAMBLE will use reasonable efforts to conduct the initial Phase II clinical trials and, subject to consultation with and the approval of VRI, conduct and/or participate in confirmatory or other Phase II clinical trials, together with all laboratory work; as required;

(4) if other sites are required in connection with Phase II clinical trials, VRI will consult with GAMBLE regarding the use and selection of other sites and GAMBLE will use reasonable efforts to assist VRI in selecting such additional sites;

(5) GAMBLE and VRI will use reasonable efforts to jointly design and draft protocols for Phase III clinical trials and GAMBLE may, at GAMBLE's option, participate as one of multiple centers for the clinical trials; Dependent upon FDA requirements, GAMBLE will use reasonable efforts to conduct all laboratory work required therefore; provided, however, that if GAMBLE's laboratory capabilities are not sufficient for the central lab work required for Phase III clinical trials, GAMBLE will use reasonable efforts to assist VRI in selecting and approving an appropriate central laboratory and will use reasonable efforts to supervise that laboratory in its performance of such work;

(6) promptly after completion of the above-described clinical trials, GAMBLE will cooperate with VRI in preparation and submission to the FDA of an appropriate application for approval with respect to the Licensed Product (PLA/NDA) and in the submission of regulatory filings in foreign countries;

(7) if the PLA/NDA is not approved, GAMBLE will cooperate with VRI at VRI's expense in taking any further action required to obtain its approval;

(8) GAMBLE will use reasonable efforts to conduct all trials with the prior approval and ongoing review of all appropriate and necessary review authorities and in accordance with applicable federal, state and local laws and regulations and will provide VRI with written evidence of review and approval of each trial by the appropriate Institutional Review Board prior to the initiation of each trial and of that Board's continuing review and approval of each trial whenever it is reviewed, but at least once per year;

(9) GAMBLE will furnish VRI with the data resulting from the clinical trials within a reasonable time alter completion of each trial, provided that GAMBLE will permit representatives of VRI to examine GAMBLE's facilities, validate case reports against original data in its files and monitor work performed, at reasonable times and in a reasonable manner at mutually agreed upon times during the term of this AGREEMENT, to determine the adequacy of the facilities and whether the clinical trials are being conducted in compliance with the protocol and relevant FDA regulations;

(10) GAMBLE will retain original records of the clinical trials conducted by GAMBLE including the original of all volunteer consent forms in strict accordance with all federal regulations.

(11) GAMBLE shall compile clinical trial data and provide copies of the complete data set to VRI in a timely manner. GAMBLE will cooperate with VRI in the analysis of the clinical data.

(12) GAMBLE is conducting the adult and child phases of the Phase I clinical trials described in the protocols entitled "Reactivity and Immunogenicity of Live, Attenuated Rotavirus Vaccine Candidate Strain 89-12." and attached as Appendix C, and will make reasonable efforts to conduct the infant phase of the Phase I clinical trial, and Phase II and Phase III clinical trials.

(13) Gilbert M. Schiff M.D. shall be responsible for supervising the adult clinical trials at GAMBLE and shall be designated as "Principal Adult Investigator." David I. Bernstein, M.D. shall be responsible for supervising the pediatric clinical trials at GAMBLE and shall be designated as "Principal Pediatric Investigator." In the event that either such investigator is disabled or no longer employed at GAMBLE, then GAMBLE shall have the right to appoint another such investigator, subject to approval by VRI which shall not be unreasonably withheld.

(14) GAMBLE and VRI agree to conduct the clinical trials according to the protocols. However, if at any future date, changes in the protocol appear desirable, such changes may be made through prior written mutual agreement between GAMBLE and VRI. The clinical trials may be suspended or terminated, as appropriate, at any time by GAMBLE if in the reasonable medical judgment of either: the Principal Adult or Pediatric Investigator, or responsible institutional review board(s) or in the medical and/or regulatory judgment of VRI the health or safety of patients will be adversely affected and it is appropriate to do so. Any action taken by GAMBLE or its investigators or employees based on any such medical judgment shall not be deemed a breach of this AGREEMENT.

(15) GAMBLE agrees that the rights and welfare of the human subjects shall be protected in accordance with the protocols and all applicable federal and state laws. GAMBLE shall be responsible for obtaining appropriate institutional review board approval for the protocols and any subsequent changes to the protocols, and for obtaining informed consent of each human subject participating in the protocols. GAMBLE shall retain records of the clinical trials including the original of all volunteer consent forms in accordance with all federal regulations.

(16) In order to maintain subject confidentiality, no information relative to subject name or address shall be provided to VRI. All patient information will be identified in code. Any audits conducted by VRI shall be undertaken in conjunction with GAMBLE in order to ensure confidentiality.

(17) VRI shall promptly advise GAMBLE of adverse reactions or side effects relating to clinical trials which may become known to VRI and, similarly GAMBLE shall promptly advise VRI of adverse reactions or side effects relating to clinical trials which may become known to GAMBLE.

(c) If GAMBLE fails to perform any of its obligations under this Section 3.1 and any such failure is not cured following sixty (60) days written notice to GAMBLE, VRI may terminate GAMBLE's services relating to the obligations in the relevant Section (Sections 3.1 (b) (1-17)) of this Section and VRI shall thereafter have the right to hire a third party contractor at VRI's expense to perform and control the performance of such services. Termination of services provided herein in Sections 3.1 (b) (1-17) shall not affect the rights and obligations of GAMBLE under any other Section. Upon termination of GAMBLE's services for the foregoing reasons VRI will be obligated to pay GAMBLE for all pre-approved costs of the studies incurred by GAMBLE and not capable of cancellation. Such payment will be made within 30 days of submission of billing by GAMBLE to VRI. At VRI's request, GAMBLE will assist VRI in selecting and approving such third party contractors to perform functions described in this Section 3.1.

(d) Notwithstanding the foregoing, VRI, as sponsor of the development program may terminate GAMBLE services in conducting clinical trials for commercial reasons at any time with 30 days' notice subject to VRI's payment of all non-cancelable, pre-approved costs within 30 days of GAMBLE's billing to VRI.

3.2 VRI agrees to pay GAMBLE for all fees and expenses that GAMBLE expects to reasonably incur in conducting the trials described in Section 3.1 above, provided that the amounts of such fees and costs have been approved by VRI in writing in advance. VRI agrees to pay 40% of the approved budget for each study in phase I, II and III upon initiation of each study and the remaining 60% at agreed upon milestones during the course of each study, so that full payment for each study is made by the conclusion of that study. Irrespective of the amount advanced, VRI shall pay all costs incurred by GAMBLE in conducting the trials described in Section 3.1, provided such expenses have been approved in advance by VRI. If the monies advanced by VRI exceed expenses for a study, GAMBLE shall refund the difference. VRI shall have the trials monitored by its own staff or outside contractors at its election and shall have the data resulting from the studies compiled and analyzed. VRI shall have any such VRI staff or outside contractors execute a confidentiality agreement, prior to such staff or outside contractors involvement in the clinical trials.

3.3 GAMBLE and/or its investigators will have the right to publish the results of the clinical trials described in Section 3.1 above and performed by GAMBLE, provided that VRI is provided with a preprint and/or abstract of any proposed publication at least forty-five (45) days in advance of submission of the proposed publication. In the event that, as a result of reviewing such abstract or preprint, VRI determines that such publication would result in disclosure of an Invention as to which VRI has rights under Sections 2.1, 2.4 and/or 2.5 hereof or includes any VRI Confidential Information (as hereinafter defined), GAMBLE agrees to delay publication for a sufficient period to enable a patent application to be filed with respect thereto at VRI's expense and delete VRI confidential information, VRI acknowledges and agrees that GAMBLE and/or its investigators will be entitled to appropriate credit, and to be included as co-authors for those directly involved in the study, in accordance with prevailing scientific standards.

3.4 In lieu of VRI paying minimum royalties and subject to obtaining FDA or foreign regulatory approval for the 89-12 rotavirus vaccine VRI agrees to use reasonable efforts to bring one or more Licensed Products to the marketplace through a program of development; production, distribution, and marketing consistent with sound and reasonable business practices and judgments. VRI agrees to provide GAMBLE annually with a business development plan (which will include strategy, major milestones for clinical development, FDA registration, commercialization, and financial performance data) for the upcoming fiscal year, the first plan due no later than one hundred eighty (180) days from the Effective Date hereof and each subsequent plan due no later than December 31 in subsequent years. In the event GAMBLE believes VRI is not exerting reasonable efforts GAMBLE shall advise VRI and state the efforts which it believes would meet this requirement. If VRI disagrees the parties will attempt to resolve the matter by good faith discussions. If they still cannot agree the matter shall be submitted to arbitration pursuant to Section 12 to determine the efforts to be exerted by VRI. After the arbitration decision, in the event VRI fails to exert the efforts required by the arbitration, GAMBLE shall have the right to terminate this AGREEMENT upon giving VRI thirty (30) days prior written notice and the opportunity to cure within said thirty (30) days or alternatively VRI may resume minimum royalty payments in lieu of preparation of a business plan and using reasonable efforts; however, in such event, resumption of payment of minimum royalties under this Section 3.4 does not entitle VRI to an exclusive license agreement.

4. PAYMENTS.

4.1 (a) VRI agrees to pay GAMBLE in partial consideration for the license granted hereunder a licensing fee in the total amount of $50,000 payable in two equal installments, as follows:

(1)	upon signing of this AGREEMENT	$25,000
(2)	upon filing of the PLA/NDA for a Licensed Product with the FDA	$25,000

4.2 (a) VRI shall pay the following running royalties to GAMBLE during the term of this AGREEMENT as set forth below:

(1) Five percent (5%) on the Net Sales by VRI or its Affiliates of Licensed Products or any use of Licensed Processes in the United States (other than sales to Sublicensees for resale) where the manufacture, use or sale of such Licensed Products or any use of such Licensed Processes is covered by a Valid Claim of Patent Rights; or four percent (4%) on such Net Sales in countries other than the United States (other than sales to Sublicensees for resale) where the manufacture, use or sale of Licensed Products or any use of Licensed Processes is covered by a Valid Claim of Patent Rights in the country of sale; or one percent (1%) of Net Sales for five (5) years from first commercial sale in a country, on a country by country basis, on any other sales by VRI or its Affiliates of Licensed Products (other than sales to Sublicensees for resale) where no Patent Rights have been nor are intended to be filed with respect to such products; or two percent (2%) of Net Sales of Licensed Products sold to the United States Government or sold to State or other agencies at equivalent prices to those established for sale to the United States Government.

(2) From any royalties received from its Sublicensees, VRI shall pay GAMBLE thirty (30%) of royalties received by VRI from a Sublicensee for sale of Licensed Products. Reporting and payment of such royalties shall be made in accordance with the provisions of Section 5.

(3) If royalties for Licensed Products or Licensed Processes covered by a Valid Claim of Patent Rights cease to be paid because a patent application has been pending for more than five (5) years from the relevant U.S. priority date, then a royalty of 1% of Net Sales will be payable until the end of the fifth year on the market in that country. No royalty will be payable following the fifth anniversary of first marketing in that country unless a valid and enforceable patent subsequently issues. If a valid and enforceable patent issues royalties will be payable from the date of issue until the expiry of said valid and enforceable patent at the full applicable royalty rate for that country as set forth in Section 4.2(1).

4.3 (a) Subject to Section 3.4, during the exclusive period of the AGREEMENT, VRI shall pay a minimum annual royalty commencing on the expiration of calendar year 1999 and continuing through calendar year 2003, as follows:

1999	$100,000
2000	$200,000
2001	$300,000
2002	$400,000
2003	$500,000

(b) If the royalties earned and paid to GAMBLE pursuant to Section 4.2 (a) for any of the above calendar years are not at least equal to the applicable minimum royalties, VRI shall have the right to pay any difference between such minimum royalty amounts and the royalties paid to GAMBLE in full satisfaction of such obligation under this Section 4.3, which payment, if any, shall be made with the quarterly royalty payment due for the last quarter of the applicable calendar year. Waiver of any minimum royalty payment by GAMBLE shall not be construed as a waiver of any such subsequent payment. If VRI fails to make any such minimum royalty payment, GAMBLE shall have the right, at its option, to convert the License for the Licensed Products and Licensed Processes under Section 2.1 to a non-exclusive license. Royalty rates for non-exclusive licenses shall be fifty percent (5 0%) of the exclusive rates set forth in Section 4.2(a).

4.4 (a) In the event that a Licensed Product under this AGREEMENT is sold in any country in a combination package or kit containing other active products not licensed hereunder, the Net Sales in each such country for purposes of determining royalty payments on the combination package, shall be calculated using one of the following methods:

(1) By multiplying the net selling price of that combination package by the fraction A/A+B, where A is the net selling price in such country during the royalty-paying period in question, of the Licensed Product sold separately or Licensed Process used separately, and B is the net selling price in such country during the royalty period in question, of the other active products sold separately or used separately.

(2) In the event that no such separate sales are made of the Licensed Product or any of the active products in such combination package in such country during the royalty-paying period in question, Net Sales for the purposes of determining royalty payments, shall be calculated by dividing the net selling price in such country of the combination package by the number of functions performed by the combination package sold where such package contains active agents or other proprietary technology other than those licensed under this AGREEMENT.

4.5 Payment of royalties specified in Section 4.2 (a) shall be made by VRI to GAMBLE within sixty (60) days after March 31, June 30, September 30 and December 31 each year during the term of this AGREEMENT covering the quantity of Licensed Products sold or Licensed Processes used by VRI during the preceding calendar quarter. The last such payment shall be made within sixty (60) days after termination or expiration of this AGREEMENT.

4.6 All payments to be made under this Section shall be paid in United States dollars at such a place and in such a way, as GAMBLE may reasonably designate, without deduction of exchange, collection or other charges. Conversion of foreign currency to U.S. dollars shall be made at the conversion rate published by the Bank of Boston on the last day of the calendar quarter with respect to which payments are due.

4.7 Only a single royalty shall be paid with respect to any Licensed Product or Licensed Process, under Section 4.2(a) irrespective of the number of Valid Claims of Patent Rights utilized.

4.8 In the event that VRI is required to pay royalties to one or more third parties under patents other than Patent Rights in order to make, use, sell or have sold Licensed Products or Licensed Processes, VRI shall be entitled to a credit against royalties due GAMBLE under Section 4.2(a) in an amount equal to fifty percent (50%) of the royalties paid to such third parties. However, in no event shall royalties payable to GAMBLE under Section 4.2(a) hereunder be reduced by more than forty percent (40%).

4.9 If the transfer of or the conversion into the United States dollar equivalent of any remittance due hereunder is not lawful or permissible in any county, such remittance shall be made thereof in the currency of the country to the credit and account of GAMBLE or its nominee in any commercial bank located in that country. Prompt notice shall be given to GAMBLE and GAMBLE may provide a nominee if so desired.

4.10 If VRI exercises its option for the rights to improvements, VRI shall reimburse GAMBLE for the cost of the development program to make such Improvements.

5. REPORTS AND RECORDS

5.1 VRI shall maintain true books of account containing an accurate record of all data necessary for the determination of the amounts payable under Section 4 hereof. Said records shall be kept at VRI's principal place of business or the principal place of business of the appropriate division of VRI to

which this AGREEMENT relates. Said records shall be available for inspection by a certified public accountant selected and paid by GAMBLE once each year during regular business hours and for six (6) years thereafter following the end of the calendar year to which they pertain in order for GAMBLE to ascertain the correctness of any report and/or payment made under this AGREEMENT. The provision of this Section 5.1 shall survive termination of this AGREEMENT.

5.2 (a) Commencing with the calendar quarter in which Net Sales first occurs, sixty (60) days after March 31, June 30, September 30 and December 31, of each year in which this AGREEMENT is in effect, VRI shall deliver to GAMBLE full, true and accurate reports of its activities and those of its Sublicensee(s), if any, relating to this AGREEMENT during the preceding three month period. These reports shall include at least the following:

(1) Gross Sales for Licensed Products or Licensed Processes;

(2) Net Sales for Licensed Products or Licensed Processes

(3) Expenses, defined in Section 1.7, used to calculate Net Sales;

(4) Calculation of royalties due based on Net Sales;

(5) Any adjustments to amounts due pursuant to this AGREEMENT; and

(6) Amounts due to GAMBLE for the applicable quarters.

5.3 With each such report, VRI shall pay to GAMBLE the royalties due and payable as provided for in Section 4.5. If no royalties are due under Section 4.2(a), VRI shall so report.

6. PATENT PROSECUTION AND INFRINGEMENT.

6.1 GAMBLE shall apply for and maintain during the term of this AGREEMENT any Patent Rights in the United States and in the European Union, Australia, Brazil, Canada, Japan and South Korea, and Mexico. The prosecution, filing and maintenance of all patents, with the exception of fee payments, shall be the primary responsibility of GAMBLE, using patent counsel selected by GAMBLE and reasonably acceptable to VRI, provided, however, that VRI shall be given a reasonable opportunity to advise GAMBLE on such matters, particularly as they pertain to patent prosecution in foreign countries, and GAMBLE shall furnish to VRI copies of any documents relevant to such prosecution, filing and maintenance in sufficient time in advance for VRI or its patent counsel to comment thereon. VRI shall pay all reasonable patent fees and costs, including reasonable counsel fees, incurred by GAMBLE pursuant to this Section.

6.2 VRI has reimbursed GAMBLE the sum of $24,277, representing 50% of foreign phase filing costs for the countries and listed in Section 6.1. VRI shall reimburse GAMBLE the sum of $78,558 upon VRI signing this AGREEMENT for the remaining 50% of the foreign phase filing costs and for its U.S. patent fees and costs arising from the Patent Rights invoiced by patent counsel to GAMBLE prior to October 10, 1994. All fees and costs incurred by GAMBLE after the Effective Date relating to the filing, prosecution and maintenance of all Patent Rights shall be paid by VRI within 30 days of receipt of invoice from GAMBLE. The foregoing notwithstanding, VRI shall will have the right to discontinue payment of any such fees or costs with respect to the Patent Rights in any particular country or countries, if after a good faith assessment of the cost of patent filing, the enforceability of intellectual property rights and the

commercial value of the market, in a specific country, VRI believes that making such payments would not be commercially practical. VRI shall provide timely notice of VRI's intention not to pay a fees so, if GAMBLE desires, GAMBLE may pay such fee.

6.3 If at any time during the term of this AGREEMENT, VRI furnishes to GAMBLE reasonably convincing written evidence of an infringement of a patent included in the Patent Rights which adversely and substantially affects the commercial operations of VRI under the license granted hereunder, GAMBLE shall have the right, but not the obligation, to prosecute, at its own expense any such infringement and shall have the right for such purpose to join VRI as a party plaintiff at GAMBLE's expense. VRI independently shall have the right to join any such suit or action brought by GAMBLE and, in such event, shall pay one-half of the cost of such suit or action from the date of joining. Provided that VRI has joined in the action and shared the costs thereof as stated in the preceding sentence, no settlement, consent judgment or other voluntary final disposition of the suit may be entered into without the consent of VRI, which consent will not unreasonably be withheld. Any recovery or damages derived from such action shall first be used to reimburse GAMBLE for all legal expenses relating to such action. If VRI has not joined the action, GAMBLE is entitled to all recovery or damages still remaining; however, if VRI has joined the action, any recovery or damages still remaining shall be applied toward (i) reimbursement of GAMBLE for the amount of royalties not received by GAMBLE from the infringing party as a result of such infringement, and (ii) compensation of VRI for its lost profits or a reasonable royalty on the sales of the infringer, whichever is applicable; provided, however that if such remaining amount of recovery or damages is insufficient to compensate GAMBLE fully for such royalties and to compensate VRI fully for such lost profits or reasonable royalty, then such amount of recovery or damages still remaining shall be apportioned pro rata between GAMBLE and VRI in proportion to (a) the amount of royalties not received by GAMBLE from the infringing party as a result of such infringement, as compared with (b) VRI's lost profits or reasonable royalty on the sales of the infringer. Any recovery or damages still remaining after the above-mentioned applications shall be distributed two-thirds (2/3) to GAMBLE and one-third (1/3) to VRI.

6.4 If after said three (3) months, GAMBLE fails to cause such infringement to terminate or to bring a suit or action to compel termination, VRI shall have the right, but not the obligation, to prosecute, at its own expense any such infringement and shall have the right for such purpose to join GAMBLE as a party plaintiff at VRI's expense. GAMBLE independently shall have the right to join any such suit or action brought by VRI and, in such event, shall pay one-half of the cost of such suit or action from the date of joining. Provided that GAMBLE has joined in the action and shared the costs thereof as stated in the preceding sentence, no settlement, consent judgment or other voluntary final disposition of the suit may be entered into without the consent of GAMBLE, which consent will not unreasonably be withheld. Any recovery or damages derived from such action shall first be used to reimburse VRI (and GAMBLE if it joined in the action) for all legal expenses relating to such action. If GAMBLE has not joined the action, VRI is entitled to all recovery or damages still remaining; however, if GAMBLE has joined the action, any recovery or damages still remaining shall be applied toward (i) reimbursement of GAMBLE for the amount of royalties not received by GAMBLE from the infringing party as a result of such infringement, and (ii) compensation of VRI for its lost profits or a reasonable royalty on the sales of the infringer, whichever is applicable; provided, however that if such remaining amount of recovery or damages is insufficient to compensate GAMBLE fully for such royalties and to compensate VRI fully for such lost profits or reasonable royalty, then such amount of recovery or damages still remaining shall be apportioned pro rata between GAMBLE and VRI in proportion to (a) the amount of royalties not received by GAMBLE from the infringing party as a result of such infringement, as compared with (b) VRI's lost profits or reasonable royalty on the sales of the infringer. Any recovery or damages still remaining after the above-mentioned applications shall be distributed two-thirds (2/3) to GAMBLE and one-third (1/3) to VRI.

6.5 In any infringement suit that either party may institute to enforce the Patent Rights pursuant to this AGREEMENT, the other party hereto shall, cooperate in all respects and, to the extent

possible, have its employees testify when requested and make available relevant records, papers, information, samples and the like.

6.6 In the event that a declaratory judgment action alleging invalidity or non-infringement of any of the Patent Rights shall be brought against VRI, GAMBLE, at its sole option shall have the right, within sixty (60) days after GAMBLE receives notice from VRI of such action, to intervene and participate in action at its own expense.

7. TERM AND TERMINATION.

7.1 Unless earlier terminated as provided herein, this AGREEMENT shall remain in full force and effect for the life of the last to expire patent issued under the Patent Rights. Upon expiration, VRI shall have a fully paid-up, non-cancelable license.

7.2 Subject to Section 16, if VRI shall cease to carry on its business, this AGREEMENT shall terminate ninety (90) days after VRI ceases to do business, unless, within ninety (90) days VRI has identified a qualified successor licensee reasonably acceptable to GAMBLE willing to assume the obligation of VRI hereunder, in which case the assignment of this AGREEMENT to such successor licensee shall be subject to the written assumption by such successor of VRI's obligations hereunder and to the written approval of GAMBLE, which shall not be unreasonably withheld.

7.3 Should VRI fail to pay GAMBLE such royalties other than minimum royalties as are due and payable hereunder, GAMBLE shall have the right to terminate this AGREEMENT on thirty (30) days written notice, or to convert this AGREEMENT from an exclusive to a non-exclusive license upon expiration of the thirty (30) day period.

7.4 VRI shall have the right to terminate this AGREEMENT at any time upon six (6) months written notice to GAMBLE, and upon payment of all amounts due GAMBLE through the effective date of termination. If this AGREEMENT is terminated, VRI will provide GAMBLE with information and data necessary for GAMBLE to pursue the development of Licensed Products or Licensed Processes and a right to reference VRI's regulatory filings with the FDA.

7.5 Upon any material breach or default of this AGREEMENT by VRI or GAMBLE, the non-breaching party shall have the right to terminate this AGREEMENT and the rights, privileges and license hereunder granted upon ninety (90) days written notice to the other party. Such termination shall become effective immediately at the conclusion of such notice period unless the breaching party shall have cured any such breach or default prior to the expiration of the ninety (90) day period.

7.6 Upon termination of this AGREEMENT for any reason, nothing herein shall be construed to release either party from any obligation that matured prior to the effective date of such termination. VRI and any Sublicensee thereof may, after the effective date of such termination, sell all Licensed Products which are in inventory at the time of termination, and complete and sell Licensed Products which VRI can clearly demonstrate were in the process of manufacture at the time of such termination, provided that VRI shall pay to GAMBLE the royalties thereon as required by Section 4 of this AGREEMENT and shall submit the reports required by Section 5 hereof on the sales of Licensed Products.

8. INDEMNIFICATION AND INSURANCE.

8.1 VRI shall defend, indemnify and hold harmless GAMBLE and its trustees, officers, medical and professional staff, employees, and agents and their respective successors, heirs and assigns, against all losses, damages, expenses, including attorney's fees and against any claims, suits, actions, demands or judgments brought against any one or more of them, arising out of any theory of product liability (including, but not limited to, actions in the form of tort, warranty, or strict liability) or negligence concerning any product, process or service made, used or sold pursuant to any right or license granted under this AGREEMENT. VRI shall have the right to control the defense settlement and/or compromise of any such claims or actions.

8.2 VRI's obligations under Section 8.1 above shall not apply to any liability, damage, loss or expense to the extent that it is directly attributable to the negligence or intentional misconduct of GAMBLE or of any of its trustees, officers, medical and professional staff, employees, agents or their respective successors, heirs or assigns.

8.3 VRI shall add, at VRI's expense, GAMBLE as an additional insured on VRI's clinical trial insurance policy, which provides limits of liability of $2,000,000 per incident and aggregate, effective upon the Effective Date of this AGREEMENT, to provide insurance coverage for GAMBLE for the clinical trials.

8.4 VRI, at VRI's expense, shall maintain policies of comprehensive general liability insurance and will obtain product liability insurance in amounts not less than $1,000,000 per incident and $2,000,000 annual aggregate and shall add GAMBLE as an additional insured on VRI's policy, which provides such limits of liability. Such insurance shall provide (i) product liability coverage, (ii) negligence, and (iii) broad form contractual liability coverage, for VRI's indemnification under Section 8.1 of this AGREEMENT. The minimum amounts of insurance coverage required under these provisions shall not be construed to create a limit of VRI's liability with respect to VRI's indemnification obligation under Section 8.1 of this AGREEMENT. VRI shall maintain such comprehensive general liability insurance and product liability insurance beyond the expiration or termination of this AGREEMENT and for a reasonable period after the termination of the clinical trials, which in no event shall be less than fifteen (15) years after the clinical trials.

8.5 This Section 8 shall survive expiration or termination of this AGREEMENT.

9. REPRESENTATIONS

9.1 Subject to any prior rights of the U.S. government, GAMBLE represents that patent applications or patents included in the Patent Rights have been assigned to it and that GAMBLE has the authority and power to issue licenses under said Patent Rights and that GAMBLE has the right to disclose Technical Information to VRI and to enter into and perform this AGREEMENT.

9.2 GAMBLE does not warrant the validity of the Patent Rights licensed hereunder and makes no representation whatsoever with regard to the scope of the Patent Rights or that such Patent Rights may be exploited by VRI, its Affiliates, or Sublicensees without infringing other patents, except that GAMBLE represents that as of the Effective Date it is not aware of any patent or patent application not a part of the Patent Rights licensed hereunder that would be infringed by the exercise by VRI, its Affiliates or Sublicensees, of the rights granted to them hereunder.

10. CONFIDENTIALITY.

10.1 Confidential Information. As used in this AGREEMENT, "Confidential Information" means all information transmitted by a party hereto or obtained by a party hereto in connection with the performance of the clinical trials and other services described in Section 3 hereof or of any such other services to be provided by the parties as described herein, subject to the exceptions specified below. "Confidential Information" means information of any type, not generally known, about the business processes, services, products, suppliers, customers, clients or plans of GAMBLE or VRI ("the parties hereto") of any client of The parties hereto (regardless of whether the parties hereto have executed a confidentiality agreement with such customer), which is used or useful in the conduct of business of the parties hereto, or which confers or tends to confer a competitive advantage over one who does not possess such information. Such information includes, but is not limited to, information relating to trade secrets, Technical Information, patent applications, know-how, research, development, design, engineering, quality control or service techniques, information about existing, new or envisioned products, processes or services and their development, performance, scientific, engineering or technical information, laboratory notebooks, notes, computer programs, source codes, object codes, software manuals, sketches, drawings, reports, formulae, gels, slides, sequences, biological materials living or otherwise, photographs, negatives, prototypes, models, correspondence, and other documents and things, and information relating to purchasing, sales, marketing, licensing, contracts with third parties, and pricing, whether or not in writing and whether or not labeled or identified as confidential or proprietary. Confidential Information may be disclosed in writing or orally or may be obtained by observation or inspection. All data, materials, information, and records developed by a party hereto in the course of performing this AGREEMENT shall be considered Confidential Information. However, Confidential Information shall not include information that a party hereto can demonstrate: (i) is in or enters the public domain through no fault of such party; (ii) is disclosed to a party hereto by a third party entitled to disclose it; (iii) was known to a party hereto before the date of this AGREEMENT; or (iv) is required by law to be disclosed, provided reasonable advance notice of such requirement is given to a party hereto before such disclosure.

10.2 Confidentiality. Without prior written consent the parties hereto will not disclose the other party's Confidential Information to any third party other than employees, agents or others of the parties hereto who must necessarily be informed thereof, but only if and to the extent that any such person has a need for such information. A party hereto will only use Confidential Information for the purpose of fulfilling its obligations under this AGREEMENT. The parties hereto agree that they will take such reasonable steps as may be necessary to prevent the disclosure or use of any such materials by their officers, employees or agents except as provided herein, including but not limited to obtaining and enforcing appropriate confidentiality agreements with such persons. All obligations of confidentiality and nondisclosure set forth in this AGREEMENT shall survive the termination or expiration of this AGREEMENT.

10.3 The parties agree that clinical trial data generated by GAMBLE under the terms of the AGREEMENT will not be published by VRI prior to its publication by GAMBLE's principal investigators. To the extent not published, the results of the clinical trials will be held in confidence by GAMBLE. Subject to the foregoing, VRI will have the unrestricted right to use or disclose such clinical trial data.

11. NOTICES.

11.1 Reports, notices and other communications from VRI to GAMBLE as provided hereunder shall be sent by certified mail to:

James N. Gamble Institute of Medical Research
2141 Auburn Avenue
Cincinnati, OH 45219
Attention: President

or other individuals or addresses as shall hereafter be furnished by written notice to VRI.

11.2 Reports, notices and other communications from GAMBLE to VRI as provided hereunder shall be sent to by certified mail to:

Virus Research Institute, Inc.
61 Moulton Street
Cambridge, MA 02138
Attention: President

or other individuals or addresses as shall hereafter be furnished by written notice to GAMBLE.

12. ARBITRATION.

12.1 (a) Any controversy, dispute or claim arising out of, or relating to, any provisions, the interpretation or the performance of this AGREEMENT or any breach thereof which cannot otherwise be resolved by good faith negotiations between the parties shall be resolved by final and binding arbitration under the rules of the American Arbitration Association, or the Patent Arbitration Rules, if applicable, which are in effect as of the Effective Date of this AGREEMENT. In the event that VRI initiates, requests and/or files for arbitration, the arbitration shall be conducted in Cincinnati, Ohio. In the event that GAMBLE initiates, requests and/or files for arbitration, the arbitration shall be conducted in Boston, Massachusetts.

(b) The arbitration shall be subject to the following terms:

(1) The number of arbitrators shall be three (3).

(2) The arbitrators shall be independent; impartial third parties having no direct or indirect personal or financial relationship to any of the parties to the dispute, who has have agreed to accept the appointment as arbitrator on the terms set out in this Section 12.1.

(3) The arbitrators shall be active or retired attorneys, law professors, or judicial officers with at least five (5) years experience in general commercial matters and a familiarity with the laws governing proprietary rights in intellectual property and in particular patent law.

(4) The arbitrators shall be selected as follows:

(i) Each party shall submit a description of the inner to be arbitrated to the American Arbitration Association at the appropriate Regional Office in Cincinnati, Ohio or Boston, Massachusetts, depending upon where the arbitration is to be held. Said Association shall submit to the parties a list of the arbitrators available to arbitrate any dispute between them. Thereafter,

each party shall select; in numerical order, those persons on said list acceptable as arbitrators and return the same to the Association. The first three arbitrators acceptable to both parties shall be deemed the selected arbitrators with respect to the dispute then at issue under this AGREEMENT. In the event of a failure to select three mutually agreeable arbitrators, the Association shall be requested to submit as man subsequent lists of arbitrators as shall be necessary to effect a mutual selection.

(ii) If the method of selection set out in Section 12.1 (b)(4)(a) fails for any reason, then either party may petition any state or federal court in Massachusetts or Ohio having jurisdiction for appointment of the arbitrators in accordance with applicable law, provided that the arbitrators must satisfy the requirements of Sections 12.1 (b)(2) and 12.1 (b)(3) above and be acceptable to each party hereto.

(5) The arbitrators shall announce the award in writing accompanied by written findings explaining the facts determined in support of the award, and any relevant conclusions of law.

(6) Unless otherwise provided in this Section 12.1 or extended by agreement of the parties, each party shall submit an initial request for designation of arbitrators within thirty (30) days after any request for arbitration, the dispute shall be submitted to the arbitrators within sixty (60) days after the arbitrators are selected, and a decision shall be rendered within thirty (30) days after the dispute is submitted.

(7) The fees of the arbitrators and any other costs and fees associated with the arbitration shall be paid in accordance with the decision of the arbitrators.

(8) The arbitrators shall have no power to add to, subtract from, or modify any of the terms or conditions of this AGREEMENT. Any award rendered in such arbitration may be enforced by either party in either the courts of the Commonwealth of Massachusetts or Ohio or in a United States District Court for the District of Massachusetts or Ohio, to whose jurisdiction for such purposes GAMBLE and VRI each hereby irrevocably consents and submits.

12.2 Notwithstanding the foregoing, nothing in this Section shall be construed to waive any rights or timely performance of any obligations existing under this AGREEMENT.

13. RESTRICTIONS ON USE OF NAMES.

VRI shall not use the names of GAMBLE, its related entities and its employees, or any adaptations thereof, in any advertising, promotional or sales literature, without the prior written consent of GAMBLE; provided however, that VRI (a) may refer to publications by employees of GAMBLE in the scientific literature or (b) may state that a license from GAMBLE has been granted as herein provided.

14. INDEPENDENT CONTRACTOR.

For the purpose of this AGREEMENT and all services to be provided hereunder, both parties shall be, and shall be deemed to be, independent contractors and not agents or employees of the other. Neither party shall have authority to make any statements, representations or commitments or any kind, or to take any action, that will be binding on the other party.

15. SEVERABILITY.

If any one or more of the provisions of this AGREEMENT shall be held to be invalid, illegal or unenforceable, the validity, legality or enforceability of the remaining provisions of this AGREEMENT shall not in any way be affected or impaired thereby.

16. NON-ASSIGNABILITY.

Neither this AGREEMENT nor any part hereof shall be assignable by either party without the express written consent of the other provided that either VRI or GAMBLE may assign this AGREEMENT in connection with the merger, consolidation or sale of substantially all of its assets or the sale of that portion of its business to which the Inventions relate or as set forth in Section 7.2 and further provided that neither party shall unreasonably withhold its consent to any other assignment by the other party to an assignee which can reasonably demonstrate its qualifications to carry out the obligations of VRI or GAMBLE hereunder. Any other attempted assignment without such consent shall be void.

17. ENTIRE AGREEMENT.

This instrument contains the entire AGREEMENT between the parties hereto. No verbal agreement, conversation or representation between any officers, agents, or employees of the parties hereto either before or after the execution of this AGREEMENT shall affect or modify any of the terms or obligations herein contained.

18. MODIFICATIONS IN WRITING.

No change, modification, extension, termination or waiver of this AGREEMENT, or any of the provisions herein contained, shall be valid unless made in writing and signed by a duly authorized representative of each party.

19. GOVERNING LAW.

The validity and interpretation of this AGREEMENT and the legal relations of the parties to it shall be governed by the laws of the State of Ohio.

20. CAPTIONS.

The captions are provided for convenience and are not to be used in construing this AGREEMENT.

21. PATENT MARKING

VRI agrees to mark and have marked all Licensed Products sold by it under the license granted herein, if practical, with the word "Patent" or "Patents" and the number of the patent or patents applicable thereto.

IN WITNESS WHEREOF, the parties hereto have caused this AGREEMENT to be executed in quadruplicate by their duly authorized representatives as of the date first above written.

JAMES N. GAMBLE INSTITUTE (GAMBLE)	VIRUS RESEARCH INSTITUTE, INC. (VRI)
By: /s/ Gilbert M. Schiff	By: /s/ William A. Packer
Gilbert M. Schiff M.D.	William A. Packer
Title: President	Title: President
WITNESSED BY:	W1TNESSED BY:
/s/ [ILLEGIBLE]	/s/ [ILLEGIBLE]

APPENDIX A

LIST OF PATENT APPLICATIONS INCLUDED IN THE PATENT RIGHTS

1.) U.S. Serial No. 07/614,310, filed November 16, 1990, entitled "Human Rotaviruses, Vaccines and Methods," and invented by Richard L. Ward.

2.) U.S. Serial No. 07/816,974, filed January 3, 1992, entitled "Human Rotaviruses, Vaccines and Methods," and invented by Richard L. Ward (Division of U.S. Serial No. 07/614,310).

3.) Serial No. PCT/U.S. 91/08191, filed November 4, 1990, entitled "Human Rotaviruses, Vaccines and Methods," and invented by Richard L. Ward.

U.S. Patent Application Serial Number	08/143975
U.S. Patent Application Serial Number	08/114114
Brazilian Patent Application Serial Number	9106982
European Patent Application Serial Number	92900590.8
Mexican Patent Application Serial Number	9303196
Australian Application Serial Number	90603/91
Canadian Application Serial Number	2096315
S. Korean Application Serial Number	93701493
Japanese Application Serial Number	501860/92

APPENDIX B

MATERIALS TRANSFER AGREEMENT

THIS AGREEMENT entered the day of 19 , by and between the James N. Gamble Institute of Medical Research ("Provider"), a non-profit corporation having a place of business at 2141 Auburn Ave., Cincinnati, Ohio 45219 and *** ("Recipient"), a corporation having a place of business at .

1. Subject to availability Provider agrees to provide the following material to recipient: ***. Such material and any related biological material or associated know-how and data that will be received by Recipient from Provider, and any substance that is replicated or derived therefrom are covered by this Agreement. All such materials shall hereinafter be referred to as the "Material(s)."

2. The Materials will be used by Recipient in connection with the research described in Appendix A and only for non-commercial purposes. The Materials shall not be used in research that is subject to consulting or licensing obligations to another institution, corporation or business entity, unless written permission is obtained in advance from Provider.

3. Recipient shall not distribute, release or disclose the Materials to any other person or entity and shall ensure that no one will be allowed to take or send the Materials to any other location, unless written permission is obtained in advance from Provider. Recipient agrees to maintain the confidentiality of any propriety information of Provider regarding the Materials.

4. The Materials are supplied solely for scientific research purposes, for use in animals and/or in vitro. THE MATERIALS SHALL NOT BE USED IN HUMANS.

5. No right or license is granted under the Agreement either expressly or by implication. It is understood that any and all proprietary rights, including but not limited to patent rights, in and to the Materials shall be and remain in Provider.

6. Recipient agrees to provide Provider with an advance copy at least thirty (30) days in advance of any written submission (abstract or paper) or oral presentation that makes reference to the Materials. If in the opinion of Provider any such publication describes a patentable development, Provider shall have an opportunity to request that Recipient delay the submission or public presentation until after a U.S. patent application has been filed. In no event shall the delay be unreasonable. If a publication does result from work using the Materials, Recipient agrees to acknowledge Provider and/or give credit to Provider's scientists, as scientifically appropriate, based on any direct contribution they may have made to the work.

7. Recipient agrees not to sequence or clone any Material provided by Provider without the written permission of Provider.

8. In the event that use of the Material results in an invention, improvement, substance, or information whether or not patentable and patents, if any, which result therefrom ("Developed Technology"), Recipient agrees to disclose promptly to Provider all such inventions, improvements or substances.

9. Recipient shall assign all right, title and interest in and to Developed Technology to Provider. Recipient agrees to cooperate and assist Provider in obtaining patent protection for Developed Technology.

10. Recipient agrees to execute, acknowledge and deliver all such further papers as may be necessary to perform its obligation under this Agreement

11. Recipient acknowledges that the Materials are provided WITHOUT WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED. PROVIDER MAKES NO REPRESENTATION THAT THE USE OF THE MATERIALS WILL NOT INFRINGE ANY PATENT, COPYRIGHT, TRADEMARK OR OTHER PROPRIETARY RIGHT.

12. In no event shall Provider be liable for any use of the Materials by Recipient. Recipient hereby agrees to defend, indemnify and hold harmless Provider, its officers, directors, trustees, employees and agents from any loss, claim, damage, expense or liability, of whatsoever kind or nature (including attorney's fees), which may arise from or in connection with this Agreement or the use, handling or storage of the Materials.

13. Recipient shall report to Provider a summary of the results of Recipient's work utilizing the Materials.

14. Upon the request of Provider, Recipient shall promptly return to Provider the Materials furnished to Recipient under this Agreement.

15. Recipient agrees to comply with all government and National Institutes of Health regulations and guidelines which are applicable to the Recipient's use of the Materials.

16. This Agreement is not assignable, whether by operation of law or otherwise, without the prior written consent of Provider.

IN WITNESS WHEREOF, the parties, intending to be legally bound, have caused this Agreement to be executed by their respective duly authorized representatives.

RECIPIENT'S INVESTIGATOR	AUTHORIZED REPRESENTATIVE FOR RECIPIENT
BY: _____	BY: _____
_____ Typed Name	_____ Typed Name
_____ Title	_____ Title
PROVIDER'S INVESTIGATOR	AUTHORIZED REPRESENTATIVE FOR PROVIDER
BY: _____	BY: _____
_____ Typed Name	_____ Typed Name
_____ Title	_____ Title

APPENDIX C

PROTOCOL

REACTIVITY AND IMMUNOGENICITY OF LIVE, ATTENUATED
ROTAVIRUS VACCINE CANDIDATE 89-12

A copy of the protocol will be attached to the execution copy of this AGREEMENT

EXHIBIT 10.17

Portions of this Exhibit have been omitted pursuant to a request for confidential treatment. The omitted portions, marked by [****], have been separately filed with the Commission.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

LICENSE AGREEMENT

(EXCLUSIVE)

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This Agreement is made and entered into this _____ day of _____, 199__, (the "Effective Date") by and between MASSACHUSETTS INSTITUTE OF TECHNOLOGY, a corporation duly organized and existing under the laws of the Commonwealth of Massachusetts and having its principal office at 77 Massachusetts Avenue, Cambridge, Massachusetts 02139, U.S.A. (hereinafter referred to as "M.I.T."), and VIRUS RESEARCH INSTITUTE, INC., a corporation duly organized under the laws of Massachusetts and having its principal office at 840 Memorial Drive Cambridge, MA 02139 (hereinafter referred to as "LICENSEE").

W I T N E S S E T H

WHEREAS, M.I.T. is the owner of certain PATENT RIGHTS (as later defined herein) and has the right to grant licenses under said PATENT RIGHTS, subject only to a royalty-free, nonexclusive license heretofore granted to the United States Government;

WHEREAS, portions of the M.I.T. PATENT RIGHTS are jointly owned by M.I.T. and Pennsylvania Research Corporation (hereinafter referred to as "PRC") and PRC has granted M.I.T. exclusive rights to license PRC's rights in such PATENT RIGHTS in the medical fields of use according to the institutional agreement dated December 3, 1990 and appended hereto as Appendix C.

WHEREAS, M.I.T. desires to have the PATENT RIGHTS utilized in the public interest and is willing to grant a license thereunder;

WHEREAS, LICENSEE has represented to M.I.T., to induce M.I.T. to enter into this Agreement, that LICENSEE is experienced in the development of products similar to the LICENSED PRODUCT(s) (as later defined herein) and/or the use of the LICENSED PROCESS(es) (as later defined herein) and that it shall commit itself to a thorough, vigorous and diligent program of exploiting the PATENT RIGHTS so that public utilization shall result therefrom; and

WHEREAS, LICENSEE desires to obtain a license under the PATENT RIGHTS upon the terms and conditions hereinafter set forth.

NOW, THEREFORE, in consideration of the premises and the mutual covenants contained herein, the parties hereto agree as follows:

ARTICLE I - DEFINITIONS

For the purposes of this Agreement, the following words and phrases shall have the following meanings:

1.1 "LICENSEE" shall include a related company of VIRUS RESEARCH INSTITUTE, INC., the voting stock of which is directly or indirectly at least fifty percent (50%) owned or controlled by VIRUS RESEARCH INSTITUTE, an organization which directly or indirectly controls more than fifty percent (50%) of the voting stock of VIRUS RESEARCH INSTITUTE and an organization, the majority ownership of which is directly or indirectly under common control with VIRUS RESEARCH INSTITUTE, INC.

1.2 "PATENT RIGHTS" shall mean all of the following M.I.T. intellectual property:

(a) the United States and foreign patents and/or patent applications listed in Appendices A and B;

(b) United States and foreign patents issued from the applications listed in Appendices A and B and from divisionals and continuations of these applications;

(c) claims of U.S. and foreign continuation-in-part applications, and of the resulting patents, which are directed to subject matter specifically described in the U.S. and foreign applications listed in Appendices A and B;

(d) claims of all foreign patent applications, and of the resulting patents, which are directed to subject matter specifically described in the United States patents and/or patent applications described in (a), (b) or (c) above; and

(e) any reissues of United States patents described in (a), (b) or (c)above.

1.3 A "LICENSED PRODUCT" shall mean any product or part thereof which:

(a) is covered in whole or in part by an issued, unexpired claim or a pending claim which has not been declared invalid by a court of Competent Jurisdiction from which there is no appeal or from which no appeal is taken contained in the PATENT RIGHTS in the country in which any such product or part thereof is made, used or sold; or

The information below marked by [****] has been omitted pursuant to a request for confidential treatment. The omitted portion has been separately filed with the Commission.

(b) is manufactured by using a process or is employed to practice a process which is covered in whole or in part by an issued, unexpired claim or a pending claim which has not been declared invalid by a court of Competent Jurisdiction from which there is no appeal or from which no appeal is taken contained in the PATENT RIGHTS in the country in which any LICENSED PROCESS is used or in which such product or part thereof is used or sold.

1.4 A "LICENSED PROCESS" shall mean any process which is covered in whole or in part by an issued, unexpired claim or a pending claim which has not been declared invalid by a court of Competent Jurisdiction from which there is no appeal or from which no appeal is taken contained in the PATENT RIGHTS.

1.5 "NET SALES" shall mean LICENSEE's (and its sublicensees') billings for LICENSED PRODUCTS and LICENSED PROCESSES produced hereunder less the sum of the following:

(a) discounts allowed in amounts customary in the trade;

(b) sales, tariff duties and/or use taxes directly imposed and with reference to particular sales;

(c) outbound transportation prepaid or allowed; and

(d) amounts allowed or credited on returns.

No deductions shall be made for commissions paid to individuals whether they be with independent sales agencies or regularly employed by LICENSEE and on its payroll, or for cost of collections. LICENSED PRODUCTS shall be considered "sold" when billed out or invoiced.

1.6 "TERRITORY" [****]

1.7 "FIELD OF USE" shall mean non-injected delivery of vaccines and immunotherapeutics to all mucosal surfaces (including oral delivery).

The information below marked by [****] has been omitted pursuant to a request for confidential treatment. The omitted portion has been separately filed with the Commission.

ARTICLE 2 - GRANT

2.1 M.I.T. hereby grants to LICENSEE the right and license to make, have made, use, lease and sell the LICENSED PRODUCTS and to practice the LICENSED PROCESSES in the TERRITORY for the FIELD OF USE to the end of the term for which the PATENT RIGHTS are granted unless this Agreement shall be sooner terminated according to the terms hereof.

2.2 LICENSEE agrees that LICENSED PRODUCTS leased or sold in the United States shall be manufactured substantially in the United States.

2.3 [****]

2.4 M.I.T. reserves the right to practice under the PATENT RIGHTS for noncommercial research purposes.

2.5 In addition to the options granted in the Sponsored Research Agreement of Appendix C, M.I.T. further grants to LICENSEE a first option to an exclusive license in the Field of Use to other new inventions which:

(a) [****]

(b) [****]

(c) [****]

This option for any new invention shall be exercisable within six months after the date on which M.I.T. notifies LICENSEE that the new invention has been reported, under the following terms:

(i) [****]

(ii) [****]

(iii) [****]

(iv) [****]

The information below marked by [****] has been omitted pursuant to a request for confidential treatment. The omitted portion has been separately filed with the Commission.

2.6 LICENSEE shall have the right to enter into sublicensing agreements for the rights, privileges and licenses granted hereunder.

2.7 LICENSEE agrees that any sublicenses granted by it shall provide that the obligations to M.I.T. of Articles 2, 5, 7, 8, 9, 10, 12, 13, and 15 of this Agreement shall be binding upon the sublicensee as if it were a party to this Agreement. LICENSEE further agrees to attach copies of these Articles to sublicense agreements.

2.8 LICENSEE agrees to forward to M.I.T. a copy of any and all sublicense agreements promptly upon execution by the parties.

2.9 LICENSEE shall not receive from sublicensees anything of value in lieu of cash payments in consideration for any sublicense under this Agreement, without the express prior written permission of M.I.T.

2.10 The license granted hereunder shall not be construed to confer any rights upon LICENSEE by implication, estoppel or otherwise as to any technology not specifically set forth in Appendix A, Appendix B or Section 2.5 hereof.

ARTICLE 3 - DUE DILIGENCE

3.1 LICENSEE shall use its best efforts to bring one or more LICENSED PRODUCTS or LICENSED PROCESSES to market through a thorough, vigorous and diligent program for exploitation of the PATENT RIGHTS and to thereafter continue active, diligent marketing efforts for one or more LICENSED PRODUCTS or LICENSED PROCESSES throughout the life of this Agreement. [****] to the bringing to market of a LICENSED PRODUCT or LICENSED PROCESS throughout the term of this Agreement until the first commercial sale of a LICENSED PRODUCT or commercial use of a LICENSED PROCESS.

3.2 In addition, LICENSEE shall adhere to the following milestones:

(a) [****]

(b) [****]

The information below marked by [****] has been omitted pursuant to a request for confidential treatment. The omitted portion has been separately filed with the Commission.

3.3 LICENSEE's failure to perform in accordance with Paragraphs 3.1 and 3.2 above shall be grounds for M.I.T. to terminate this Agreement pursuant to Paragraph 13.3 hereof.

ARTICLE 4 - ROYALTIES

4.1 For the rights, privileges and license ranted hereunder, LICENSEE shall pay royalties to M.I.T. in the manner hereinafter provided to the end of the term of the PATENT RIGHTS or until this Agreement shall be terminated:

a) [****]

b) [****]

(c) [****]

(d) [****]

4.2 [****]

4.3 [****]

4.4 If LICENSEE sells LICENSED PRODUCTS to or under arrangement with a governmental or non-profit organization (such as the World Health Organization), and if such sales [****]

4.5 No multiple royalties shall be payable because any LICENSED PRODUCT, its manufacture, use, lease or sale are or shall be covered by more than one PATENT RIGHTS patent application or PATENT RIGHTS patent licensed under this Agreement.

4.6 Except as provided in Section 4.7 below, royalty payments shall be paid in United States dollars in Cambridge, Massachusetts, or at such other place as M.I.T. may reasonably designate consistent with the laws and regulations controlling in any foreign country. If any currency conversion shall be required in connection with the payment of royalties hereunder, such conversion shall be made by using the exchange rate prevailing at the Chase

Manhattan Bank (N.A.) on the last business day of the calendar quarterly reporting period to which such royalty payments relate.

4.7 If by law, regulation, or fiscal policy of a particular country, conversion into United States dollars or transfer of funds of a convertible currency to the United States is restricted or forbidden, LICENSEE shall give M.I.T. prompt notice in writing and shall pay the royalty and other amounts due through such means or methods as are lawful in such country as M.I.T. may reasonably designate. Failing the designation by M.I.T. of such lawful means or methods within thirty (30) days after such notice is given to M.I.T., LICENSEE shall deposit such royalty payment in local currency to the credit of M.I.T. in a recognized banking institution designated by M.I.T., or if none is designated by M.I.T. within the thirty (30) day period described above, in a recognized banking institution selected by LICENSEE and identified in a written notice to M.I.T. by LICENSEE, and such deposit shall fulfill all obligations of LICENSEE to M.I.T. with respect to such royalties.

ARTICLE 5 - REPORTS AND RECORDS

5.1 LICENSEE shall keep full, true and accurate books of account containing all particulars that may be necessary for the purpose of showing the amounts payable to M.I.T. hereunder. Said books of account shall be kept at LICENSEE's principal place of business or the principal place of business of the appropriate division of LICENSEE to which this Agreement relates. Said books and the supporting data shall be open at all reasonable times for five (5) years following the end of the calendar year to which they pertain, to the inspection of M.I.T. or its Agents for the purpose of verifying LICENSEE's royalty statement or compliance in other respects with this Agreement. Should such inspection lead to the discovery of a greater than ten percent (10%) discrepancy in reporting, LICENSEE agrees to pay the full cost of such inspection.

5.2 Prior to the first calendar quarter in which Net Sales occur, LICENSEE shall provide M.I.T. with an annual summary of LICENSEE's efforts during the preceding year to bring to market a LICENSED PRODUCT or LICENSED PROCESS. Beginning with the first calendar quarter in which Net Sales occur, LICENSEE, within ninety (90) days after March 31, June 30, September 30 and December 31, of each year, shall in place of such annual reports

deliver to M.I.T. true and accurate reports, giving such particulars of the business conducted by LICENSEE and its sublicensees during the preceding three-month period under this Agreement as shall be pertinent to a royalty accounting hereunder. These quarterly reports shall include at least the following:

(a) number of LICENSED PRODUCT manufactured and sold by LICENSEE and all sublicensees;

(b) total billings for LICENSED PRODUCTS sold by LICENSEE and all sublicensees;

(c) accounting for all LICENSED PROCESSES used or sold by LICENSEE and all sublicensees;

(d) deductions applicable as provided in Paragraph 1.5;

(e) total royalties due; and

(f) names and addresses of all sublicensees of LICENSEE.

5.3 With each such report submitted, LICENSEE shall pay to M.I.T. the royalties due and payable under this Agreement. If no royalties shall be due, LICENSEE shall so report.

5.4 On or before the ninetieth (90th) day following the close of LICENSEE's fiscal year, LICENSEE shall provide M.I.T. with LICENSEE's certified financial statements for the preceding fiscal year including, at a minimum, a Balance Sheet and an Operating Statement.

5.5 The royalty payments set forth in this Agreement and amounts due under Article 6 shall, if overdue, bear interest until payment at a per annum rate two percent (2%) above the prime rate in effect at the Chase Manhattan Bank (N.A.) on the due date. The payment of such interest shall not foreclose M.I.T. from exercising any other rights it may have as a consequence of the lateness of any payment.

ARTICLE 6 - PATENT PROSECUTION

6.1 Except as provided in Section 6.4, M.I.T. shall apply for, seek prompt issuance of, and maintain during the term of this Agreement the PATENT RIGHTS in the United States and in the foreign countries listed in Appendix B hereto. Appendix B may be amended by

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verbal agreement of both parties, such agreement to be confirmed in writing within ten (10) days. The prosecution, filing and maintenance of all PATENT RIGHTS patents and applications shall be the primary responsibility of M.I.T.; provided, however, that patent counsel selected by M.I.T. is reasonably acceptable to LICENSEE. M.I.T. (and by instruction its patent counsel) shall consult with LICENSEE and its patent counsel as to the preparation and filing, prosecution and maintenance of PATENT RIGHTS, and shall furnish to LICENSEE and its patent counsel copies of documents relevant to such preparation, filing, prosecution or maintenance sufficiently prior to filing such documents or making any payment due thereunder to allow for review and comment by LICENSEE and its patent counsel. If, as a result of any such consultation, LICENSEE shall elect not to pay the expenses of any patent application or patent included in PATENT RIGHTS (which election may be limited to a specific country or countries), LICENSEE shall so notify M.I.T. within thirty (30) days of such consultation and shall thereby surrender its rights under PATENT RIGHTS in the country or countries affected, provided, however, that LICENSEE shall remain obligated to reimburse M.I.T. for any costs incurred with respect to such patent application or patent prior to said election. M.I.T. agrees that it shall not abandon the prosecution of any patent applications under PATENT RIGHTS nor shall it fail to make any payment or fail to take any other action necessary to obtain or maintain a patent under PATENT RIGHTS unless it has notified LICENSEE in sufficient time for LICENSEE to assume such prosecution, make such payment or take such action, and LICENSEE shall thereafter have the right to prosecute and/or maintain such PATENT RIGHTS at its expense in M.I.T.'s name, and M.I.T. shall thereafter render to LICENSEE all necessary assistance in order to facilitate such prosecution and/or maintenance.

6.2 LICENSEE shall reimburse M.I.T. for payment of all fees and costs relating to the filing, prosecution, and maintenance of the PATENT RIGHTS incurred by M.I.T. after the Effective Date of this Agreement.

6.3 [****]

6.4 If, pursuant to Section 8.B.2 of the Research Agreement, LICENSEE obtains an exclusive license to a new invention which is added to PATENT RIGHTS, and if such new invention is jointly owned pursuant to Section 8.F. of the Research Agreement ("JOINT PATENT RIGHTS"), LICENSEE shall apply for, seek prompt issuance of, and maintain during the term of this Agreement at its own expense such JOINT PATENT RIGHTS in the United States and in such other countries as LICENSEE shall have elected. The prosecution, filing and maintenance of JOINT PATENT RIGHTS shall be the primary responsibility of LICENSEE; provided, however that patent counsel selected by LICENSEE is reasonably acceptable to M.I.T. LICENSEE (and by instruction its patent counsel) shall consult with M.I.T. and its patent counsel as to the preparation and filing, prosecution and maintenance of JOINT PATENT RIGHTS, and shall furnish to M.I.T. and its patent counsel copies of documents relevant to such preparation, filing, prosecution or maintenance sufficiently prior to filing such documents or making any payment due thereunder to allow for review and comment by M.I.T. and its patent counsel. If, at any time, LICENSEE shall elect not to pay the expenses of any patent application or patent included in JOINT PATENT RIGHTS (which election may be limited to a specific country or countries), LICENSEE shall so notify M.I.T. within thirty (30) days of such consultation and shall thereby surrender its rights under JOINT PATENT RIGHTS in the country or countries affected, provided, however, that LICENSEE shall remain obligated for any COSTS incurred with respect to such patent application or patent prior to said election. LICENSEE agrees that it shall not abandon the prosecution of any patent applications under JOINT PATENT RIGHTS nor shall it fail to make any payment or fail to take any other action necessary to obtain or maintain, in a patent under JOINT PATENT RIGHTS unless it has notified M.I.T. in sufficient time for M.I.T. to assume such prosecution, make such payment or take such action, and M.I.T. shall thereafter have the right to prosecute and/or maintain such JOINT PATENT RIGHTS at its expense in LICENSEE's name, and LICENSEE shall thereafter render to M.I.T. all necessary assistance in order to facilitate such prosecution and/or maintenance.

The information below marked by [****] has been omitted pursuant to a request for confidential treatment. The omitted portion has been separately filed with the Commission.

ARTICLE 7 - INFRINGEMENT

7.1 LICENSEE shall inform M.I.T. promptly in writing of any alleged infringement of the PATENT RIGHTS by a third party of which LICENSEE becomes aware and of any available evidence thereof.

7.2 During the term of this Agreement, M.I.T. shall have the right, but shall not be obligated to prosecute at its own expense all infringements of the PATENT RIGHTS and, in furtherance of such right, LICENSEE hereby agrees that M.I.T. may include LICENSEE as a party plaintiff in any such suit, without expense to LICENSEE. M.I.T.'s choice of counsel in any such suit shall be subject to LICENSEE's approval, providing that such approval shall not be unreasonably withheld. The total cost of any such infringement action commenced or defended [****]

7.3 If within six (6) months after having been notified of any alleged infringement, M.I.T. shall have been unsuccessful in persuading the alleged infringer to desist and shall not have brought and shall not be diligently prosecuting an infringement action, or if M.I.T. shall notify LICENSEE at any time prior thereto of its intention not to bring suit against any alleged infringer in the TERRITORY for the FIELD OF USE, then, and in those events only, LICENSEE shall have the right, but shall not be obligated, to prosecute at its own expense any infringement of the PATENT RIGHTS in the TERRITORY for the FIELD OF USE, and LICENSEE may, for such purposes, use the name of M.I.T. as party plaintiff; provided, however, that such right to bring such an infringement action shall remain in effect only for so long as the license granted herein remains exclusive. No settlement, consent judgment or other voluntary final disposition of the suit may be entered into without the consent of M.I.T., which consent shall not unreasonably be withheld. LICENSEE shall indemnify M.I.T. against any order for costs that may be made against M.I.T. in such proceedings.

7.4 In the event that LICENSEE shall undertake the enforcement and/or defense of the PATENT RIGHTS by litigation, [****] Any recovery of damages by LICENSEE

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for each such suit shall be applied first in satisfaction of any unreimbursed expenses and legal fees of LICENSEE relating to such suit, [****]

7.5 For any patent of the PATENT RIGHTS jointly owned by M.I.T. and LICENSEE, LICENSEE shall have the first right to enforce and/or defend the patent. Other provisions of such enforcement or defense by LICENSEE shall be in accordance with Paragraphs 7.3 and 7.4 above. If LICENSEE chooses not to enforce or defend such patent, M.I.T. shall then have the right to do so, in accordance with the provisions of Paragraph 7.2 above.

7.6 In the event that a declaratory judgment action alleging invalidity or noninfringement of any of the PATENT RIGHTS shall be brought against LICENSEE, M.I.T., at its option, shall have the right, within thirty (30) days after commencement of such action, to intervene and take over the sole defense of the action at its own expense.

7.7 In any infringement suit as either party may institute to enforce the PATENT RIGHTS pursuant to this Agreement, the other party hereto shall, at the request and expense of the party initiating such suit, cooperate in all respects and, to the extent possible, have its employees testify when requested and make available relevant records, papers, information, samples, specimens, and the like.

ARTICLE 8 - PRODUCT LIABILITY

8.1 LICENSEE shall at all times during the term of this Agreement and thereafter, indemnify, defend and hold M.I.T. and PRC, their trustees, officers, employees and affiliates, harmless against all claims and expenses, including legal expenses and reasonable attorneys' fees, rising out of the death of or injury to any person or persons or out of any damage to property and against any other claim, proceeding, demand, expense and liability of any kind whatsoever resulting from the production, manufacture, sale, use, lease, consumption or advertisement of the LICENSED PRODUCT(s) and/or LICENSED PROCESS(es) or arising from any obligation of LICENSEE hereunder.

8.2 Commencing not later than commencement of human trials of any LICENSED PRODUCT, LICENSEE shall obtain and carry in full force and effect liability insurance which shall protect LICENSEE and M.I.T. in regard to events covered by Paragraph 8.1 above, providing that such insurance is available at commercially acceptable rates.

8.3 M.I.T. warrants that it owns above or jointly with PRC the PATENT RIGHTS and that it has the right to grant the rights and licenses granted in this agreement. M.I.T.'s total liability under this warranty shall be limited to the amounts paid by LICENSEE to M.I.T. under this License Agreement.

8.4 EXCEPT AS OTHERWISE EXPRESSLY SET FORTH IN THIS AGREEMENT, M.I.T. MAKES NO REPRESENTATIONS AND EXTENDS NO WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND VALIDITY OF PATENT RIGHTS CLAIMS, ISSUED OR PENDING. NOTHING IN THIS AGREEMENT SHALL BE CONSTRUED AS A REPRESENTATION MADE OR WARRANTY GIVEN BY M.I.T. THAT THE PRACTICE BY LICENSEE OF THE LICENSE GRANTED HEREUNDER SHALL NOT INFRINGE THE PATENT RIGHTS OF ANY THIRD PARTY.

ARTICLE 9 - EXPORT CONTROLS

It is understood that M.I.T. is subject to United States laws and regulations controlling the export of technical data, computer software, laboratory prototypes and other commodities (including the Arms Export Control Act, as amended and the Export Administration Act of 1979), and that its obligations hereunder are contingent on compliance with applicable United States export laws and regulations. The transfer of certain technical data and commodities may require a license from the cognizant agency of the United States Government and/or written assurances by LICENSEE that LICENSEE shall not export data or commodities to certain foreign countries without prior approval of such agency. M.I.T. neither represents that a license shall not be required nor that, if required, it shall be issued.

ARTICLE 10 - NON-USE OF NAMES

LICENSEE shall not use the names or trademarks of the Massachusetts Institute of Technology nor of Pennsylvania Research Corporation nor of Pennsylvania State University, nor any adaptation thereof, nor the names of any of their employees, in any advertising, promotional or sales literature without prior written consent obtained from M.I.T., PRC or said employee, in each case, except that LICENSEE may state that it is licensed by M.I.T. under one or more of the patents and/or applications comprising the PATENT RIGHTS.

ARTICLE 11 - ASSIGNMENT

This Agreement is not assignable except by LICENSEE in conjunction with substantially all of the assets of LICENSEE which relate to the business of vaccines and immunotherapeutics. Any other attempt to do so is void.

ARTICLE 12- DISPUTE RESOLUTION

12.1 For any and all claims, disputes or controversies arising under, out of, or in connection with this Agreement, including any dispute relating to patent validity or infringement, which the parties shall be unable to resolve within sixty (60) days, the party raising such dispute shall promptly advise the other party of such claim, dispute or controversy in a writing which describes in reasonable detail the nature of such dispute. By not later than five (5) business days after the recipient has received such notice of dispute, each party shall have selected for itself a representative who shall have the authority to bind such party, and shall additionally have advised the other party in writing of the name and title of such representative. By not later than ten (10) business days after the date of such notice of dispute, such representatives shall schedule a date for a mediation hearing with the Cambridge Dispute Settlement Center or Endispute Inc. in Cambridge, Massachusetts. If the representatives of the parties have not been able to resolve the dispute within fifteen (15) business days after such mediation hearing, the parties shall have the right to pursue any other remedies legally available to resolve such dispute in either the Courts of the Commonwealth of Massachusetts or in the United States District Court for the District of Massachusetts, to whose jurisdiction for such purposes M.I.T. and LICENSEE each hereby irrevocably consents and submits.

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12.2 Notwithstanding the foregoing, nothing in this Article shall be construed to waive any rights or timely performance of any obligations existing under this Agreement.

ARTICLE 13 - TERMINATION

13.1 If LICENSEE shall cease to carry on its business, this Agreement shall terminate upon notice by M.I.T.

13.2 Should LICENSEE fail to make any payment whatsoever due and payable to M.I.T. hereunder, M.I.T. shall have the right to terminate this Agreement effective on thirty (30) days' notice, unless LICENSEE shall make all such payments to M.I.T. within said thirty (30) day period. Upon the expiration of the thirty (30) day period, if LICENSEE shall not have made all such payments to M.I.T., the rights, privileges and license granted hereunder shall automatically terminate.

13.3 Upon any material breach or default of this Agreement by LICENSEE, other than those occurrences set out in Paragraphs 13.1 and 13.2 hereinabove, which shall always take precedence in that order over any material breach or default referred to in this Paragraph 13.3, M.I.T. shall have the right to terminate this Agreement and the rights, privileges and license granted hereunder effective on ninety (90) days' notice to LICENSEE. Such termination shall become automatically effective unless LICENSEE shall have cured any such material breach or default prior to the expiration of the ninety (90) day period. The above notwithstanding, if LICENSEE is in breach of Article 3, but otherwise in compliance with the terms of this Agreement [****]

13.4 [****]

13.5 LICENSEE shall have the right to terminate this Agreement at any time on six (6) months' notice to M.I.T., and upon payment of all amounts due M.I.T. through the effective date of the termination.

13.6 Upon termination of this Agreement for any reason, nothing herein shall be construed to release either party from any obligation that matured prior to the effective date of

such termination. LICENSEE and any sublicensee thereof may, however, after the effective date of such termination, sell all LICENSED PRODUCTS, and complete LICENSED PRODUCTS in the process of manufacture at the time of such termination and sell the same, provided that LICENSEE shall pay to M.I.T. the Running Royalties thereon as required by Article 4 of this Agreement and shall submit the reports required by Article 5 hereof on the sales of LICENSED PRODUCTS.

13.7 Upon termination of this Agreement for any reason, any sublicensee not then in default shall have the right to seek a license from M.I.T., M.I.T. agrees to negotiate such licenses in good faith under reasonable terms and conditions.

ARTICLE 14- PAYMENTS, NOTICES AND OTHER COMMUNICATIONS

Any payment, notice or other communication pursuant to this Agreement shall be sufficiently made or given on the date of mailing if sent to such party by certified first class mail, postage prepaid, addressed to it at its address below or as it shall designate by written notice given to the other party:

In the case of M.I.T.:

Director
Technology Licensing Office
Massachusetts Institute of Technology
Room E32-300
Cambridge, Massachusetts 02139

In the case of LICENSEE:

President
Virus Research Institute
840 Memorial Drive
Cambridge, MA 02139

ARTICLE 15 - MISCELLANEOUS PROVISIONS

15.1 This Agreement shall be construed, governed, interpreted and applied in accordance with the laws of the Commonwealth of Massachusetts, U.S.A., except that questions

affecting the construction and effect of any patent shall be determined by the law of the country in which the patent was granted.

15.2 The parties hereto acknowledge that this Agreement sets forth the entire Agreement and understanding of the parties hereto as to the subject matter hereof, and shall not be subject to any change or modification except by the execution of a written instrument subscribed to by the parties hereto.

15.3 The provisions of this Agreement are severable, in the event that any provisions of this Agreement shall be determined to be invalid or unenforceable under any controlling body of the law, such invalidity or unenforceability shall not in any way affect the validity or enforceability of the remaining provisions hereof.

15.4 LICENSEE agrees to mark the LICENSED PRODUCTS sold in the United States with all applicable United States patent numbers. All LICENSED PRODUCTS shipped to or sold in other countries shall be marked in such a manner as to conform with the patent laws and practice of the country of manufacture or sale.

15.5 The failure of either party to assert a right hereunder or to insist upon compliance with any term or condition of this Agreement shall not constitute a waiver of that right or excuse a similar subsequent failure to perform any such term or condition by the other party.

IN WITNESS WHEREOF the parties have duly executed this Agreement the day and year set forth below.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY	VIRUS RESEARCH INSTITUTE
By /s/ JOHN T. PRESTON	By /s/ JOHN W. LITTLECHILD
Title Director, Technology License Office	Title President
Date 12/5/91	Date 12/6/91

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APPENDIX A

[****]

The information below marked by [****] has been omitted pursuant to a request for confidential treatment. The omitted portion has been separately filed with the Commission.

APPENDIX B

[****]

The information below marked by [****] has been omitted pursuant to a request for confidential treatment. The omitted portion has been separately filed with the Commission.

APPENDIX C

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

OFFICE OF SPONSORED PROGRAMS

RESEARCH AGREEMENT between the MASSACHUSETTS INSTITUTE OF TECHNOLOGY, hereinafter referred to as "the Institute" and the VIRUS RESEARCH INSTITUTE, hereinafter referred to as "the Sponsor".

WHEREAS, the research program contemplated by this Agreement is of mutual interest and benefit to the Institute and to the Sponsor, and will further the instructional and research objectives of the Institute in a manner consistent with its status as a non-profit, tax-exempt, educational institution.

NOW, THEREFORE, the parties hereto agree as follows:

1. STATEMENT OF WORK. [****]

2. PRINCIPAL INVESTIGATOR. [****]

3. PERIOD OF PERFORMANCE. [****]

4. REIMBURSEMENT OF COSTS. [****]

The information below marked by [****] has been omitted pursuant to a request for confidential treatment. The omitted portion has been separately filed with the Commission.

5. PAYMENT. Payments shall be made to the Institute by the Sponsor in advance on the following basis:

[****]

6. TERMINATION. Performance under this Agreement may be terminated by the Sponsor upon six months written notice; performance may be terminated by the Institute if circumstances beyond its control preclude continuation of the research. Upon termination, the Institute will be reimbursed as specified in Article 4 for all costs and non-cancelable commitments incurred in the performance of the research, such reimbursement not to exceed the total estimated project cost specified in Article 4.

7. PUBLICATIONS. The Institute will be free to publish the results of research under this Agreement; provided that a copy of each publication will be provided to the Sponsor at least thirty (30) days in advance of publication and, if the publication would disclose a patentable invention, the Institute will delay publication for an additional sixty (60) days to enable the Institute or Sponsor to file a patent application in accordance with Section 8.

8. INTELLECTUAL PROPERTY.

A. Title to any invention conceived or first reduced to practice in the performance of the research program shall remain with the Institute which shall have the sole right to determine the disposition of any inventions or other rights resulting therefrom, including the right to determine whether or not a patent application will be filed, and shall so notify the Sponsor.

The information below marked by [****] has been omitted pursuant to a request for confidential treatment. The omitted portion has been separately filed with the Commission.

B. In the event that a patent application on such an invention is filed by the Institute, the Sponsor (subject to third party rights, if any, in such invention) shall be entitled to elect one of the following alternatives by notice in writing to the Institute within six (6) months after notification to the Sponsor that a patent application has been filed:

1. [****]

2. [****]

3. [****]

C. In the event that the Sponsor has not elected any of the foregoing alternatives within six (6) months after notification that a patent application has been filed, the Sponsor shall be deemed to have elected alterative 3. above.

D. [****]

E. In the event that the Institute declines to file a patent application, the Sponsor may file in the United States and/or elsewhere, in the name of the Institute, and shall be entitled to elect between the above alternatives no later than six (6) months after such filing date.

F. Inventions made jointly by employees of the Institute and employees of the Sponsor shall be owned jointly by the Institute and the Sponsor and, in the absence of any further agreement, the Institute and the Sponsor shall

each have the independent right to use and/or license the jointly owned invention(s). The Institute shall grant to Sponsor the same option and license rights to the Institute's rights in jointly owned invention(s) as are granted to the Sponsor in Paragraph 8B above.

G. The Sponsor shall retain all invention disclosures submitted by the Institute in confidence and use its best efforts to prevent their disclosure to third parties. The Sponsor shall be relieved of this obligation only when this information becomes publicly available through no fault of the Sponsor.

H. Title to and the right to determine the disposition of any copyrights or copyrightable material first produced or composed in the performance of this research shall remain with the Institute. The Institute shall grant to the Sponsor an irrevocable, royalty-free, non-transferable, non-exclusive right and license to use, reproduce, display, distribute, translate and perform, all such copyrightable materials other than computer software and its documentation. The Institute shall grant to the Sponsor an irrevocable, royalty-free, non-transferable, non-exclusive right and license to use, reproduce, display, translate and perform computer software and its documentation specified to be developed and delivered under the Statement of Work for Sponsor's internal (non-commercial) research purposes. Sponsor may elect to negotiate a non-exclusive (or exclusive subject to third party rights, if any) royalty-bearing license to use, reproduce, display, distribute, translate and perform such computer software and its documentation for commercial purposes (in a designated field of use, where appropriate). Computer software for which a patent application is filed shall be subject to paragraph B. above.

I. In the event that the Institute elects to establish property rights other than patents to any tangible research property (TRP), e.g., biological materials, developed during the course of the research, the Institute and the Sponsor will determine disposition of rights to such property by separate agreement. The Institute will, at a minimum, reserve the right to use and distribute TRP for non-commercial research purposes.

J. All licenses elected by Sponsor pursuant to this clause become effective as of the date the parties sign a subsequent license agreement, and shall survive termination or expiration of this Agreement.

9. USE OF NAMES. Neither party will use the name of the other in any advertising or other form of publicity without the written permission of the other, in the case of the Institute, that of the Director of the News Office.

10. NOTICES. Any notices required to be given or which shall be given under this Agreement shall be in writing delivered by first class air mail or telex addressed to the parties as follows:

MASSACHUSETTS INSTITUTE OF TECHNOLOGY	SPONSOR
Mr. George H. Dummer, Director Office of Sponsored Programs, E19-702 Massachusetts Institute of Technology 77 Massachusetts Avenue Cambridge, MA 02139	Virus Research Institute, Inc. 840 Memorial Drive Cambridge, MA 02139

In the event notices, statements and payments required under this Agreement are sent by certified or registered mail by one party to the party entitled thereto at its

above address, they shall be deemed to have been given or made as of the date so mailed.

11. ASSIGNMENT. This agreement shall be binding upon and inure to the benefit of the parties hereto and the successors to substantially the entire business and assets of the respective parties hereto. This Agreement shall not be assignable by either party without the prior written consent of the other party; any attempted assignment is void.

12. GOVERNING LAW. The validity and interpretation of this agreement and the legal relation of the parties to it shall be governed by the laws of the Commonwealth of Massachusetts.

13. ENTIRE AGREEMENT. Unless otherwise specified, this Agreement embodies the entire understanding between the Institute and the Sponsor for this project, and any prior or contemporaneous representations, either oral or written are hereby superseded. No amendments or changes to this Agreement including without limitation, changes in the statement of work, total estimated cost, and period of performance, shall be effective unless made in writing and signed by authorized representatives of the parties.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY	SPONSOR
By /s/ DAVID J. HARRIGAN	By /s/ JOHN W. LITTLECHILD
Associate Director/ Office of Sponsored	
Title Programs	Title President
Date 12/5/91	Date 12/6/91

The information below marked by [****] has been omitted pursuant to a request for confidential treatment. The omitted portion has been separately filed with the Commission.

FIRST AMENDMENT

This Amendment is to the License Agreement with the Effective Date of December 6, 1991 between MASSACHUSETTS INSTITUTE OF TECHNOLOGY and VIRUS RESEARCH INSTITUTE, INC.

The parties thereto now further agree as follows:

1. [****]

2. LICENSEE shall pay to M.I.T., in addition to the fees and royalties due under Article IV of the License Agreement, the following fees:

a) [****]

b) [****]

3. [****]

4. The effective date of this Amendment shall be the last date of the signatures below. Agreed to for:

MASSACHUSETTS INSTITUTE OF TECHNOLOGY	VIRUS RESEARCH INSTITUTE, INC.
By /s/ JOHN T. PRESTON	By /s/ BRYAN E. ROBERTS
Title Director, Technology Licensing	Title V.P., Research & Development
Date 9-17-92	Date 9-17-92

EXHIBIT 10.18

Portions of this Exhibit have been omitted pursuant to a request for Confidential Treatment. The omitted portions, marked by [****], have been separately filed with the Commission.

LICENSE AGREEMENT

THIS LICENSE AGREEMENT ("Agreement") is made and entered into as of December 13, 1994 (the "Effective Date") between VIRUS RESEARCH INSTITUTE, INC., as its Delaware corporation having its principal place of business at 61 Moulton Street, Cambridge, Mass 02138 (hereinafter referred to as "VRI"), and PASTEUR MERIEUX SERUMS ET VACCINS, a French corporation having its registered head office at 58 Avenue Leclerc, Lyon, France (hereinafter referred to as "PMC").

RECITALS

A. VRI has certain proprietary rights relating to the use of polyphosphazene as an immunoadjuvant for vaccines against human diseases.

B. PMC desires to obtain a license to such rights and to research, develop, manufacture, market, sell and distribute certain vaccines which incorporate polyphosphazene, all under the terms and conditions set forth below.

NOW THEREFORE, for and in consideration of the covenants, conditions and undertakings hereinafter set forth, it is agreed by and between the parties as follows:

ARTICLE 1

DEFINITIONS

1.1 "Affiliate" shall mean, with respect to any Person, (i) any other Person of which securities or other ownership interests representing 50% or more of the voting interests (or such lesser percentage which is the maximum allowed to be owned by a foreign corporation in a particular jurisdiction) are, at the time such determination is being made, owned, controlled or held directly or indirectly, by such Person, or (ii) any other Person which, at the time such determination is being made, is Controlling, Controlled by or under common Control with, such Person.

For the purpose of this section 1.1, "Control," whether used as a noun or verb, refers to the possession directly or indirectly, of the power to direct, or cause the direction of, the management or policies of a Person, whether through the ownership of voting securities, by contract or otherwise, and "Person" means any natural person, corporation, firm, business trust, joint venture, association, organization, company, partnership or other business entity, or any

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government, or any agency or political subdivision thereof. The Joint Venture companies known as Pasteur Merieux MSD Snc and MCM Vaccine Co. are Affiliates of PMC.

1.2 "Co-Exclusive Vaccine" shall mean a parenterally administered vaccine (other than a DNA vaccine) against one or more of the following diseases: Respiratory Syncytial Virus ("RSV"), Para Influenza, Cytomegalovirus ("CMV"), Pneumococcal Pneumonia ("Pneumo") (including S. pneumoniae, Branhamalla and non-typable Haemophilus Influenza), Rabies, each alone or in combination with each other, and specifically excluding a combination of (a) one or more of the vaccines specifically enumerated as a Co-Exclusive Vaccine or Exclusive Vaccine with (b) a vaccine which is not specifically enumerated as an Exclusive Vaccine or Co-Exclusive Vaccine.

1.3 "Exclusive Vaccine" shall mean a parenterally administered vaccine(s) (other than a DNA vaccine) against one or more of Lyme Disease, Meningococcus and Influenza, each alone or in combination with each other or in combination with a Co-Exclusive Vaccine and shall also include the combination [****] excluding a combination of (a) one or more of the vaccines specifically enumerated as a Co-Exclusive Vaccine or Exclusive Vaccine with (b) a vaccine which is not specifically enumerated as an Exclusive Vaccine or Co-Exclusive Vaccine.

1.4 "Field" shall mean the prevention of a disease in humans.

1.5 "Licensed Know-How" shall mean any biological materials, and any research and development information, inventions, know-how, pre-clinical, clinical and other technical data, in each case that are owned by VRI, or possessed by VRI with the right to provide the same to others, from and after the Effective Date and which is necessary or useful for the improving, making, using or selling of Licensed Products as provided in this Agreement.

1.7 "Licensed Product(s)" shall mean, individually and collectively, the Exclusive Vaccines and the Co-Exclusive Vaccines provided that polyphosphazene is used as an immunoadjuvant in the product containing such vaccine.

1.8 "Net Sales" shall mean the gross invoice price of Licensed Products sold or distributed by PMC or its Affiliates or any of their sublicensees, less: (i) normal and customary rebates, trade discounts, and credits for returns and allowances, all to the extent actually allowed, (ii) to the extent separately reported on the invoice, sales or other excise taxes or duties imposed upon and paid by PMC, its Affiliates or sublicensees with respect to such sales, and (iii) transportation charges and insurance for transportation to the extent separately invoiced or separately reported on the invoice and paid by the seller.

In the event that Licensed Product is sold in other than an arms length transaction, then Net Sales shall be the gross invoice price which would be received in an arms length transaction, taking account of any deductions for items referred to in clauses (i), (ii) and (iii) of the preceding paragraph.

In the event that consideration in addition to or in lieu of money is received for Licensed Product such consideration shall be added to Net Sales.

Notwithstanding the provisions of this Section, Net Sales shall not include sales to an Affiliate for resale by such Affiliate.

1.9 "Option Agreement" shall mean the Option Agreement of even date herewith entered into between the parties hereto.

1.10 "Patent Rights" shall mean the following patents and patent applications, and all subject matter claimed therein:

(a) All patents and applications listed in Exhibit A; any continuations, continuations-in-part, divisions and substitutions thereof, or of which such an application or patent is a successor; patents which may issue upon any of the foregoing; and all renewals, reissues and extensions thereof; and

(b) Any foreign patents and/or applications that are counterparts of a patent or application described in paragraph (a) above, including any patent or application that claims subject matter claimed in, or that takes priority from, a patent or application described in paragraph (a) above.

(c) Any patent or application owned by VRI during the term of this Agreement which claims polyphosphazene and/or the use thereof in a parenteral vaccine.

(d) Any patent or patent application as to which PMC exercises its option under the Option Agreement.

1.11 "PMC Immunoadjuvant Technology" shall mean any and all materials, information, data, improvements, patents and patent applications directed to polyphosphazene and/or its use as an immunoadjuvant including, but not limited to, data related to polymer safety (other than Drug Master Files or clinical data, and excluding that which is unique to the formulation of polyphosphazene with a specific PMC antigen) which are owned by PMC or in the possession of PMC with the right to provide same to others during the term of the Agreement.

1.12 "Significant Competition" with respect to each Licensed Product in each country for each calendar year shall mean that a third party sells a vaccine which competes with a Licensed Product as a given indication, whether in single antigen or multivalent form and such

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third party vaccine has a commercially recognized advantage in safety, immunogenicity and/or therapeutic value over the competing Licensed Product and that such third party vaccine [****] of vaccines for the indication concerned. The sale of a Co-Exclusive Vaccine by a licensee of VRI shall not be a third party vaccine for the purpose of this definition.

1.13 "Territory" shall mean (i) all countries included in the continents of North and South America, including Central America and the islands of the Carribean, Europe, and Africa, including the dependencies and territories of such countries; (ii) Thailand, and (iii) all countries previously part of the U.S.S.R. [****]

1.14 "Valid Claim" shall mean a claim of an issued and unexpired patent or pending patent application included within the Patent Rights, which has not been held unenforceable, unpatentable or invalid by a court or other governmental agency of competent jurisdiction from which no appeal can be or is taken, and which is not admitted to be invalid or unenforceable through reissue, disclaimer or otherwise.

ARTICLE 2

GRANT OF RIGHTS

2.1 License to PMC.

(a) Subject to the terms and conditions of this Agreement, VRI hereby grants to PMC (i) a license under the Patent Rights and Licensed Know-How to make, have made, and use the Licensed Products which are Exclusive Vaccines outside of the Territory but only for sale in the Field in the Territory and to make, have made, use, sell and distribute the Licensed Products which are Exclusive Vaccines in the Field in the Territory, which license under this Section 2.1(a)(i) shall be exclusive with respect to sale of Exclusive Vaccines in the Field in the Territory and in all other respects the license granted under this Section 2.1(a)(i) is non-exclusive, and (ii) a license under the Patent Rights and Licensed Know-How to make, have made, and use the Licensed Products which are Co-Exclusive Vaccines outside of the Territory but only for sale in the Field in the Territory and to make, have made, use and sell a Licensed Product which is a Co-Exclusive Vaccine in the Field in the Territory which license under this Paragraph 2.1(a) shall be exclusive to PMC for use, sale and distribution of Co-Exclusive Vaccine in the Field in each country of the Territory but for one other entity which may, at VRI's option, be VRI or an entity licensed by VRI, and in all other respects the license granted under

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this Section 2.1(a)(ii) is non-exclusive. It is expressly understood that only one entity other than PMC will be or be permitted to be licensed by VRI, to use or sell any Co-Exclusive Vaccine in the Field in any country of the Territory.

(b) Subject to the terms and conditions of this Agreement, VRI hereby grants to PMC a non-exclusive license under the Patent Rights and Licensed Know-How (i) to use, sell and distribute the Licensed Products set forth in Exhibit B in the countries set forth in Exhibit B, but only to the extent that all of the antigens contained therein are covered by patent rights of PMC and/or its Affiliates which give PMC an exclusive position with respect to those antigens in those countries, and (ii) to make and have made and use Licensed Products set forth in Exhibit B in any country of the world but only for use, sale and distribution in the countries set forth in Exhibit B, and only to the extent that all of the antigens contained therein are covered by patent rights of PMC and/or its Affiliates, which give PMC an exclusive position with respect to all of the antigens contained in the Licensed Product of Exhibit B in those countries of Exhibit B. Exhibit B is intended to set forth the countries in which PMC holds exclusive rights in respect of a given antigen and the antigens as to which such exclusive rights are held in that country. Such Exhibit B shall be amended from time to time to take account of any additional countries and/or additional Licensed Products which contain only antigens as to which PMC obtains exclusive rights during the term of this Agreement but only to the extent that VRI is able to grant such a license and only to the extent VRI has nor previously granted to a third party rights which would prevent RI from granting such rights to PMC.

(c) Upon written notice to VRI, PMC shall have the right to be granted a non- exclusive license to use, sell and distribute each Co-Exclusive Vaccine and each Exclusive Vaccine, in each country (other than Japan) ,where PMC and/or its Affiliates have patent rights (as an owner or exclusive licensee) which cover the antigen of such Exclusive Vaccine or CoExclusive Vaccine provided that VRI has not granted rights to a third party in such country which would prevent VRI from granting such license to PMC, which non-exclusive license extension shall be limited to a Co-Exclusive Vaccine or Exclusive Vaccine, as the case may be, which contains such antigen. The non-exclusive license shall include the right to make and have made each such Co-Exclusive Vaccine and Exclusive Vaccine but only for use and sale in the countries specified in this paragraph. 2.1(c).

(d) [****]

(e) In order to assure PMC of the exclusive rights granted in Paragraph 2.1(a)(i), VRI shall not grant to a third party or itself exercise any rights or licenses under Patent Rights and Licensed Know-How to use, sell or distribute a parenterally administered vaccine [****] against Lyme Disease, Meningococcus or Influenza in the Field in the Territory. In addition, except as permitted in Paragraph 2.1(a)(ii), VRI shall not grant to a third party or itself

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exercise any rights or licenses under Patent Rights and Licensed Know-How to use, sell or distribute a parenterally administered vaccine [****] against RSV, Para Influenza, CMV Pneumo (including S. Pneumoniae, Branhamalla and non-typable Haemophilus Influenza) and Rabies in the Field in the Territory.

2.2 Licenses to VRI. Subject to the rights granted to and maintained by PMC and to any existing rights of third-parties, PMC hereby grants to VRI a worldwide, royalty free, license to use PMC Immunoadjuvant Technology to make, have made, use and sell vaccine products, including the right to sublicense such license to Affiliates. Such license of PMC Immunoadjuvant Technology may also be sublicensed to third parties with the prior written consent of PMC, which consent shall not be unreasonably withheld.

2.3 Sublicenses. With respect to the rights granted under Section 2.1 (a)(i) PMC shall have the right to grant sublicenses under this Agreement with the prior approval of VRI as to the sublicensee, which approval shall not be unreasonably denied. With respect to the rights granted under Section 2.1(a)(ii), PMC shall have the right (without the approval of VRI) to grant a sublicense to one other party in any country where PMC is not selling or does not intend to sell Licensed Product. PMC shall advise VRI of the name of such sublicensee when such sublicensee is selected. The rights granted under Section 2.1(b) and (c) are not sublicensable, except to Affiliates of PMC.

2.4 (a) In case of any sublicense by PMC or VRI of the rights and licenses granted in this Agreement, the sublicensee shall agree to be bound by the terms, obligations and conditions identical to those of Articles 6 and 10 and Sections 2.5 and 11.5 of this Agreement (substituting the name of the Sublicensee for that of the sublicensing party), with the other party being expressly made a third party beneficiary thereof, and the sublicensing party shall be responsible for the performance by the appointed sublicensee of such terms, obligations and conditions.

(b) Each sublicense agreement concluded by PMC will include a requirement that the sublicensee maintain records and permit inspection on terms essentially identical to Article 9.4 of this Agreement. At VRI's request, PMC shall arrange for an independent certified accountant selected by VRI to inspect the records of its sublicensee(s) for the purpose of verifying royalties due to VRI and shall cause such accountant to report the results thereof to VRI.

(c) All sublicenses granted for a Licensed Product or for the PMC immunoadjuvant Technology in a country shall terminate upon termination of the licenses granted hereunder with respect to such Licensed Product or to PMC Immunoadjuvant

Technology as the case may be, provided that upon expiration of the full term of this Agreement pursuant to Paragraph 4.1, all parties shall have fully paid-up, non-cancelable licenses.

2.5 To the extent Patent Rights are licensed to PMC under this Agreement by PMC exercising its option under the Option Agreement which Patent Rights VRI has licensed from another party under an agreement with another party ("Another Party Agreement(s)"), PMC understands and agrees as follows:

(i) The rights licensed to PMC by VRI are subject to the terms, limitations, restrictions and obligations of the Another Party Agreement(s).

(ii) PMC will comply with the terms, obligations, limitations and restrictions of the Another Party Agreement(s) to the extent PMC has been permitted to review such terms, obligations, limitations and restrictions. VRI will give PMC, upon request, a reasonable opportunity to review the same except to the extent that confidentiality or other obligations towards Another Party may prevent VRI from doing so. In any event VRI shall act reasonably in advising PMC of the scope of PMC's obligation pursuant to such Another Party Agreement. It is expressly understood that PMC may refuse to accept a license under one or more Another Party Agreements, in which case PMC will not be bound thereby.

2.6 Disclosure of Technology. Upon the execution of this Agreement, and periodically thereafter upon request by PMC, VRI shall provide to PMC copies of all available information in tangible form within the Licensed Know-How or related to the Patent Rights.

2.7 Subject to the terms and conditions of the Supply Agreement to be negotiated under this Section 2.7, PMC is hereby granted a non-exclusive right and license under the Patent Rights and Licensed Know-How to make and have made polyphosphazene for use by PMC, its Affiliates and its sublicensees as an immunoadjuvant in the manufacture of Licensed Product in accordance with and to the extent that PMC retains its license to Licensed Product under this Agreement.

PMC shall have the right at any time during the term of this Agreement, but not the obligation, to exercise its right under the herein granted manufacturing license. In the event that PMC decides to exercise such rights, it shall so inform VRI in writing, and VRI shall promptly disclose to PMC all applicable manufacturing technology in the possession of VRI at the time of such disclosure. Subject to applicable confidentiality obligations, VRI and PMC shall share and exchange any technology and know-how they shall generate while establishing manufacturing processes and facilities.

When either PMC or VRI achieves manufacture of polyphosphazene on a commercial basis, it shall have an obligation to use reasonable efforts in good faith to assist the other to satisfy its reasonable requirements of polyphosphazene for use as an immunoadjuvant on reasonable commercial terms, taking into account the respective investments made and risks incurred by the parties in connection with such manufacture.

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PMC and VRI shall consult in good faith and in their mutual interest as to an arrangement for the manufacture and supply of polyphosphazene for clinical lots as well as in commercial quantities for use as an immunoadjuvant by PMC and its Affiliates and authorized sublicensees in the Licensed Products as licensed hereunder and for use by VRI, its Affiliates and licensees (other than PMC).

VRI shall use commercially reasonable efforts to establish a process capable of yielding under GMP conditions consistent and validated supplies of polyphosphazene in accordance with agreed upon specifications, [****]

Upon successful completion of such step, PMC shall pay to VRI the milestone payment provided for in Section 3.1(b) hereof.

VRI shall use commercially reasonable efforts to obtain a manufacturer of polyphosphazene. Thereafter, under the terms and conditions of a supply agreement to be negotiated in good faith between the parties (the "Supply Agreement"), VRI shall be responsible for scaling-up the process in an efficient cost-effective GAP manufacturing facility for production or polyphosphazene according to agreed-upon specifications at industrial scale, which Supply Agreement shall provide that if VRI manufactures the polyphosphazene[****].

[****]

PMC shall render all reasonable assistance to VRI in identifying and selecting a third-party manufacturer. In the event that VRI retains such manufacturer, VRI shall then, subject to appropriate confidentiality provisions, transfer to it all of VRI's technology for manufacture of polyphosphazene.

ARTICLE 3

MILESTONES AND ROYALTIES

3.1 Milestone Fees. PMC shall pay to VRI the non-refundable and non-creditable amounts specified below within thirty (30) days following the accomplishment by PMC (or in the case of Paragraph 3.1(a) by PMC or VRI) its Affiliates or sublicensees of the corresponding event set forth below, or (ii) within thirty (30) days following receipt by PMC of written notice of accomplishment by VRI or a VRI's Affiliate of such other corresponding event set forth below:

(a) The sum of two and one half million dollars, upon the earlier of (i) successful completion of toxicology work carried out by or on behalf of PMC or by VRI which

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is suitable for use in the preparation of an IND in the United States (or the equivalent thereof in the European Union) for a Licensed Product(s) or (ii) initiation of a Phase I Clinical Trial by or on behalf of PMC anywhere in the world for a Licensed Product.

(b) the sum of one million dollars upon establishment by VRI of a process capable of yielding under GMP, conditions consistent and validated supplies of polyphosphazene in accordance with agreed upon specifications [****]

(c) Influenza milestone payments as follows:

[****]

(d) [****]

(e) [****]

3.2 Royalties. [****]

(a) [****]

(b) [****]

(c) Earned royalties [****]

The Royalty obligations set forth above will be calculated for each calendar year by (a) first applying sales in countries for which there has been [****] up to the total sales of such products and (b) secondly applying sales in countries for which there has been [****] for which there was [****] and going up to the level of total sales of products for which there was [****]. An example of such calculation is as follows:

[****]

(d) In the case of the earned royalties set forth in paragraphs (a) and (b) above, the royalties would be adjusted in each country for each calendar year for each Licensed Product in the event PMC was required to pay royalties to a third party for use of a polyphosphazene immunoadjuvant in such Licensed Product in such a country for such year utilizing the following method, but in no event shall [****]

(1) First determine the relationship between Net Sales in the applicable country for the year and the total worldwide Net Sales in that same category of sales for the year for the Licensed Product, i.e., divide Net Sales in a country for the applicable

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Licensed Product, where, for example, [****] by worldwide Net Sales in all countries for such Licensed Product [****]

(2) Apply this percentage to total royalties paid in all such countries for the Licensed Product for the year to determine the VRI royalties in a country against which a credit for third party royalties paid in such country may be taken.

(3) Subtract the amount of third party royalties paid in the country in question [****]

(e) Royalties shall be calculated and paid on a country-by-country and product-by-product basis [****] provided, however, that if at any time after the expiration [****], the making, using or selling of the product is covered by Patent Rights, the royalties shall be paid until the expiration of the last to expire of any such patent(s).

(f) [****]

3.3 Single Royalty: Non-Royalty Sales. It is understood that in no event shall more than one royalty be payable under Sections 3.2 with respect to a particular unit of Licensed Product. No royalty shall be payable under this Article 3 with respect to sales of Licensed Products among PMC, its Affiliates and/or sublicensees, but royalty shall be due upon the subsequent sale of the Licensed Product to an entity who is not an Affiliate or sublicensee provided, however, that if there is no or is to be no subsequent sale of the Licensed Product to an entity who is not an Affiliate or a sublicensee, then the royalty shall be due and shall be based upon the higher of (i) the gross invoice price to such Affiliate or sublicensee or (ii) the average gross invoice price which PMC charges to its customers (other than Affiliates and sublicensees) for the Licensed Product for the relevant reporting period of Section 9.1 in the relevant country.

No royalty shall be payable for (i) Licensed Product used in clinical trials, or (ii) Licensed Product used by PMC or its sublicensee for research, or (iii) customary quantities of Licensed Product distributed by PMC or its sublicensee as free samples.

3.4 Combination Products. In the event Licensed Products contain vaccines licensed hereunder in combination, the royalty rate applicable to said combination products shall be the [****]

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ARTICLE 4

TERM AND TERMINATION

4.1 Term. This Agreement shall become effective as of the Effective Date and, unless earlier terminated pursuant to the other provisions of this Article 4, shall continue in full force and effect as long as PMC is obligated to pay royalties under this Agreement. PMC's license under Section 2.1 with respect to the Licensed Know-How shall survive the expiration, but not an earlier termination, of this Agreement.

4.2 Termination for Breach. In the event of a material breach of this Agreement the nonbreaching party in addition to any other remedy which it may have shall be entitled to terminate this Agreement following written notice of such breach to the breaching party. If such breach is not cured within sixty (60) days after written notice is given by the nonbreaching party to the breaching party specifying the breach, the non-breaching party may terminate the Agreement forthwith upon written notice to, the breaching party after expiration of such sixty (60) day period.

4.3 Termination by PMC. (a) Any provision herein notwithstanding, PMC may terminate this Agreement at any time by giving VRI at least one hundred and eighty (180) days prior written notice.

(b) PMC may terminate its license with respect to any Licensed Product by one-hundred and eighty (180) days prior written notice to VRI, and thereafter such Licensed Product(s) shall no longer be licensed under this agreement.

(c) In the event of a termination under Article 4.3 (a) all rights granted herein to PMC shall forthwith revert to VRI and PMC shall provide VRI [****] developed during the term of this Agreement with respect thereto which may be used in accordance with [****]

4.4 Survival.

4.4.1 Termination of this Agreement for any reason shall not release either party hereto from any liability which at the time of such termination has already accrued to the other party.

4.4.2 In the event this Agreement is terminated for any reason, PMC and its Affiliates and sublicensees shall have the right to sell to otherwise dispose of the stock of any Licensed Product then on hand, all subject to the payment to VRI of fees and royalties pursuant to Article 3 hereof.

4.4.3 Articles 6, 10 and 11, and Sections 2.5, 4.43, 4.5, 5.5, 9.3, and 9.4, shall survive the expiration and any termination of this Agreement. Except as otherwise provided in Section 4.1 and Section 4.4.3, all rights and obligations of the parties under this Agreement shall terminate upon the expiration or termination of this Agreement.

4.5 In the event that PMC's right, and licenses under this Agreement are terminated, PMC agrees not to make, use or sell Licensed Products except as permitted by Article 4.4.2.

4.6 Either party may terminate this Agreement on notice if the other party makes a general assignment for the benefit of creditors, is the subject of proceedings in voluntary or involuntary bankruptcy or has a receiver or trustee appointed for substantially all of its property; provided that in the case of an involuntary bankruptcy proceeding such right to terminate shall only become effective if the other party consents thereto or such proceeding is not dismissed within ninety (90) days after the filing thereof. If, in connection with bankruptcy proceedings involving a party, an election is made by or on behalf of such party to reject the obligations of this Agreement and the other party elects to retain its rights to intellectual property hereunder pursuant to Section 365 n.1 of the Bankruptcy Code (USA), such other party shall be entitled to enforce any rights exclusively granted to it in respect of intellectual property hereunder by commencement of any action it deems necessary to that effect against third-party infringers and may do so in the name and stead of the bankrupt party.

ARTICLE 5

PATENTS AND INFRINGEMENTS

5.1 Prosecution by VRI. VRI shall have the right, at PMC's expense, to control the filing for, prosecution and maintenance of the Patent Rights in the Territory. In the event that VRI grants any license in a country of the Territory with respect to any Patent Right, then thereafter PMC's obligation to pay patent costs for Patent Rights in such country shall be an amount equal to the total cost therefor multiplied by a fraction having as a numerator one and as a denominator the total number of licenses granted by VRI in respect of such Patent Rights in such country. VRI shall keep PMC reasonably informed as to the status of the Patent Rights in the Territory, and shall provide PMC with copies of all proposed filings and correspondence of a substantive nature with respect to patents or applications within the Patent Rights to be made with or sent to the United Sates Patent and Trademark Office or its counterpart in any country of the Territory (each, a "Patent Authority"). VRI shall also provide to PMC copies of all correspondence that it receives from a Patent Authority with respect to the Patent Rights and shall consider any comments of PMC with respect thereto.

5.2 Infringement Claims. If the production, sale or use of a Licensed Product result in any claim for infringement of a patent or other proprietary right of a third party against PMC, its Affiliates or sublicensees PMC shall promptly notify VRI thereof in writing. As between the

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parties to this Agreement, PMC shall have the right at its own expense to defend and control the defense of any such claim against PMC, by counsel of PMC's own choice.

5.3 Enforcement of Patent Rights. (a) In the event that any Patent Rights are infringed by a third party with respect to an Exclusive Vaccine or Co-Exclusive Vaccine in the Field in the Territory, with the consent and approval of VRI (which shall not be unreasonably denied and shall be deemed to have been granted if VRI shall be in voluntary or involuntary bankruptcy proceedings, other than a proceeding such as Chapter II where the debtor continues to operate the business), PMC and/or its Affiliates or sublicensees shall have the right (except as provided below), but not the obligation, to institute, and prosecute any action or proceeding under the Patent Rights with respect to such infringement, by counsel of its choice, including any declaratory judgment action arising from such infringement. Any amounts recovered from third parties with respect to the Patent Rights in such action shall be applied first to reimburse the expenses of the action; then to the extent the award is [****] PMC shall not have the right to settle, compromise or take any action in such litigation which diminish, limit or inhibit the scope, validity or enforceability of the Patent Rights without the express written permission of VRI. PMC shall keep VRI advised of the progress of such proceedings.

5.4 In the event that a third party is infringing the Patent Rights with respect to an Exclusive Vaccine or Co-Exclusive Vaccine in the Territory in the Field and PMC does not elect to institute an action, VRI shall have the right, but not the obligation, to commence an infringement suit under the Patent Rights against such infringer and retain any recovery; provided that it so notifies PMC. If VRI commences a suit in accordance with this Section 5.4, PMC shall have the right to participate in such suit and [****] the out-of-pocket expenses thereof. If PMC elects to so participate, it shall share in any amounts recovered in respect of such suit [****]VRI shall have the right to control such action with counsel of its choice.

5.5 VRI Participation. In VRI's sole discretion, VRI shall be entitled to participate at its expense through counsel of its choosing in and control any legal action by or against PMC affecting the validity or enforceability of the patents on which Parent Rights are based, and PMC may elect to participate in any such action to the extent necessary to defend its own interests.

5.6 Each party agrees to cooperate with each other with respect to any litigation under Sections 5.2, 5.3 or 5.4.

ARTICLE 6

CONFIDENTIALITY

6.1 Nondisclosure. Except as otherwise provided in this Agreement, a party receiving (the "Receiving Party") any business or technical information ("Proprietary Information") that is disclosed to it by the other party the ("Disclosing Party") shall for a period beginning on the Effective Date and ending ten (10) years after the termination of this Agreement hold in confidence and not disclose to any third party the "Proprietary Information". In addition, the Receiving Party shall not use Proprietary Information that it receives from the Disclosing Party, except as is reasonably necessary to exercise the rights granted to the Receiving Party under Article 2 or Article 5 of this Agreement. Notwithstanding the foregoing, with the prior written permission of the Disclosing Party (which shall not be unreasonably withheld), the Receiving Party may disclose information concerning the Patent Rights and/or the Licensed Know-How to actual or prospective sublicensees or to other third parties with whom the Receiving Party is considering or has entered into a business relationship, all of whom are similarly bound in writing under a reasonable confidentiality agreement. Proprietary Information of a party shall not include:

6.1.1 Information which is or was published or has become generally available to the public through no fault of the Receiving Party;

6.1.2 Information which the Receiving Party can document is or was in its possession at the time of disclosure or was independently developed by the Receiving Party; or

6.1.3 Information which is rightfully acquired by the Receiving Party from a third party who is not under an obligations of confidentiality to the disclosing party, and to the best of the Receiving Party's knowledge and belief is entitled to rightfully make such disclosure, but only to the extent the Receiving Party complies with any restrictions imposed by the third party.

6.2 Exceptions. The Receiving Party may disclose Proprietary Information of the other, in connection with the order of a court of law or administrative or governmental authority provided that the Receiving Parry exerts reasonable efforts to preserve the confidentiality thereof and the disclosing party is given an opportunity to protect the confidentiality thereof, or as is reasonably necessary in connection with the labeling of its products that are otherwise sold in compliance with this Agreement or as required for obtaining regulatory approval of Licensed Product, provided that the Receiving Party protects the confidentiality thereof to the fullest extent possible.

6.3 Notwithstanding anything else to the contrary, PMC agrees that Licensed Know-How, or Proprietary Information received from VRI shall be used by PMC only in and for Licensed Products and their development for sale in the Territory in the Field, all in accordance with this Agreement, and can only be used by PMC for so long as and to the extent that PMC maintains a license under this Agreement.

6.4 Notwithstanding anything else to the contrary and subject to Section 4.1, in the event that PMC's rights and licenses under this Agreement are terminated, PMC agrees (a) not to use Licensed Know-How, or any Proprietary Information provided to PMC by VRI or any information developed by PMC which is derived from or is based on Licensed Know- How for the research, development, making, or using or selling of any product or process, including, but not limited to Licensed Products and (b) not to do any of the foregoing while this Agreement is in force for any product except as licensed under this Agreement.

6.5 Notwithstanding anything else to the contrary, VRI agrees that Licensed Know- How (including but not limited to PMC Immunoadjuvant Technology) licensed to it by PMC hereunder may be used only in a manner consistent with the provisions of this Agreement. VRl's licenses herein shall survive the expiration of the term hereof but not an earlier termination of this Agreement except as provided in Section 4.3(c).

ARTICLE 7

REPRESENTATIONS AND WARRANTIES

7.1.1 VRI and PMC each represents and warrant to the other that each has the full right and authority to enter into this Agreement and grant the rights and licenses granted herein:

7.1.2 VRI represents and warrants to PMC that it has not previously granted and, prior to termination of this Agreement, will not grant any rights in the Patent Rights or the Licensed Know-How that are inconsistent with the rights and licenses granted to PMC herein;

7.1.3 To the best of VRl's knowledge, there is no pending or threatened claim or litigation to which VRI is a party contesting the validity or right to use any of the Patent Rights, and VRI has not received any notice of infringement with respect to Patent Rights.

7.2 Disclaimer. EXCEPT AS OTHERWISE EXPRESSLY SET FORTH IN SECTION 7.1 ABOVE, NEITHER PARTY MAKES ANY REPRESENTATION OR EXTENDS ANY WARRANTIES OF ANY KIND EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NO INFRINGEMENT, OR VALIDITY OF ANY PATENT RIGHTS ISSUED OR PENDING.

The information below marked by [****] has been omitted pursuant to a request for Confidential Treatment. The omitted portion has been separately filed with the Commission.

7.3 Effect of Representations and Warranties. Subject to Section 7.4, it is understood that if the representations and warranties under this Article 7 are not true and accurate and PMC incurs liabilities, costs or other expenses as a result of such falsity, VRI shall indemnify and hold PMC harmless from and against any such liabilities, costs or expenses incurred, provided that VRI receives prompt notice of any claim against PMC resulting from or related to such falsity and the sole right to control the defense or settlement thereof.

7.4 Limitation of Liability. Notwithstanding anything else to the contrary, VRl's liability for any breach of this Agreement (including but not limited to any liability which results from any breach of any representation or warranty) is limited to the payments received or to be received from PMC under this Agreement. This Limitation on Liability shall not be applicable to intentional misconduct on the part of VRI or where PMC, as a result of such breach, is liable to a Third Party in excess of such Limitation on Liability.

ARTICLE 8

DUE DILIGENCE

8.1 General. PMC shall use commercially reasonable efforts to research, develop, register, market and sell and to continue to market and sell each Licensed Product in each country of the Territory. Upon a failure by PMC to meet its obligations under this Section 8.1 with respect to any Licensed Product in any country (directly or through a sublicensee), VRI shall, among other remedies available to it, have the right to terminate the rights and licenses granted hereunder with respect to such Licensed Product in such country.

8.2 PMC shall promptly notify VRI, in writing, if at any time PMC does not intend to continue to research, develop and/or obtain regulatory approval for and/or market and sell any Licensed Product in any country of the Territory.

8.3 In the event that PMC provides VRI with notice pursuant to Section 8.2 with respect to any Licensed Product or with respect to any country(ies) the rights herein granted by VRI to PMC to such Licensed Product in such country(ies), upon written notice from VRI to PMC shall revert to VRI.

8.4 In the event that PMC does not meet any of the milestones set forth in Exhibit C (as the same may be extended as indicated herein) for any of the Licensed Products set forth in Exhibit C, VRI shall have the right [****] PMC shall have the right to [****] and the Parties shall agree on a reasonable period for such extension. Exhibit C shall be appropriately revised to reflect such extension. In addition, PMC shall have the right to extend each of the milestones of Exhibit C, if not achieved, as set forth therein by [****] The parties agree to set similar

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milestones for [****] after [****] for one of the Licensed Products included in Exhibit C. Notwithstanding the preceding sentence, such milestone [****]

8.5 PMC shall provide written reports to VRI on June 30th and December 31st of each year concerning the efforts being made, in accordance with Section 8.1 with respect to the Licensed Product. PMC shall provide VRI with any additional information reasonably requested by VRI in this respect. Such reports shall be considered to be Proprietary Information of PMC.

ARTICLE 9

ACCOUNTING AND RECORDS

9.1 Reports. PMC agrees to make quarterly written reports to VRI within sixty (60) days after the end of each calendar quarter in which royalties are due under this Agreement, stating in each such report the number, description, and aggregate Net Sales of Licensed Products sold during the calendar-quarter and upon which a fee or royalty is payable under Article 3 above. The report shall also include the calculation of Net Sales all on a country by country and Licensed Product by Licensed Product basis. The report shall be due with respect to sales of Licensed Product sold by PMC sixty (60) days after the end of the calendar quarter and with respect to sales of Licensed Product by sublicensees, ninety (90) days after the end of a calendar quarter. If no such sales have been made, by PMC, its Affiliates and sublicensees the report shall so state.

9.2 Payment. Concurrently with the making of each such report of Section 9.1, PMC shall pay to VRI the royalties at the rate specified in Article 3 above. All payments by PMC to VRI hereunder shall be made in U.S. Dollars. If any currency conversion shall be required in connection with the calculation of royalties hereunder, such conversion shall be made by using the rate of exchange published in the Wall Street Journal for the last business day of the applicable calendar quarter.

9.3 Withholding Taxes. Any withholding or other tax that PMC or any of its Affiliates are required by statute to withhold and pay on behalf of VRI with respect to the royalties payable to VRI under this Agreement shall be deducted from said royalties and paid contemporaneously with the remittance to VRI; provided, however, that in regard to any tax so deducted PMC shall furnish VRI with proper evidence of the taxes paid on its behalf. VRI will furnish PMC with appropriate documents to secure application of the favorable rate of withholding tax under applicable tax treaties.

9.4 Records; Inspection.

9.4.1 PMC shall keep complete, true and accurate books of account and records for the purpose of determining the amounts payable to VRI under this Agreement. Such books and records shall be kept at PMC's principal place of business for at least three (3) years following the end of the calendar quarter to which they pertain, and will be open for inspection during such three (3) year period by a representative of VRI for the purpose of verifying PMC's royalty statements. Such inspections may be made no more than once each calendar year, during normal business hours and upon thirty (30)/days prior notice. Any such information shall be considered to be Proprietary Information of PMC.

9.4.2 Inspections conducted under this Section 9.4 shall be at the expense of VRI, unless an underpayment exceeding five percent (5%) of the amount paid for the period covered by the inspection is established in the course of any such inspection, whereupon all costs relating thereto will be paid by PMC, as well as any unpaid royalties within the thirty (30) days after requested by VRI.

ARTICLE 10

INDEMNIFICATION AND INSURANCE

10.1 PMC shall defend, indemnify and hold harmless VRI, Affiliates of VRI and its licensors, and its respective directors, officers, shareholders, agents, consultants and employees (collectively, the Indemnitees) from and against any and all liability, loss, damages and expenses (including reasonable attorneys' fees) as the result of claims, demands, costs or judgments which may be made or instituted against any of the Indemnitees arising out of the manufacture, design, possession, distribution, use, testing, sale or other disposition by or through PMC and/or Affiliates of PMC and/or licensees of either PMC or Affiliates of PMC of any Licensed Product and/or any product or process in connection with or arising out of the Patent Rights or Licensed Know-How and/or any material provided by PMC or Affiliates of PMC under this Agreement (in each case, other than any claims, demands, costs or judgments arising out of, based upon or resulting from infringement of the intellectual property rights of a third party based upon the use of polyphosphazene as an immunoadjuvant. PMC's obligation to defend, indemnify and hold harmless shall include any and all such claims, demands, costs or judgments, including but not limited to money damages arising from alleged personal injury (including death) to any person or alleged property damage. PMC shall have the right to control the defense of any action which is to be indemnified in whole by PMC hereunder, including the right to select counsel (which shall be reasonably acceptable to VRI) to defend the Indemnitees and to settle any claim as to which the Indemnitees are fully indemnified by PMC. Notwithstanding the foregoing, PMC shall have no obligation to indemnify or hold any Indemnitee harmless with respect to any claim, demand, cost or judgment that results or is alleged to result from the willful misconduct or negligence of an Indemnitee nor to the extent that VRI has the obligation to indemnify under a

Supply Agreement entered into between the parties pursuant to Par. 2.7. If PMC does not provide counsel to defend the Indemnitees, VRI shall have the right to select counsel and PM shall pay the reasonable costs and expenses of said counsel. The provisions of this paragraph shall survive and remain in full force and effect after any termination, expiration or cancellation of this Agreement and PMC's obligation hereunder shall apply whether or not such claims are rightfully brought.

ARTICLE 11

MISCELLANEOUS

11.1 Publicity. VRI and PMC shall cooperate in the preparation of a mutually agreeable press release and other publicity disclosing the existence of this Agreement and their business relationship. Except for information disclosed in such a mutually agreed press release or publicity, neither PMC nor VRI shall disclose the existence or any terms of this Agreement without the prior written consent of the other party, except for such limited disclosure as may be reasonably necessary to either party's bankers, investors, attorneys or other professional advisors, or in connection with a merger or acquisition, or as may be required by law in the offering of securities or in securities regulatory filings or otherwise.

11.2 Waiver. It is agreed that no waiver by either party hereto of any breach or default of any of the covenants or agreements herein set forth shall be deemed a Waiver as to any subsequent and/or similar breach or default.

11.3 Independent Contractors. The relationship of the parties hereto is that of independent contractors. Neither party hereto is an agent, partner or joint venturer of the other for any purpose.

11.4 Compliance with Laws. In exercising its rights under this license, PMC shall fully comply with the requirements of any and all applicable laws, regulations, rules and orders of any governmental body having jurisdiction on over the exercise of rights under this license.

11.5 Notices. Any notice required or permitted to be given to the parties hereto shall be deemed to have been properly given if delivered in person or when received if mailed by first class certified mail or sent by facsimile to the other party at the appropriate address as set forth below or to such other addresses as may be designated in writing by the parties from time to time during the term of this Agreement.

VRI: VIRUS RESEARCH INSTITUTE. INC.:
61 Moulton Street
Cambridge, Mass. 02138
Attention: Chief Executive Officer

PMC: PASTEUR MERIEUX SERUMS ET VACCINS:

58 Avenue Leclerc
Lyon, France
Attention: V.P. Product Development with copy to V.P.

Secretary & General Counsel

11.6 Complete Agreement. It is understood and agreed between VRI and PMC that this Agreement and the Option Agreement constitutes the entire agreement with respect to the subject matter of this Agreement, both written and oral, between the parties, and that all prior agreements respecting the subject matter hereof, either written or oral, expressed or implied, shall be abrogated, cancelled, and are null and void and of no effect. No amendment or change hereof or addition hereto shall be effective or binding on either of the parties hereto unless reduced to writing and executed by the respective duly authorized representatives of each of the parties hereto.

11.7 Severability. In the event that any provision of this Agreement becomes or is declared by a court of competent jurisdiction to be illegal, unenforceable or void, this Agreement shall continue in full force and effect without said provision and the parties shall exert best efforts to amend this Agreement to include a provision which is valid, legal and enforceable and which carries out the original intent of the parties. In the event that such a provision cannot be included in the Agreement and the absence thereof materially changes a party's obligations or rights under this Agreement, such party shall have the right to terminate this Agreement.

11.8 Counterparts and Headings. This Agreement may be executed in counterparts, each of which shall be deemed to be an original and both together shall be deemed to be one and the same agreement. All headings and any cover page or table of contents are inserted for convenience of reference only and shall not affect its meaning or interpretation.

11.9 Governing Law. All matters affecting the interpretation, validity and performance under this Agreement shall be governed by the internal laws of the Commonwealth of Massachusetts without regard for its conflict of laws principles.

11.10 Force Majeure. If and to the extent that either party hereto is prevented, by circumstances not now reasonably foreseeable and not within its reasonable ability to control, from performing any of its obligations under this Agreement (other than payment obligations) and promptly so notifies the other party giving full particulars of the circumstances in question, then the party affected shall be relieved of liability to the other for failure to perform such obligations, but shall nevertheless use its best efforts to resume full performance thereof without avoidable delay, and pending such resumption shall consult with the other party and shall permit and shall use its best efforts to facilitate any efforts the other party may make to effect the performance of such obligations by other means. If such failure to perform continues for a period of more than one (1) year, the other party may terminate this Agreement by written notice to the non-performing party with respect to the rights and licenses with respect to those Licensed

Products and with respect to those countries affected by such failure. The failure to achieve milestones under Article 8 and/or the failure to obtain regulatory approval for a Licensed Product shall not be considered to be circumstances within this Section 11.10.

ARTICLE 12
ASSIGNMENT; SUCCESSORS

12.1 This Agreement shall not be assignable by either of the parties without the prior written consent of the other party (which consent shall not be unreasonably withheld), except that either party may assign this Agreement to an Affiliate or to a successor in interest or transferee of all or substantially all of the portion of the business to which this Agreement relates.

12.2 Subject to the limitations on assignment herein, this Agreement shall be binding upon and inure to the benefit of said successors in interest and assigns of VRI and PMC. In order for such assignment to be effective any such successor or assignee of a party's interest shall expressly assume in writing the performance of all the terms and conditions of this Agreement to be performed by said party and such Assignment shall not relieve the Assignor of any of its obligations under this Agreement.

IN WITNESS WHEREOF, both VRI and PMC have executed this Agreement, in duplicate originals, by their respective officers hereunto duly authorized, the day and year first above written.

VIRUS RESEARCH INSTITUTE, INC.	PASTEUR MERIEUX SERUMS ET VACCINS
By: /s/ WILLIAM A. PACKER	By: /s/ JEAN-JACQUES BERTRAND
Print Name: William A. Packer	Print Name: Jean-Jacques Bertrand
Title: President	Title: Vice Chairman, President & Chief Executive Officer

The information below marked by [****] has been omitted pursuant to a request for Confidential Treatment. The omitted portion has been separately filed with the Commission.

EXHIBIT A

PATENT RIGHTS

1. United States

[****]

2. PCT

[****]

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EXHIBIT B

PMC PROPRIETARY RIGHTS

[****]

Portions of this Exhibit have been omitted pursuant to a request for Confidential Treatment. The omitted portions, marked by [****], have been separately filed with the Commission.

LICENSE AGREEMENT

THIS LICENSE AGREEMENT ("Agreement") is made and entered into as of August 2, 1995 (the "Effective Date") between VIRUS RESEARCH INSTITUTE, INC., a Delaware corporation having its principal place of business at 61 Moulton Street, Cambridge, Mass 02138 (hereinafter referred to as "VRI"), and PASTEUR MERIEUX SERUMS ET VACCINS, a French corporation having its registered head office at 58 Avenue Leclerc, Lyon, France (hereinafter referred to as "PMC").

RECITALS

A. VRI has certain proprietary rights relating to the use of polyphosphazene for the mucosal delivery of vaccines against human diseases.

B. PMC desires to obtain a license to such rights and to research, develop, manufacture, market, sell and distribute certain vaccines which incorporate polyphosphazene, all under the terms and conditions set forth below.

NOW THEREFORE, for and in consideration of the covenants, conditions, and undertakings hereinafter sat forth, it is agreed by and between the parties as follows:

ARTICLE 1

DEFINITIONS

1.1 "Affiliate" shall mean, with respect to any Person, (i) any other Person of which securities or other ownership interests representing 50% or more of the voting interests (or such lesser percentage which is the maximum allowed to be owned by a foreign corporation in a particular jurisdiction) are, at the time such determination is being made, owned, controlled or held directly or indirectly, by such Person, or (ii) any other Person which, at the time such determination is being made, is Controlling, Controlled by or under common Control with, such Person.

For the purpose of this section 1.1, "Control," whether used as a noun or verb, refers to the possession directly or indirectly, of the power to direct, or cause the direction of, the management or policies of a Person, whether through the ownership of voting securities, by contract or otherwise, and "Person" means any natural person, corporation, firm, business trust, joint venture, association, organization, company, partnership or other business entity, or

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any government, or any agency or political subdivision thereof. The Joint Venture companies known as Pasteur Merieux MSD Snc and MCM Vaccine Co. are Affiliates of PMC.

1.2 "Co-Exclusive Vaccine" shall mean a mucosally administered vaccine (other than a DNA vaccine) against one or more of the following diseases: Respiratory Syncytial Virus ("RSV"), Para Influenza, Cytomegalovirus ("CMV"), Pneumococcal Pneumonia ("Pneumo") (including S. pneumoniae, Branhamalla, non-typable Haemophilus Influenza and Otitis Media), Rabies, each alone or in combination with each other, and specifically excluding a combination of (a) one or more of the vaccines specifically enumerated as a Co-Exclusive Vaccine or Exclusive Vaccine with (b) a vaccine which is not specifically enumerated as an Exclusive Vaccine or Co-Exclusive Vaccine.

1.3 "Exclusive Vaccine" shall mean a mucosally administered vaccine(s) (other than a DNA vaccine) against one or more of Lyme Disease, Meningococcus and Influenza, each alone or in combination with each other or in combination with a Co-Exclusive Vaccine and shall also include [****] specifically excluding a combination of (a) one or more of the vaccines specifically enumerated as a Co-Exclusive Vaccine or Exclusive Vaccine with (b) a vaccine which is not specifically enumerated as an Exclusive Vaccine or Co-Exclusive Vaccine.

1.4 "Field" shall mean the prevention of a disease in humans.

1.5 "Licensed Know-How" shall mean any biological materials, and any research and development information, inventions, know-how, pre-clinical, clinical and other technical data, in each case that are owned by VRI, or possessed by VRI with the right to provide the same to others, from and after the Effective Date and which is necessary or useful for the improving, making, using or selling of Licensed Products as provided in this Agreement.

1.7 "Licensed Product(s)" shall mean, individually and collectively, the Exclusive Vaccines and the Co-Exclusive Vaccines provided that polyphosphazene is used for the mucosal administration of the product containing such vaccine.

1.8 "Net Sales" shall mean the gross invoice price of Licensed Products sold or distributed by PMC or its Affiliates or any of their sublicensees, less: (i) normal and customary rebates, trade discounts, and credits for returns and allowances, all to the extent actually allowed, (ii) to the extent separately reported on the invoice, sales or other excise taxes or duties imposed upon and paid by PMC, its Affiliates or sublicensees with respect to such sales, and (iii) transportation charges and insurance for transportation to the extent separately invoiced or separately reported on the invoice and paid by the seller.

In the event that Licensed Product is sold in other than an arms length transaction, then Net Sales shall be the gross invoice price which would be received in an arms length transaction, taking account of any deductions for items referred to in clauses (i), (ii) and (iii) of the preceding paragraph.

In the event that consideration in addition to or in lieu of money is received for Licensed Product such consideration shall be added to Net Sales.

Notwithstanding the provisions of this Section, Net Sales shall not include sales to an Affiliate for resale by such Affiliate.

1.9 "Patent Rights" shall mean the following patents and patent applications, and all subject matter claimed therein:

(a) All patents and applications listed in Exhibit A; any continuations, continuations-in-part, divisions and substitutions thereof, or of which such an application or patent is a successor; patents which may issue upon any of the foregoing; and all renewals, reissues and extensions thereof; and

(b) Any foreign patents and/or applications that are counterparts of a patent or application described in paragraph (a) above, including any patent or application that claims subject matter claimed in, or that takes priority from, a patent or application described in paragraph (a) above; and

(c) Any patent or application owned by VRI during the term of this Agreement which claims polyphosphazene and/or the use thereof in as part of a vehicle for the mucosal administration of vaccine.

1.10 "PMC Mucosal Delivery Technology" shall mean any and all materials, information, data, improvements, patents and patent applications directed to polyphosphazene and/or its use as part of a mucosal delivery system including, but not limited to, data related to polymer safety (other than Drug Master Files or clinical data, and excluding that which is unique to the formulation of polyphosphazene with a specific PMC antigen) which are owned by PMC or in the possession of PMC with the right to provide same to others during the term of the Agreement.

1.11 "Significant Competition" with respect to each Licensed Product in each country for each calendar year shall mean that a third party sells a mucosally delivered vaccine which competes with a Licensed Product as to a given indication, whether in single antigen or multivalent form and such third party vaccine has a commercially recognized advantage in safety, immunogenicity and/or therapeutic value over the competing Licensed

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Product and that such third party vaccine has [****] vaccines for the indication concerned. The sale of a Co-Exclusive Vaccine by a licensee of VRI or the sale of a polyphosphazene adjuvanted parenteral vaccine shall not be a third party vaccine for the purpose of this definition.

1.12 "Territory" shall mean (i) all countries included in the continents of North and South America, including Central America and the islands of the Caribbean, Europe, and Africa, including the dependencies and territories of such countries; (ii) Thailand, and (iii) all countries previously part of the U.S.S.R. [****]

1.13 "Valid Claim" shall mean a claim of an issued and unexpired patent or pending patent application included within the Patent Rights, which has not been held unenforceable, unpatentable or invalid by a court or other governmental agency of competent jurisdiction from which no appeal can be or is taken, and which has not been admitted to be invalid or unenforceable through reissue, disclaimer or otherwise.

ARTICLE 2

GRANT OF RIGHTS

2.1 License to PMC. (a) Subject to the terms and conditions of this Agreement, VRI hereby grants to PMC (i) a license under the Patent Rights and Licensed Know-How to make, have made, and use the Licensed Products which are Exclusive Vaccines outside of the Territory but only for sale in the Field in the Territory and to make, have made, use, sell and distribute the Licensed Products which are Exclusive Vaccines in the Field in the Territory, which license under this Section 2.1(a)(i) shall be exclusive with respect to sale of Exclusive Vaccines in the Field in the Territory and in all other respects the license granted under this Section 2.1(a)(i) is non-exclusive, and (ii) a license under the Patent Rights and Licensed Know-How to make, have made, and use the Licensed Products which are Co-Exclusive Vaccines outside of the Territory but only for sale in the Field in the Territory and to make, have made, use and sell a Licensed Product which is a Co-Exclusive Vaccine in the Field in the Territory which license under this Paragraph 2.1(a) shall be exclusive to PMC for use, sale and distribution of Co-Exclusive Vaccine in the Field in each country of the Territory but for one other entity which may, at VRI's option, be VRI or an entity licensed by VRI, and in all other respects the license granted under this Section 2.1(a)(ii) is non-exclusive. It is expressly understood that only one entity other than PMC will be or be permitted to be licensed by VRI, to use or sell any Co-Exclusive Vaccine in the Field in any country of the Territory.

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(b) Subject to the terms and conditions of this Agreement, VRI hereby grants to PMC a non-exclusive license under the Patent Rights and Licensed Know-How (i) to use, sell and distribute the Licensed Products set forth in Exhibit B in the countries set forth in Exhibit B, but only to the extent that all of the antigens contained therein are covered by patent rights of PMC and/or its Affiliates which give PMC an exclusive position with respect to those antigens in those countries, and (ii) to make and have made and use Licensed Products set forth in Exhibit B in any country of the world but only for use, sale and distribution in the countries set forth in Exhibit B, and only to the extent that all of the antigens contained therein are covered by patent rights of PMC and/or its Affiliates, which give PMC an exclusive position with respect to all of the antigens contained in the Licensed Product of Exhibit B in those countries of Exhibit B. Exhibit B is intended to set forth the countries in which PMC holds exclusive rights in respect of a given antigen and the antigens as to which such exclusive rights are held in that country. Such Exhibit B shall be amended from time to time to take account of any additional countries and/or additional Licensed Products which contain only antigens as to which PMC obtains exclusive rights during the term of this Agreement but only to the extent that VRI is able to grant such a license and only to the extent VRI has not previously granted to a third party rights which would prevent VRI from granting such rights to PMC.

(c) Upon written notice to VRI, PMC shall have the right to be granted a non-exclusive license to use, sell and distribute each Co-Exclusive Vaccine and each Exclusive Vaccine, in each country (other than Japan) where PMC and/or its Affiliates have patent rights (as an owner or exclusive licensee) which cover the antigen of such Exclusive Vaccine or Co-Exclusive Vaccine provided that VRI has not granted rights to a third party in such country which would prevent VRI from granting such license to PMC, which non-exclusive license extension shall be limited to a Co-Exclusive Vaccine or Exclusive Vaccine, as the case may be, which contains such antigen. The non-exclusive license shall include the right to make and have made each such Co-Exclusive Vaccine and Exclusive Vaccine but only for use and sale in the countries specified in this Paragraph 2.1(c).

(d) [****]

(e) In order to assure PMC of the exclusive rights granted in Section 2.1(a)(i), VRI shall not grant to a third party or itself exercise any rights or licenses under Patent Rights and Licensed Know-How to use, sell or distribute a mucosally administered vaccine [****] against Lyme Disease, Meningococcus or Influenza in the Field in the Territory. In addition, except as permitted in Section 2.1 (a (ii), VRI shall not grant to a third party or itself exercise any rights or licenses under Patent Rights and Licensed Know-How to use, sell or distribute a mucosally administered vaccine [****] against RSV, Para Influenza, CMV Pneumo (including S. Pneumoniae, Branhamalla, non-typable Haemophilus Influenza and Otitis Media) and Rabies in the Field in the Territory.

2.2 Licenses to VRI. Subject to the rights granted to and maintained by PMC and to any existing rights of third-parties, PMC hereby grants to VRI a worldwide, royalty free, license to use PMC Mucosal Delivery Technology to make, have made, use and sell vaccine products, including the right to sublicense such license to Affiliates. Such license of PMC Mucosal Delivery Technology may also be sublicensed to third parties with the prior written consent of PMC, which consent shall not be unreasonably withheld.

2.3 Sublicenses. With respect to the rights granted under Section 2.1(a)(i) PMC shall have the right to grant sublicenses under this Agreement with the prior approval of VRI as to the sublicensee, which approval shall not be unreasonably denied. With respect to the rights granted under Section 2.1(a)(ii), PMC shall have the right (without the approval of VRI) to grant a sublicense to one other party in any country where PMC is not selling or does not intend to sell Licensed Product. PMC shall advise VRI of the name of such sublicensee when such sublicensee is selected. The rights granted under Section 2.1(b) and (c) are not sublicensable, except to Affiliates of PMC.

2.4 (a) In case of any sublicense by PMC or VRI of the rights and licenses granted in this Agreement, the sublicensee shall agree to be bound by the terms, obligations and conditions identical to those of Articles 7 and 10 and Sections 2.5 and 12.5 of this Agreement (substituting the name of the Sublicensee for that of the sublicensing party), with the other party being expressly made a third party beneficiary thereof, and the sublicensing party shall be responsible for the performance by the appointed sublicensee of such terms, obligations and conditions.

(b) Each sublicense agreement concluded by PMC will include a requirement that the sublicensee maintain records and permit inspection on terms essentially identical to Article 10.4 of this Agreement. At VRI's request, PMC shall arrange for an independent certified accountant selected by VRI to inspect the records of its sublicensee(s) for the purpose of verifying royalties due to VRI and shall cause such accountant to report the results thereof to VRI.

(c) All sublicenses granted for a Licensed Product or for the PMC Mucosal Delivery Technology in a country shall terminate upon termination of the licenses granted hereunder with respect to such Licensed Product or to PMC Mucosal Delivery Technology as the case may be, provided that upon expiration of the full term of this Agreement pursuant to Paragraph 5.1, all parties shall have fully paid-up, non-cancelable licenses.

2.5 To the extent Patent Rights licensed to PMC under this Agreement have been licensed by VRI from another party under an agreement with another party ("Another Party Agreement(s)"), PMC understands and agrees as follows:

(i) The rights licensed to PMC by VRI are subject to the terms, limitations, restrictions and obligations of the Another Party Agreement(s).

(ii) PMC will comply with the terms, obligations, limitations and restrictions of the Another Party Agreement(s) to the extent PMC has been permitted to review such terms, obligations, limitations and restrictions. VRI will give PMC, upon request, a reasonable opportunity to review the same except to the extent that confidentiality or other obligations towards Another Party may prevent VRI from doing so. In any event VRI shall act reasonably in advising PMC of the scope of PMC's obligation pursuant to such Another Party Agreement. It is expressly understood that PMC may refuse to accept a license under one or more Another Party Agreements, in which case PMC will not be bound thereby.

2.6 Disclosure of Technology. Upon the execution of this Agreement, and periodically thereafter upon request by PMC, VRI shall provide to PMC copies of all available information in tangible form within the Licensed Know-How or related to the Patent Rights.

2.7 Subject to the terms and conditions of the Supply Agreement to be negotiated under this Section 2.7, PMC is hereby granted a non-exclusive right and license under the Patent Rights and Licensed Know-How to make and have made polyphosphazene for use by PMC, its Affiliates and its sublicensees as part of a mucosal delivery system in the manufacture of Licensed Product in accordance with and to the extent that PMC retains its license to Licensed Product under this Agreement.

PMC shall have the right at any time during the term of this Agreement, but not the obligation, to exercise its right under the herein granted manufacturing license. In the event that PMC decides to exercise such rights, it shall so inform VRI in writing, and VRI shall promptly disclose to PMC all applicable manufacturing technology in the possession of VRI at the time of such disclosure. Subject to applicable confidentiality obligations, VRI and PMC shall share and exchange any technology and know-how they shall generate while establishing manufacturing processes and facilities.

When either PMC or VRI achieves manufacture of polyphosphazene on a commercial basis, it shall have an obligation to use reasonable efforts in good faith to assist the other to satisfy its reasonable requirements of polyphosphazene for use as part of a vehicle for a mucosal delivery system for vaccines on reasonable commercial terms, taking into account the respective investments made and risks incurred by the parties in connection with such manufacture.

PMC and VRI shall consult in good faith and in their mutual interest as to an arrangement for the manufacture and supply of polyphosphazene for clinical lots as well as in

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commercial quantities for use as a part of a mucosal delivery system by PMC and its Affiliates and authorized sublicensees in the Licensed Products as licensed hereunder and for use by VRI, its Affiliates and licensees (other than PMC).

VRI shall use commercially reasonable efforts to establish a process capable of yielding under GMP conditions consistent and validated supplies of polyphosphazene in accordance with agreed upon specifications, [****]

VRI shall use commercially reasonable efforts to obtain a manufacturer of polyphosphazene. Thereafter, under the terms and conditions of a supply agreement to be negotiated in good faith between the parties (the "Supply Agreement"), VRI shall be

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responsible for scaling-up the process in an efficient, cost-effective GMP manufacturing facility for production of polyphosphazene according to agreed-upon specifications at industrial scale, which Supply Agreement [****]

PMC shall render all reasonable assistance to VRI in identifying and selecting a third-party manufacturer. In the event that VRI retains such manufacturer, VRI shall then, subject to appropriate confidentiality provisions, transfer to it all of VRI's technology for manufacture of polyphosphazene.

ARTICLE 3

MILESTONES AND ROYALTIES

3.1 Milestone Fees. PMC shall pay to VRI the non-refundable and non-creditable amounts specified below within thirty (30) days following the accomplishment by PMC, its Affiliates or sublicensees of the corresponding event set forth below, or (ii) within thirty (30) days following receipt by PMC of written notice of accomplishment by VRI or a VRI's Affiliate of such other corresponding event set forth below:

(a) [****]

(b) [****]

3.2 Royalties. [****]

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(a) [****]

(b) [****]

(c) [****]

(d) In the case of the earned royalties set forth in paragraphs (a) and (b) above, the royalties would be adjusted in each country for each calendar year for each Licensed Product in the event PMC was required to pay royalties to a third party for use of polyphosphazene as part of a mucosal delivery system in such Licensed Product in such a country for such year utilizing the following method, but in no event shall [****]

(1) First determine the relationship between Net Sales in the applicable country for the year and the total worldwide Net Sales in that same category of sales for the year for the Licensed Product, i.e., divide Net Sales in a country for the applicable Licensed Product, where, [****] by worldwide Net Sales in all countries for such Licensed Product [****].

(2) Apply this percentage to total royalties paid in all such countries for the Licensed Product for the year to determine the VRI royalties in a country against which a credit for third party royalties paid in such country may be taken.

(3) Subtract the amount of third party royalties paid in the country in question from [****].

(e) Royalties shall be calculated and paid on a country-by-country and product-by-product basis [****] provided, however, that if at any time after the expiration [****], the making, using or selling of the product is covered by Patent Rights, the royalties shall be paid until the expiration if the last to expire of any such patent(s).

(f) [****]

3.3 Single Royalty: Non-Royalty Sales. It is understood that in no event shall more than one royalty be payable under Section 3.2 with respect to a particular unit of Licensed Product. No royalty be payable under Section 3 with respect to sales of Licensed Products among PMC, its Affiliates and/or sublicensees, but royalty shall be due upon the subsequent sale of the Licensed Product to an entity who is not an Affiliate or sublicensee provided, however, that if there is no or is to be no subsequent sale of the Licensed Product to an entity who is not an Affiliate or a sublicensee, then the royalty shall be due and shall be based upon the higher of (i) the gross invoice price to such Affiliate or sublicensee or (ii) the average gross invoice price with PMC charges to its customers (other than Affiliates and

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sublicensees) for the Licensed Product for the relevant reporting period of Section 9.1 in the relevant country.

No royalty shall be payable for (i) Licensed Product used in clinical trials, or (ii) Licensed Product used by PMC or its sublicensee for research, or (iii) customary quantities of Licensed Product distributed by PMC or its sublicensee as free samples.

3.4 Combination Products. In the event Licensed Products contain vaccines licensed hereunder in combination, the royalty rate applicable to said combination products shall be the rate [****]

ARTICLE 4

RESEARCH PROGRAM

4.1 Object. Pursuant to the mutually agreed upon research program attached hereto as Exhibit D (the "Research Program"), VRI agrees to conduct the research described therein and PMC agrees to support and fund such Research Program in accordance with the terms and conditions set forth below.

4.2 Oversight of the Research Program

(a) Oversight. The Research Program will be overseen and monitored by the Research Steering Committee as described herein (the "Committee").

(b) Membership. [****] Such representatives will be qualified, by reason of background and experience, to assess the scientific progress of the Research Program. Each party will have the right to change its representation on the Committee upon written notice sent to the other.

(c) Chair. [****]

(d) Responsibilities. The Committee will have

authority to:

(i) review and approve the draft Research Program prepared by VRI and establish the definitive Research Program;

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(ii) make recommendations regarding the performance of the Research Program and the conduct of the research pursuant thereto, and monitor performance thereunder;

(iii) modify the Research Program as it determines, for each twelve (12) month period during the term thereof;

(iv) review any and all proposed publication[s] or communication[s] relating to the Research Program and the results therefrom, in accordance with the procedure set forth in this Article 4;

(v) review any and all proposed filing of patent application[s] in connection with the Research Program.

4.3 Meetings. [****] Meetings in person will normally take place at VRI's premises or such other pace as may be mutually agreed upon. Meetings may be held by telephone. At such meetings, the Committee will discuss the Research Program and the status of performance by VRI under the program, evaluate the results thereof and set priorities therefor. [****] The Committee will prepare written minutes of each meeting and a written record of all decisions whether made at a formal meeting or not. Such minutes will incorporate semi-annual research reports prepared for the parties by VRI. A quorum for a meeting shall require [****]

4.4 Committee Deadlock. If there are issues on which the Committee cannot reach agreement because of a Deadlock (as hereinafter defined)[****]

4.5 The Principal Investigator.

(a) Principal Investigator. [****]

(b) Duties. The Principal Investigator will direct the Research Program and coordinate the efforts of other researchers involved in the performance of such Program. The Principal Investigator will sit with the Committee as provided in Section 4.2 hereof, will perform the duties set forth hereunder and will be afforded the opportunity to actively participate in all Committee deliberations. The Principal Investigator will provide reasonably detailed status reports of the Research Program to the Committee at six-month intervals, as well as at the earliest practicable time whenever, in the Principal Investigator's judgment, an invention is created or reduced to practice. The Principal Investigator will devote such time and efforts as may be required to fulfill his duties hereunder and to ensure the successful administration and coordination of the Research Program.

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(c) Replacement. The Principal Investigator may be replaced in the event the then existing Principal Investigator is no longer able or is unwilling to so serve or fails to perform the duties assigned. In such circumstances VRI, with the consent of PMC shall appoint a substitute Principal Investigator. PMC will not unreasonably withhold its consent to a substitute Principal Investigator proposed by VRI. [****]

4.6 (a) Conduct of Research Program. The Research Program will be conducted by VRI at VRI's laboratories. VRI will use all reasonable efforts to complete research in accordance with the said Research Program [****]. Any research work performed by VRI pursuant hereto will be in compliance with Good Laboratory Practices as applicable in the United States of America. [****]

(b) Visitation. For the purpose of facilitating PMC's understanding of the research activities conducted by VRI hereunder, VRI will permit duly authorized employees or representatives of PMC to visit its facilities where the research is conducted, at reasonable times and with reasonable notice.

4.7 Financial Conditions.

(a) Support Commitment. PMC will provide funding for and during the term of the Research Program up to a maximum of two million five hundred thousand United States dollars (2,500,000 US$) (the "Maximum Commitment"). The Maximum Commitment will be inclusive of all costs incurred by VRI implementing the Research Program.

(b) Payment Schedule. Support payments will be made by PMC to VRI in four (4) equal half-year payments of six hundred twenty-five thousand United States dollars (625,000 US$) in advance with the first payment to be made within eight (8) days of the Effective Date hereof.

4.8 VRI will provide an annual budget for the research program and semi-annual financial reports of actual and budgeted expenditure.

[****]

[****] the records on which these reports are based shall be open, no more than once each year, for inspection by an independent certified accountant selected by PMC and acceptable to VRI, upon reasonable notice during normal business hours and at PMC's expense, for the sole purpose of verifying the accuracy of the reports.

[****]

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4.9 No Conflict With Research Program. VRI agrees that the Research Program funds provided by PMC will be applied to the Research Program and may not, without PMC prior written approval, be used in support of any other research at VRI.

4.10 Title to Equipment. VRI will retain title to any equipment purchased with funds provided by PMC under this Agreement, if such purchase is mutually agreed upon as part of the Research Program budget.

4.11 Term and termination.

(a) The term of the Research Program will be two (2) years as from the Effective Date hereof.

(b) In addition to any other remedy which it may have, PMC will be entitled to terminate the Research Program and cease funding thereof in the event of a material breach by VRI of any of VRI's obligations and covenants hereunder following written notice or such breach to VRI. If such breach is not cured within thirty (30) days after written notice is given by PMC to VRI specifying the breach, PMC may terminate the Research Program and cease funding hereunder forthwith upon written notice to VRI after expiration of such thirty (30) day period, and [****]

(c) In the event that the Research Program is terminated pursuant to this Section 4.11, VRI's right to receive any unpaid balance otherwise committed by PMC as support commitment pursuant to Section 4.7 hereof will become forfeited and no further payments with respect to the Research Program will be due to VRI by PMC except to the extent that such funds are needed to pay actual and non-cancelable obligations of VRI accrued to that date.

4.12 Confidentiality. In order to facilitate the operation of the Research Program, either party may disclose confidential or proprietary information owned or controlled by it to the other. It is hereby understood and agreed that such information shall be deemed "Proprietary Information" and treated as such in accordance with Article 7.

4.13 Results of the Research Program

(a) [****]

(b) [****]

(c) [****]

(d) [****]

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(e) [****]

(f) [****]

(g) [****]

(h) [****]

4.14 [****]

ARTICLE 5

TERM AND TERMINATION

5.1 Term. This Agreement shall become effective as of the Effective Date and, unless earlier terminated pursuant to the other provisions of this Article 5, shall continue in full force and effect as long as PMC is obligated to pay royalties under this Agreement. PMC's license under Section 2.1 with respect to the Licensed Know-How shall survive the expiration, but not an earlier termination, of this Agreement.

5.2 Termination for Breach. In the event of a material breach of this Agreement the nonbreaching party in addition to any other remedy which it may have shall be entitled to terminate this Agreement following written notice of such breach to the breaching party. If such breach is not cured within sixty (60) days after written notice is given by the non-breaching party to the breaching party specifying the breach, the non-breaching party may terminate the Agreement forthwith upon written notice to the breaching party after expiration of such sixty (60) day period.

5.3 Termination by PMC. (a) Any provision herein notwithstanding, after completing PMC's funding obligation under Article 4, PMC may terminate this Agreement at any time by giving VRI at least one hundred and eighty (180) days prior written notice.

(b) PMC may terminate its license with respect to any Licensed Product by one hundred and eighty (180) days prior written notice to VRI, and thereafter such Licensed Product(s) shall no longer be licensed under this agreement.

(c) In the event of a termination under Section 5.3 (a) all rights granted herein to PMC shall forthwith revert to VRI [****].

5.4 Survival.

5.4.1 Termination of this Agreement for any reason shall not release either party hereto from any liability which at the time of such termination has already accrued to the other party.

5.4.2 In the event this Agreement is terminated for any reason, PMC and its Affiliates and sublicensees shall have the right to sell or otherwise dispose of the stock of any Licensed Product then on hand, all subject to the payment to VRI of fees and royalties pursuant to Article 3 hereof.

5.4.3 Articles 7, 11 and 12, and Sections 2.5, 5., 5.5, 8.4, 10.3 and 10.4, shall survive the expiration and any termination of this Agreement. Except as otherwise provided in Section 5.1 and Section 5.4.3, all rights and obligations of the parties under this Agreement shall terminate upon the expiration or termination of this Agreement.

5.5 In the event that PMC's rights and licenses under this Agreement are terminated, PMC agrees not to make, use or sell Licensed Products except as permitted by Article 5.4.2.

5.6 Either party may terminate this Agreement on notice if the other party makes a general assignment for the benefit of creditors, is the subject of proceedings in voluntary or involuntary bankruptcy or has a receiver or trustee appointed for substantially all of its property; provided that in the case of an involuntary bankruptcy proceeding such right to terminate shall only become effective if the other party consents thereto or such proceeding is not dismissed within ninety (90) days after the filing thereof. If, in connection with bankruptcy proceedings involving a party, an election is made by or on behalf of such party to reject the obligations of this Agreement and the other party elects to retain its rights to intellectual property hereunder pursuant to Section 365 n.1 of the Bankruptcy Code (USA), such other party shall be entitled to enforce any rights exclusively granted to it in respect of intellectual property hereunder by commencement of any action it deems necessary to that effect against third-party infringers and may do so in the name and stead of the bankrupt party.

ARTICLE 6

PATENTS AND INFRINGEMENTS

6.1 Prosecution by VRI. VRI shall have the right, at PMC's expense, to control the filing for, prosecution and maintenance of the Patent Rights in the Territory. In the event that VRI grants any license in a country of the Territory with respect to any Patent Right, then thereafter PMC's obligation to pay patent costs for Patent Rights in such country shall be an amount equal to the total cost therefor multiplied by a fraction having as a

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numerator one and as a denominator the total number of licenses granted by VRI in respect of such Patent Rights in such country. VRI hall keep PMC reasonably informed as to the status of the Patent Rights in the Territory, and shall provide PMC with copies of all proposed filings and correspondence of a substantive nature with respect to patents or applications within the Patent Rights to be made with or sent to the United Sates Patent and Trademark Office or its counterpart in any country of the Territory (each, a "Patent Authority"). VRI shall also provide to PMC copies of all correspondence that it receives from a Patent Authority with respect to the Patent Rights and shall consider any comments of PMC with respect thereto.

6.2 Infringement Claims. If the production, sale or use of a Licensed Product results in any claim for infringement of a patent or other proprietary right of a third party against PMC, its Affiliates or sublicensees, PMC shall promptly notify VRI thereof in writing. As between the parties to this Agreement, PMC shall have the right at its own expense to defend and control the defense of any such claim against PMC, by counsel of PMC's own choice.

6.3 Enforcement of Patent Rights. (a) In the event that any Patent Rights are infringed by a third party with respect to an Exclusive Vaccine or Co-Exclusive Vaccine in the Field in the Territory, with the consent and approval of VRI (which shall not be unreasonably denied and shall be deemed to have been granted if VRI shall be in voluntary or involuntary bankruptcy proceedings, other than a proceeding such as Chapter 11 where the debtor continues to operate the business), PMC and/or its Affiliates or sublicensees shall have the right (except as provided below), but not the obligation, to institute, and prosecute any action or proceeding under the Patent Rights with respect to such infringement, by counsel of its choice, including any declaratory judgment action arising from such infringement. Any amounts recovered from third parties with respect to the Patent Rights in such action shall be applied first to reimburse the expenses of the action; then to the extent the award [****]. PMC shall not have the right to settle, compromise or take any action in such litigation which diminish, limit or inhibit the scope, validity or enforceability of the Patent Rights without the express written permission of VRI. PMC shall keep VRI advised of the progress of such proceedings.

6.4 In the event that a third party is infringing the Patent Rights with respect to an Exclusive Vaccine or Co-Exclusive Vaccine in the Territory in the Field and PMC does not elect to institute an action, VRI shall have the right, but not the obligation, to commence an infringement suit under the Patent Rights against such infringer and retain any recovery; provided that it so notifies PMC. If VRI commences a suit in accordance with this Section 6.4, PMC shall have the [****] expenses thereof. If PMC elects to so participate,[****]. VRI shall have the right to control such action with counsel of its choice.

6.5 VRI Participation. In VRI's sole discretion, VRI shall be entitled to participate at its expense through counsel of its choosing in and control any legal action by or against PMC affecting the validity or enforceability of the patents on which Patent Rights are based, and PMC may elect to participate in any such action to the extent necessary to defend its own interests.

6.6 Each party agrees to cooperate with each other with respect to any litigation under Sections 6.2, 6.3 or 6.4.

ARTICLE 7

CONFIDENTIALITY

7.1 Nondisclosure. Except as otherwise provided in this Agreement, a party receiving (the "Receiving Party") any business or technical information ("Proprietary Information") that is disclosed to it by the other party the ("Disclosing Party") shall for a period beginning on the Effective Date and ending ten (10) years after the termination of this Agreement hold in confidence and not disclose to any third party the "Proprietary Information". In addition, the Receiving Party shall not use Proprietary Information that it receives from the Disclosing Party, except as is reasonably necessary to exercise the rights granted to the Receiving Party under Article 2 or Article 6 of this Agreement. Notwithstanding the foregoing, with the prior written permission of the Disclosing Party (which shall not be unreasonably withheld), the Receiving Party may disclose information concerning the Patent Rights and/or the Licensed Know-How to actual or prospective sublicensees or to other third parties with whom the Receiving Party is considering or has entered into a business relationship, all of whom are similarly bound in writing under a reasonable confidentiality agreement. Proprietary Information of a party shall not include:

7.1.1 Information which is or was published or has become generally available to the public through no fault of the Receiving Party;

7.1.2 Information which the Receiving Party can document is or was in its possession at the time of disclosure or was independently developed by the Receiving Party; or

7.1.3 Information which is rightfully acquired by the Receiving Party from a third party who is not under an obligation of confidentiality to the disclosing party, and to the best of the Receiving Party's knowledge and belief is entitled to rightfully make such disclosure, but only to the extent the Receiving Party complies with any restrictions imposed by the third party.

7.2 Exceptions. The Receiving Party may disclose Proprietary Information of the other, in connection with the order of a court of law or administrative or governmental authority provided that the Receiving Party exerts reasonable efforts to preserve the

confidentiality thereof and the disclosing party is given an opportunity to protect the confidentiality thereof, or as is reasonably necessary in connection with the labeling of its products that are otherwise sold in compliance with this Agreement or as required for obtaining regulatory approval of Licensed Product, provided that the Receiving Party protects the confidentiality thereof to the fullest extent possible.

7.3 Notwithstanding anything else to the contrary, PMC agrees that Licensed Know-How, or Proprietary Information received from VRI shall be used by PMC only in and for Licensed Products and their development for sale in the Territory in the Field, all in accordance with this Agreement, and can only be used by PMC for so long as and to the extent that PMC maintains a license under this Agreement.

7.4 Notwithstanding anything else to the contrary and subject to Section 5.1, in the event that PMC's rights and licenses under this Agreement are terminated, PMC agrees a) not to use Licensed Know-How, or any Proprietary Information provided to PMC by VRI or any information developed by PMC which is derived from or is based on Licensed Know-How for the research, development, making, or using or selling of any product or process, including, but not limited to Licensed Products and (b) not to do any of the foregoing while this Agreement is in force for any product except as licensed under this Agreement.

7.5 Notwithstanding anything else to the contrary, VRI agrees that PMC Mucosal Delivery Technology licensed to it by PMC hereunder may be used only in a manner consistent with the provisions of this Agreement. VRI's licenses herein shall survive the expiration of the term hereof but not an earlier termination of this Agreement except as provided in Section 5.3(c).

ARTICLE 8

REPRESENTATIONS AND WARRANTIES

8.1.1 VRI and PMC each represents and warrants to the other that each has the full right and authority to enter into this Agreement and grant the rights and licenses granted herein;

8.1.2 VRI represents and warrants to PMC that it has not previously granted and, prior to termination of this Agreement, will not grant any rights in the Patent Rights or the Licensed Know-How that are inconsistent with the rights and licenses granted to PMC herein;

8.1.3 To the best of VRI's knowledge, there is no pending or threatened claim or litigation to which VRI is a party contesting the validity or right to use any of the Patent Rights, and VRI has not received any notice of infringement with respect to Patent Rights.

The information below marked by [****] has been omitted pursuant to a request for Confidential Treatment. The omitted portion has been separately filed with the Commission.

8.2 Disclaimer. EXCEPT AS OTHERWISE EXPRESSLY SET FORTH IN SECTION 8.1 ABOVE, NEITHER PARTY MAKES ANY REPRESENTATION OR EXTENDS ANY WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NONINFRINGEMENT, OR VALIDITY OF ANY PATENT RIGHTS ISSUED OR PENDING.

8.3 Effect of Representations and Warranties. Subject to Section 8.4, it is understood that if the representations and warranties under this Article 8 are not true and accurate and PMC incurs liabilities, costs or other expenses as a result of such falsity, VRI shall indemnify and hold PMC harmless from and against any such liabilities, costs or expenses incurred, provided that VRI receives prompt notice of any claim against PMC resulting from or related to such falsity and the sole right to control the defense or settlement thereof.

8.4 Limitation of Liability. Notwithstanding anything else to the contrary, VRI's liability for any breach of this Agreement (including but not limited to any liability which results from any breach of any representation or warranty) is limited to the payments received or to be received from PMC under this Agreement. This Limitation on Liability shall not be applicable to intentional misconduct on the part of VRI or where PMC, as a result of such breach, is liable to a third party in excess of such Limitation on Liability.

ARTICLE 9

DUE DILIGENCE

9.1 General. PMC shall use commercially reasonable efforts to research, develop, register, market and sell and to continue to market and sell each Licensed Product in each country of the Territory; [****]. Upon a failure by PMC to meet its obligations under this Section 9.1 with respect to any Licensed Product in any country (directly or through a sublicensee), VRI shall, among other remedies available to it, [****]

9.2 PMC shall promptly notify VRI, in writing, if at any time PMC does not intend to continue to research, develop and/or obtain regulatory approval for and/or market and sell any Licensed Product in any country of the Territory.

9.3 In the event that PMC provides VRI with notice pursuant to Section 9.2 with respect to any Licensed Product or with respect to any country(ies) the rights herein

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granted by VRI to PMC to such Licensed Product in such country(ies), upon written notice from VRI to PMC shall revert to VRI.

9.4 In the event that PMC does not meet any of the milestones set forth in Exhibit C (as the same may be extended as indicated herein) for any of the Licensed Products set forth in Exhibit C, VRI shall have the right to [****]. PMC shall have the right to a [****] and the Parties shall agree on a reasonable period for such extension. Exhibit C shall be appropriately revised to reflect such extension. In addition, PMC shall have the right to extend each of the milestones of Exhibit C, if not achieved, [****]. The parties agree to set similar milestones for [****]

9.5 PMC shall provide written reports to VRI on June 30th and December 31st of each year concerning the efforts being made in accordance with Section 9.1 with respect to the Licensed Product. PMC shall provide VRI with any additional information reasonably requested by VRI in this respect. Such reports shall be considered to be Proprietary Information of PMC.

ARTICLE 10

ACCOUNTING AND RECORDS

10.1 Reports. PMC agrees to make quarterly written reports to VRI within sixty (60) days after the end of each calendar quarter in which royalties are due under this Agreement, stating in each such report the number, description, and aggregate Net Sales of Licensed Products sold during the calendar quarter and upon which a fee or royalty is payable under Article 3 above. The report shall also include the calculation of Net Sales all on a country by country and Licensed Product by Licensed Product basis. The report shall be due with respect to sales of Licensed Product sold by PMC sixty (60) days after the end of the calendar quarter and with respect to sales of Licensed Product by sublicensees, ninety (90) days after the end of a calendar quarter. If no such sales have been made, by PMC, its Affiliates and sublicensees, the report shall so state.

10.2 Payment. Concurrently with the making of each such report of Section 10.1, PMC shall pay to VRI the royalties at the rate specified in Article 3 above. All payments by PMC to VRI hereunder shall be made in U.S. Dollars. If any currency conversion shall be required in connection with the calculation of royalties hereunder, such conversion shall be made by using the rate of exchange published in the Wall Street Journal for the last business day of the applicable calendar quarter.

10.3 Withholding Taxes. Any withholding or other tax that PMC or any of its Affiliates are required by statute to withhold and pay on behalf of VRI with respect to the royalties payable to VRI under this Agreement shall be deducted from said royalties and paid contemporaneously with the remittance to VRI; provided, however, that in regard to any tax so deducted PMC shall furnish VRI with proper evidence of the taxes paid on its behalf. VRI will furnish PMC with appropriate documents to secure application of the favorable rate of withholding tax under applicable tax treaties.

10.4 Records; Inspection.

10.4.1 PMC shall keep complete, true and accurate books of account and records for the purpose of determining the amounts payable to VRI under this Agreement. Such books and records shall be kept at PMC's principal place of business for at least three (3) years following the end of the calendar quarter to which they pertain, and will be open for inspection during such three (3) year period by a representative of VRI for the purpose of verifying PMC's royalty statements. Such inspections may be made no more than once each calendar year, during normal business hours and upon thirty (30) days prior notice. Any such information shall be considered to be Proprietary Information of PMC.

10.4.2 Inspections conducted under this Section 10.4 shall be at the expense of VRI, unless an underpayment exceeding five percent (5%) of the amount paid for the period covered by the inspection is established in the course of any such inspection, whereupon all costs relating thereto will be paid by PMC, as well as any unpaid royalties within the thirty (30) days after requested by VRI.

ARTICLE 11

INDEMNIFICATION AND INSURANCE

11.1 PMC shall defend, indemnify and hold harmless VRI, Affiliates or VRI and its licensors, and its respective directors, officers, shareholders, agents, consultants and employees (collectively, the "Indemnitees") from and against any and all liability, loss, damages and expenses (including reasonable attorneys' fees) as the result of claims, demands, costs or judgments which may be made or instituted against any of the Indemnitees arising out of the manufacture, design, possession, distribution, use, testing, sale or other disposition by or through PMC and/or Affiliates of PMC and/or licensees of either PMC or Affiliates of PMC of any Licensed Product and/or any product or process in connection with or arising out of the Patent Rights or Licensed Know-How and/or any material provided by PMC or Affiliates of PMC under this Agreement (in each case, other than any claims, demands, costs or judgments arising out of, based upon or resulting from infringement of the intellectual property rights of a third party based upon the use of polyphosphazene as a part of a mucosally delivered vaccine PMC's obligation to defend, indemnify and hold harmless shall include any and all such claims, demands, costs or judgments, including but not limited to

money damages arising from alleged personal injury (including death) to any person or alleged property damage. PMC shall have the right to control the defense of any action which is to be indemnified in whole by PMC hereunder, including the right to select counsel (which shall be reasonably acceptable to VRI) to defend the Indemnitees and to settle any claim as to which the Indemnitees are fully indemnified by PMC. Notwithstanding the foregoing, PMC shall have no obligation to indemnify or hold any Indemnitee harmless with respect to any claim, demand, cost or judgment that results or is alleged to result from the willful misconduct or negligence of an Indemnitee nor to the extent that VRI has the obligation to indemnify under a Supply Agreement entered into between the parties pursuant to Section 2.7. If PMC does not provide counsel to defend the Indemnitees, VRI shall have the right to select counsel and PMC shall pay the reasonable costs and expenses of said counsel. The provisions of this paragraph shall survive and remain in full force and effect after any termination, expiration or cancellation of this Agreement and PMC's obligation hereunder shall apply whether or not such claims are rightfully brought.

ARTICLE 12

MISCELLANEOUS

12.1 Publicity. VRI and PMC shall cooperate in the preparation of a mutually agreeable press release and other publicity disclosing the existence of this Agreement and their business relationship. Except for information disclosed in such a mutually agreed press release or publicity, neither PMC nor VRI shall disclose the existence or any terms of this Agreement without the prior written consent of the other party, except for such limited disclosure as may be reasonably necessary to either party's bankers, investors, attorneys or other professional advisors, or in connection with a merger or acquisition, or as may be required by law in the offering of securities or in securities regulatory filings or otherwise.

12.2 Waiver. It is agreed that no waiver by either party hereto of any breach or default of any of the covenants or agreements herein set forth shall be deemed a Waiver as to any subsequent and/or similar breach or default.

12.3 Independent Contractors. The relationship of the parties hereto is that of independent contractors. Neither party hereto is an agent, partner or joint venturer of the other for any purpose.

12.4 Compliance with Laws. In exercising its rights under this license, PMC shall fully comply with the requirements of any and all applicable laws, regulations, rules and orders of any governmental body having jurisdiction over the exercise of rights under this license.

12.5 Notices. Any notice required or permitted to be given to the parties hereto shall be deemed to have been properly given if delivered in person or when received if

mailed by first-class certified mail or sent by facsimile to the other party at the appropriate address as set forth below or to such other addresses as may be designated in writing by the parties from time to time during the term of this Agreement.

VRI:	VIRUS RESEARCH INSTITUTE, INC. 61 Moulton Street Cambridge, Mass. 02138 Attention: Chief Executive Officer
PMC:	PASTEUR MERIEUX SERUMS El VACCINS 58 Avenue Leclerc Lyon, France Attention: V.P. Product Development
With Copy to:	V.P. Secretary & General Counsel

12.6 Complete Agreement. It is understood and agreed between VRI and PMC that this Agreement constitutes the entire agreement with respect to the subject matter of this Agreement, both written and oral, between the parties, and that all prior agreements respecting the subject matter hereof, either written or oral, expressed or implied, shall be abrogated, cancelled, and are null and void and of no effect. No amendment or change hereof or addition hereto shall be effective or binding on either of the parties hereto unless reduced to writing and executed by the respective duly authorized representatives of each of the parties hereto.

12.7 Severability. In the event that any provision of this Agreement becomes or is declared by a court of competent jurisdiction to be illegal, unenforceable or void, this Agreement shall continue in full force and effect without said provision and the parties shall exert best efforts to amend this Agreement to include a provision which is valid, legal and enforceable and which carries out the original intent of the parties. In the event that such a provision cannot be included in the Agreement and the absence thereof materially changes a party's obligations or rights under this Agreement, such party shall have the right to terminate this Agreement.

12.8 Counterparts and Headings. This Agreement may be executed in counterparts, each of which shall be deemed to be an original and both together shall be deemed to be one and the same agreement. All headings and any cover page or table of contents are inserted for convenience of reference only and shall not affect its meaning or interpretation.

12.9 Governing Law. All matters affecting the interpretation, validity and performance under this Agreement shall be governed by the internal laws of the Commonwealth of Massachusetts without regard for its conflict of laws principles.

12.10 Force Majeure. If and to the extent that either party hereto is prevented, by circumstances not now reasonably foreseeable and not within its reasonable ability to control, from performing any of its obligations under this Agreement (other than payment obligations) and promptly so notifies the other party giving full particulars of the circumstances in question, then the party affected shall be relieved of liability to the other for failure to perform such obligations, but shall nevertheless use its best efforts to resume full performance thereof without avoidable delay, and pending such resumption shall consult with the other party and shall permit and shall use its best efforts to facilitate any efforts the other party may make to effect the performance of such obligations by other means. If such failure to perform continues for a period of more than one (1) year, the other party may terminate this Agreement by written notice to the non-performing party with respect to the rights and licenses with respect to those Licensed Products and with respect to the failure to obtain regulatory approval for a Licensed Product shall not be considered to be circumstances within this Section 12.10.

ARTICLE 13

ASSIGNMENT; SUCCESSORS

13.1 This Agreement shall not be assignable by either of the parties without the prior written consent of the other party (which consent shall not be unreasonably withheld), except that either party may assign this Agreement to an Affiliate or to a successor in interest or transferee of all or substantially all of the portion of the business to which this Agreement relates.

13.2 Subject to the limitations on assignment herein, this Agreement shall be binding upon and inure to the benefit of said successors in interest and assigns of VRI and PMC. In order for such assignment to be effective any such successor or assignee of a party's interest shall expressly assume in writing the performance of all the terms and conditions of this Agreement to be performed by said party and such Assignment shall not relieve the Assignor of any of its obligations under this Agreement.

IN WITNESS WHEREOF, both VRI and PMC have executed this Agreement, in duplicate originals, by their respective officers hereunto duly authorized, the day and year first above written.

VIRUS RESEARCH INSTITUTE, INC.	PASTEUR MERIEUX SERUMS ET VACCINS
By: /s/ J. Barrie Ward	By: /s/ Herve Tainturier
Print Name: J. Barrie Ward	Print Name: Herve Tainturier
Title: Chairman & CEO	Title: Corporate Vice President, Secretary and General Counsel

The information below marked by [****] has been omitted pursuant to a request for Confidential Treatment. The omitted portion has been separately filed with the Commission.

EXHIBIT A
PATENT RIGHTS

1. [****]

2. [****]

3. U.S. PATENT NO. 5,053,451 licensed from The Pennsylvania Research Corporation

4. U.S. APPLICATION SERIAL NO. [****]

I. M.I.T. Case No. 5400

U.S. Patent 5,149,543
"Ionically Cross-Linked Polymeric Mirocapsules"
By Samdar Cohen, Carmen Bano, Karyn B. Visscher, Marie Chow, Harry B. Allcock and Robert S. Langer

U.S. Patent 5,308,701
"Ionically Cross-Linked Polymeric Microcapsules"
By Samdar Cohen, Carmen Bano, Karyn B. Visscher, Marie Chow, Harry B. Allcock and Robert S. Langer

Foreign Patent Applications pending:
[****]

II. M.I.T. Case 5743

U.S. Patent 4,880,662
"Water-Soluble Phosphazene Polymers Having Pharmacological Applications"
By Harry R. Allcock, Paul E. Austin and Sukky Kwon

U.S.S.N.: 434,145 - ABANDONED
"Water-Soluble Phosphazene Polymers Having Pharmacological Applications"
By Harry K. Allcock, Paul E. Austin and Sukky Kwon
Jointly owned with Pennsylvania Research Corporation.

II. M.I.T. Case No. 3985
U.S. Patent No. 4,900,556
"Systems For Delayed And Pulsed Release of Biologically Active Substances"

By Herman N. Eisen, Robert S. Langer, Jr. and Margaret A. Wheatley

U.S. Patent No. 4,921,757
"System and Apparatus For Delayed And Pulsed Release of Biologically Active Substances"
By Herman N. Eisen, Robert S. Langer, Jr. and Margaret A. Wheatley

IV. M.I.T. Case No. 3986
U.S. Patent No. 4,933,185
"System For Controlled Release of Biologically Active Compounds"
By Herman N. Eisen, Robert S. Langer, Jr. and Margaret A. Wheatley

Explanatory Notes

M.I.T. Case No. 4433 -- All patent rights abandoned.
"Polyphosphazene Matrix System for Drug Delivery Applications"
By Cato T. Laurencin, Robert S. Langer, Harry R. Allcock and Thomas X. Neenan U.S.S.N. 737,921

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EXHIBIT B

PMC PROPRIETARY RIGHTS

[****]

The information below marked by [****] has been omitted pursuant to a request for Confidential Treatment. The omitted portion has been separately filed with the Commission.

EXHIBIT C

MILESTONES TO BE MET BY PMC

[****]

The information below marked by [****] has been omitted pursuant to a request for Confidential Treatment. The omitted portion has been separately filed with the Commission.

EXHIBIT D

RESEARCH PROGRAM

[****]

EXHIBIT 10.20

LICENSE AGREEMENT

This License Agreement ("Agreement") is made effective as of this first day of December 1997, between VIRUS RESEARCH INSTITUTE, Inc., having a place of business at 61 Moulton Street, Cambridge, MA 02138, USA (herein referred to as "LICENSOR") and SmithKline Beecham P.L.C., having a place of business at New Horizons Court, Brentford, Middlesex TW8 9EP, United Kingdom (herein referred to as "LICENSEE"),

WITNESSETH THAT:

WHEREAS, LICENSOR is the owner of and/or controls all right, title and interest in certain patents, identified in Appendix A hereto, and know-how in the field of Rotavirus; and

WHEREAS, LICENSEE desires to obtain certain worldwide licenses from LICENSOR under the aforesaid patents and know-how, and LICENSOR is willing to grant to LICENSEE such licenses;

NOW, THEREFORE, in consideration of the covenants and obligations expressed herein and intending to be legally bound, and otherwise to be bound by proper and reasonable conduct, the parties agree as follows:

1. DEFINITIONS

1.01 "AFFILIATE(S)" shall mean any corporation, firm, partnership or other entity, whether de jure or de facto, which directly or indirectly owns, is owned by or is under common ownership with a party to this Agreement to the extent of at least fifty percent (50%) of the equity (or such lesser percentage which is the maximum allowed to be owned by a foreign corporation in a particular jurisdiction) having the power to vote on or direct the affairs of the entity and any person, firm, partnership, corporation or other entity actually controlled by, controlling or under common control with a party to this Agreement.

1.02 "BLOCKING PATENTS" shall mean patents owned and/or controlled by THIRD PARTIES which are needed by LICENSEE for the making, having made, using, having used, importing, offering for sale, selling or having sold VACCINES

and/or technology owned and/or controlled by THIRD PARTIES which is necessary for LICENSEE in order to practice the license(s) granted by LICENSOR hereunder. For the avoidance of doubt any patents and/or patent applications and/or technology owned and/or controlled by DynCorp to which LICENSEE may acquire a licence will be considered for the purpose of this Agreement as BLOCKING PATENTS.

1.03 "COMBINATION" shall mean VACCINE wherein (a) Rotavirus antigen(s) is (are) formulated in combination with one or more additional therapeutically and/or prophylactically active antigens.

1.04 "FDA" shall mean the United States Food and Drug Administration.

1.05 "KNOW-HOW" shall mean all present and future technical information, materials and know-how which relate to (a) Rotavirus antigen(s) for use in a live attenuated vaccine against rotavirus which are now and/or at anytime during the term of this Agreement developed, owned, proprietary to and/or controlled by LICENSOR and/or to which LICENSOR has otherwise the right to grant license, which are both secret and substantial. KNOW-HOW shall include the Rotavirus 89.12 strain and any other live attenuated Rotavirus strain(s) useful or necessary for VACCINE, owned and/or controlled by LICENSOR and/or to which LICENSOR has otherwise the right to grant license and, without limitation, all chemical, pharmacological, toxicological, clinical, assay, control and manufacturing data and any other information relating thereto. KNOW-HOW shall not include any information, materials and/or know-how which are generally ascertainable from publicly available information or which subsequently become publicly available. KNOW-HOW existing as of the Effective Date is listed in Appendix B attached hereto which shall, as appropriate, be updated from time to time. LICENSOR shall identify KNOW-HOW in writing at the time of disclosure to LICENSEE.

1.06 "LICENSEE" shall mean SmithKline Beecham P.L.C.

1.07 "LICENSOR" shall mean Virus Research Institute, Inc.

1.08 "MAJOR MARKETS" shall mean the United States of America, United Kingdom, France, Germany and Italy.

1.09 "NET SALES" shall mean the gross receipts from sales of VACCINE in the TERRITORY by LICENSEE, its AFFILIATES and/or sublicensees to THIRD PARTIES under this Agreement after deducting:

(i) reasonable transportation charges, including insurance; and

(ii) LICENSEE's costs for syringes and other administration devices combined with, or contained in, commercial packaging; and

(iii) sales and excise taxes and duties paid by a selling party and any other governmental charges imposed upon the production, importation, use or sale of VACCINE including, without limitation, contributions and payments collected by any governmental authorities as liability provisions and/or made pursuant to governmental injury compensation schemes; and

(iv) trade, quantity and cash discounts (other than cash discounts for early payments), commissions and other customary rebates; and

(v) allowances or credits to customers or charges back from customers on account of rejection or return of VACCINE subject to royalty under this Agreement or on account of retroactive price reductions affecting such VACCINE; and

(vi) the difference between fifty percent (50%) of the royalties paid to THIRD PARTIES as referred to in Paragraph 4.02 and the amount of royalties actually deducted under Paragraph 4.02; and

(vii) the royalties payable by LICENSEE to THIRD PARTIES on the manufacture, use and/or sale of VACCINE for adjuvants and/or other technology contained in VACCINE to the extent they are not otherwise deducted pursuant to the provisions of Section 4 hereof or under Paragraph 1.09 (vi) above.

Sales between or among LICENSEE and its AFFILIATES or sublicensees shall be excluded from the computation of NET SALES except where such AFFILIATES or sublicensees are end users, but NET SALES shall include the subsequent final sales to THIRD PARTIES by such AFFILIATES or sublicensees.

If VACCINE is sold as a COMBINATION, NET SALES for purposes of determining royalties on COMBINATION shall be calculated by multiplying NET SALES by the fraction A/B, where A is the invoice price of a monovalent form of VACCINE sold separately and B is the invoice price of COMBINATION.

If the invoice price of a monovalent form of VACCINE is not available and the parties are unable to agree on an alternative arrangement, then royalty on COMBINATION shall be determined by multiplying NET SALES by a fraction X/Y wherein X is one (1) and Y is the total number of active antigens included in COMBINATION with all the Rotavirus antigens being counted as only one (1) antigen.

1.10 "PATENTS" shall mean all patents and patent applications which are or become owned and/or controlled, in whole or in part, by LICENSOR or to which LICENSOR otherwise has, now or in the future, the right to grant licenses, which generically or specifically claim VACCINE, a process for manufacturing VACCINE and intermediates used in such process, or a use of VACCINE. Included within the definition of PATENTS are any continuations, continuations-in-part, divisions, patents of addition, reissues, renewals or extensions (other than SPC) thereof. Also included within the definition of PATENTS are any patents and patent applications which generically or specifically claim any improvements of VACCINE or intermediates or manufacturing processes required or useful for production of VACCINE which are developed by LICENSOR and/or under which LICENSOR otherwise has the right to grant licenses or sublicenses, now or in the future, during the term of this Agreement. For the avoidance of doubt PATENTS do not include patents or patent applications which claim adjuvants, delivery systems, or other delivery vehicles or vaccines which include solely antigens other than Rotavirus antigens. The current list of patent applications and patents encompassed within PATENTS is set forth in Appendix A attached hereto.

1.11 "SPC" shall mean all Supplementary Protection Certificates for medicinal products and their equivalents provided under the Council Regulation (EEC) No. 1768/92 of June 18, 1992 which are directed to a VACCINE.

1.12 "VACCINE" shall mean any and all live attenuated Rotavirus vaccines or components thereof licensed hereunder which contain the Rotavirus 89.12 strain and/or a strain derived from the Rotavirus 89.12 strain, developed and/or owned by LICENSOR and/or to which LICENSOR has otherwise, now or in the

future, the right to grant license and/or any and all live attenuated Rotavirus vaccines or components thereof licensed hereunder which are developed and/or owned by LICENSOR and/or to which LICENSOR has otherwise, now or in the future, the right to grant license.

1.13 "VALID CLAIM" shall mean a claim of a granted PATENT which has not lapsed or been abandoned and which has not been declared invalid or unenforceable by a court of competent jurisdiction or administrative agency from which no appeal is or can be taken.

1.13 "TERRITORY" shall mean all the countries and territories of the world.

1.14 "THIRD PARTY(IES)" shall mean any person or party other than a party to this Agreement or an AFFILIATE.

"Interpretative Rules". For purposes of this Agreement, except as otherwise expressly provided herein or unless the context otherwise requires: (a) defined terms include the plural as well as the singular and the use of any gender shall be deemed to include the other gender; (b) references to "Articles", "Sections", "Paragraphs" and other subdivisions and to "Appendices", "Schedules" and "Exhibits" without reference to a document, are to designated Articles, Sections, Paragraphs and other subdivisions of, and to Appendices, Schedules and Exhibits to, this Agreement; (c) the use of the term "including" means "including but not limited to"; and (d) the words "herein", "hereof", "hereunder" and other words of similar import refer to this Agreement as a whole and not to any particular provision.

2. GRANT

2.01 LICENSOR hereby grants to LICENSEE and its AFFILIATES an exclusive license, with the right subject to Paragraph 2.02 to grant sublicenses, under PATENTS, KNOW-HOW and any SPC to make, have made, use, have used, sell, offer for sale, have sold, keep, import and export VACCINE and COMBINATION, in the TERRITORY, in any formulation, configuration, combination and/or delivery system, subject to the terms and conditions of this Agreement.

2.02 LICENSEE agrees to notify LICENSOR of any sublicense under PATENTS and/or KNOW-HOW it shall grant to any THIRD PARTY(IES) and, at

LICENSOR's request, agrees to provide LICENSOR with suitably redacted versions of the sublicense agreements LICENSEE may enter into with said THIRD PARTY(IES).

2.03 Notwithstanding anything else to the contrary herein, LICENSEE agrees that PATENTS and KNOW-HOW shall be used by LICENSEE only in and for VACCINES and in accordance with this Agreement and can only be used by LICENSEE for so long as and to the extent this Agreement and the licences and rights granted hereunder are not terminated pursuant to Paragraph 10.02, 10.03, 10.04 or 10.06.

2.04 To the extent that any rights and licenses granted to LICENSEE under this Agreement are rights and licenses obtained by LICENSOR under an agreement with a THIRD PARTY ("Third Party Agreement"), then any such rights and licenses granted to LICENSEE will be subject to the terms, conditions and obligations of such Third Party Agreement. LICENSEE specifically acknowledges that the obligations contained in Sections 2.4 (c), 8 and 10 (attached hereto as Appendix E) of a certain License and Clinical Trials Agreement between LICENSOR and the James N. Gamble Institute of Medical Research ("the Gamble Agreement") will be binding on LICENSEE.

3. PAYMENTS AND ROYALTIES

3.01 LICENSEE shall make the following license fee payment to LICENSOR, which payment shall be non-refundable to LICENSEE for any reason: [*]

3.02 As consideration for the license under PATENTS granted to LICENSEE under this Agreement, LICENSEE shall pay to LICENSOR the following royalties ("Patent Royalty(ies)"):

(a) [*]

(b) [*]

(c) [*] ; and

/*/ Confidential material omitted and filed separately with the Securities and Exchange Commission.

(d) [*]

provided that the VACCINE sold is covered by a VALID CLAIM in the particular country where sales are made.

3.03 As consideration for the license to KNOW-HOW granted to LICENSEE under this Agreement, LICENSEE shall pay to LICENSOR royalties on NET SALES in those countries wherein there is no granted PATENT or wherein a patent application is pending or wherein there is no VALID CLAIM ("Know-How Royalty(ies)"), provided that the making, using or selling of VACCINE actually use KNOW-HOW which LICENSOR has identified in writing as being secret and substantial at the time of disclosure to LICENSEE. The rate of the Know-How Royalties payable under this Paragraph 3.03 shall, on a country-by-country basis, be [*] that would be payable under paragraph 3.02 hereto considering the applicable portion of annual NET SALES. In the event LICENSEE, in a specific country, faces competition with a vaccine which represents [*] of NET SALES in such country, the sale of which vaccine would infringe PATENTS if sold in patented countries (a "Competitive Vaccine"), the rate of the Know-How Royalties payable by LICENSEE to LICENSOR on NET SALES in such country shall only be [*] that, considering the applicable portion of annual NET SALES, would be payable under Paragraph 3.02 hereof. LICENSEE acknowledges that the supply of the Rotavirus 89.12 strain by LICENSOR to LICENSEE shall constitute supply of KNOW-HOW which is secret, substantial and identified as being secret and substantial and that Know-How Royalties due under this Paragraph 3.03, subject to Paragraph 3.05, shall be payable on NET SALES of VACCINE which contains such strain(s) or any strain derived therefrom.

3.04 LICENSEE's royalty obligations under Paragraph 3.02 shall become effective in each country in the TERRITORY, on a country-by-country basis, at such time as there is a VALID CLAIM in such country covering the VACCINE sold and shall be applicable until expiry of the last remaining PATENT in such country. In the event that any THIRD PARTY initiates any legal or administrative proceedings challenging the validity, scope or enforceability of a PATENT in any country in the TERRITORY and a THIRD PARTY sells a Competitive Vaccine in such

/*/ Confidential material omitted and filed separately with the Securities and Exchange Commission.

country, then the Patent Royalties on NET SALES pursuant to Paragraph 3.02 in such country shall be suspended during pendency of the proceedings while such Competitive Vaccine is sold in such country and a Know-How Royalty calculated pursuant to Paragraph 3.03 shall be due instead for the period specified in Paragraph 3.05 with the Know-How Royalty being [*]. If the validity, scope and enforceability of claims in the PATENT which cover VACCINE are upheld by a court or other legal or administrative tribunal from which no appeal is or can be taken, then the amount of Patent Royalties which would have been due during the period of suspension, less any amount of paid Know-How Royalties, shall be promptly paid with interests, the interest rate being the Interbank Bank of America base rate. If the claims in the PATENT which cover VACCINE are held to be invalid or otherwise unenforceable by a court or other legal or administrative tribunal from which no appeal is or can be taken then LICENSOR shall retain the Know-How Royalties paid under this Paragraph 3.04 and no further royalties under Paragraph 3.02 shall be owed in such country provided that in the event LICENSEE has paid to LICENSOR a Know-How royalty pursuant to this Paragraph 3.04 after the expiration of the period specified in Paragraph 3.05, the amount of such Know-How Royalties paid by LICENSEE shall be promptly reimbursed by LICENSOR to LICENSEE with interests.

3.05 LICENSEE's Know-How Royalty obligations under Paragraph 3.03 shall be effective, on a country-by-country basis, for a period of ten (10) years from LICENSEE's first commercial sale of VACCINE as part of a nationwide introduction of VACCINE in such country of the TERRITORY.

3.06 In the event the only remaining patent protection afforded to a PRODUCT in any country of the TERRITORY where it is sold is a SPC, LICENSEE shall pay to LICENSOR a royalty on NET SALES in that country at the applicable Patent Royalty rate pursuant to Paragraph 3.02 if LICENSEE does not face competition from a Competitive Vaccine with respect to VACCINE in that country and at the applicable Know-How royalty rate pursuant to Paragraph 3.03 if LICENSEE does face competition from a Competitive Vaccine with respect to VACCINE in that country.

/*/ Confidential material omitted and filed separately with the Securities and Exchange Commission.

3.07 In the event that LICENSOR secures rights to any live attenuated Rotavirus strain(s) other than the Rotavirus 89.12 strain which LICENSEE considers is(are) useful or necessary for VACCINE, LICENSOR shall, at LICENSEE's sole option, transfer such other live attenuated Rotavirus strain(s) to LICENSEE with unrestricted rights to use such strain(s) whereupon LICENSEE shall contribute to [*] of the procurement costs of LICENSOR.

In the event that LICENSOR is offered a license to improvements on Inventions (as defined in the Gamble Agreement) under paragraph 2.5 of the Gamble Agreement, LICENSOR shall notify LICENSEE forthwith and provide all information with respect thereto received by LICENSOR. If requested in writing by LICENSEE, LICENSOR shall exercise the option provided that LICENSEE pays the costs and expenses thereof. Any licensing rights obtained by LICENSOR as a result of the exercise of the option upon LICENSEE's request shall automatically be included in the license granted to LICENSEE hereunder. Any costs and expenses paid by LICENSEE in relation to the exercise of the option for licensing rights to improvements on Inventions shall be fully creditable against any royalties paid hereunder.

4. COMPULSORY LICENSES, BLOCKING PATENTS AND OTHER ROTAVIRUS ANTIGENS

4.01 In the event that a governmental agency in any country or territory grants or compels LICENSOR or LICENSEE to grant a license under PATENTS and/or KNOW-HOW to any THIRD PARTY for any vaccine(s) that compete(s) with VACCINE sold by LICENSEE, LICENSEE shall have the benefit in such country or territory of the terms granted to such THIRD PARTY to the extent that such terms as a whole are more favourable to the THIRD PARTY than those granted to LICENSEE under this Agreement.

4.02 The parties recognize that BLOCKING PATENTS may exist. If at any time during the term of this Agreement LICENSEE, in its sole discretion, deems it necessary to seek a license under any BLOCKING PATENT(S) from any THIRD PARTY in order to practice the rights and licenses granted by LICENSOR to LICENSEE hereunder in any particular country(ies), [*]

/*/ Confidential material omitted and filed separately with the Securities and Exchange Commission.

4.03 In the event that Rotavirus antigens (other than Rotavirus antigens produced from strain 89.12 or derivatives thereof) are required to provide and/or to increase protection against any specific Rotavirus serotype, the royalties payable to LICENSOR pursuant to Paragraph 3.02 or pursuant to Paragraph 3.03, as appropriate, shall be reduced by [*].

4.04 In no event shall the combined royalty reductions and deductions pursuant to Paragraphs 4.02 and 4.03 cause the level of royalties otherwise due to LICENSOR pursuant to Paragraph 3.02 or pursuant to Paragraph 3.03, as appropriate, to be reduced by [*] with respect to any VACCINE in any country for any calendar quarter.

5. DEVELOPMENT AND MILESTONES

5.01 Subject to the provisions of Paragraph 5.02 below, LICENSEE will, in accordance with LICENSEE's reasonable business and scientific judgement, exercise its reasonable efforts and diligence in developing VACCINE and in undertaking investigations and actions required to obtain appropriate governmental approvals to market VACCINE in at least the MAJOR MARKETS and in commercialising VACCINE in such MAJOR MARKETS. All such activity shall be undertaken at LICENSEE's expense. At LICENSEE's request and expense, LICENSOR shall supply LICENSEE with reasonable technical assistance in undertaking such investigations and actions.

5.02 The parties shall institute a development program with the objective of advancing VACCINE to commercial launch. The responsibilities of the parties shall be as follows:

/*/ Confidential material omitted and filed separately with the Securities and Exchange Commission.

(a) FIRST PHASE

LICENSOR has initiated a Phase II clinical trial to demonstrate proof of concept of VACCINE and shall complete such trial at LICENSOR's cost and expense. The parties shall agree on acceptable end points concerning immunogenicity, safety and efficacy for proof of concept which end points shall be attached hereto as Appendix C and the meeting of such end points shall establish proof of concept.

In parallel with said Phase II trial, LICENSEE shall at its expense perform feasibility studies to produce VACCINE with a commercial cell line. The feasibility studies will have the purpose of (i) demonstrating that a commercially viable yield is obtainable from the chosen cell line(s), (as defined in Appendix D attached hereto) and (ii) subject to prior successful completion of (i), optimizing the manufacturing process, and, if necessary and feasible, producing GMP commercial products for use in a Phase III clinical study and in Phase II/III bridging studies.

(b) MILESTONE - PHASE II/MANUFACTURING

Contingent upon (i) LICENSOR establishing proof of concept under Paragraph 5.02 (a) and (ii) LICENSEE demonstrating that VACCINE can be produced in commercially viable yields under Paragraph 5.02 (a) LICENSEE shall pay LICENSOR a development milestone fee of [*] unless LICENSEE notifies LICENSOR in writing that LICENSEE has decided not to pursue the development of VACCINE within sixty (60) days after successful completion of first phase by both parties.

If however LICENSOR is not able to demonstrate satisfactory proof of concept at the end of Phase II trial and/or LICENSEE cannot demonstrate in accordance with Paragraph 5.02 (a) within six (6) months after proof of concept in the Phase II trial that a commercially viable yield can be obtained, then the parties shall negotiate in good faith to determine whether further joint development is warranted and, if no agreement can be reached, this Agreement may be terminated at the option of LICENSEE if LICENSOR has

/*/ Confidential material omitted and filed separately with the Securities and Exchange Commission.

been unable to demonstrate satisfactory proof of concept at the end of Phase II trial and at the option of LICENSOR if LICENSEE has been unable to demonstrate that a commercially viable yield can be obtained.

(c) MILESTONE - PHASE III/TRIAL INITIATION

Contingent upon satisfactory completion of the Phase II clinical and manufacturing milestone in accordance with Paragraph 5.02 (b), LICENSEE shall prepare a clinical development plan and discuss the suitability of such plan with the FDA and shall exert reasonable efforts to obtain FDA's approval of such plan under an IND within a reasonable timeframe to be agreed upon in good faith between the parties.

If LICENSEE, after discussion with the FDA, is satisfied with the economics of such plan and decides to advance to pivotal Phase III, it shall at its expense conduct a pivotal Phase III clinical trial. LICENSOR shall be consulted in the design of such trial and shall participate in the running of the trial but LICENSEE shall exercise the ultimate control and management of the trial.

Upon initiation of the Phase III clinical study under an IND the design of which has been discussed with and approved by the FDA, LICENSEE shall pay LICENSOR a second milestone fee of [*].

If LICENSEE, after discussion with the FDA, is not satisfied with the economics of such plan and decides to discontinue the VACCINE development, the second milestone fee shall not be due.

However, should LICENSEE decide to conduct the Phase III clinical study with, and pursue the development of, VACCINE in a MAJOR MARKET of Europe rather than in the USA, the second milestone fee shall be reduced to [*].

/*/ Confidential material omitted and filed separately with the Securities and Exchange Commission.

(d) MILESTONE - PHASE III/COMPLETION

Provided that the pivotal Phase III study on completion provides satisfactory results that in LICENSEE's opinion can be used for submission of a registration file in a MAJOR MARKET, then LICENSEE shall pay LICENSOR a third milestone fee of [*]. In the event that the results of the Phase III study are not acceptable for registration purpose, such third milestone fee shall be payable only when a regulatory submission is first made in a MAJOR MARKET.[*]

(e) REGISTRATION MILESTONE

LICENSEE shall pay a milestone fee of [*]

5.03 LICENSEE shall report to LICENSOR on the status and progress of LICENSEE's efforts to develop and commercialise VACCINE at such times and in such manner as LICENSOR may reasonably request.

5.04 LICENSOR shall provide to LICENSEE, at LICENSEE's request and expense, technical assistance within its area of expertise concerning development, production and commercialisation of VACCINE. Provision of such technical assistance shall include, but not be limited to, visits by LICENSOR personnel to LICENSEE and visits by LICENSEE personnel to LICENSOR at times and for periods of time upon which the parties will agree.

5.05 In the event that LICENSEE's development of VACCINE is terminated at any time under the provisions of this Section 5 other than for failure by LICENSOR to establish satisfactory proof of concept, LICENSEE shall, to the extent that it is allowed and free to do so, grant LICENSOR a license under its manufacturing

/*/ Confidential material omitted and filed separately with the Securities and Exchange Commission.

technology specific for VACCINES in exchange for a reasonable compensation to be discussed and agreed upon in good faith by the parties.

In the event LICENSEE, at its sole option, elects not to market VACCINE itself or through its AFFILIATES in any MAJOR MARKET(S), LICENSEE shall give LICENSOR a first option for the grant of marketing sub-licensing rights in any such MAJOR MARKET upon terms and conditions to be negotiated and agreed upon in good faith by the parties.

In the event LICENSEE, at its sole option, elects not to market VACCINE itself or through its AFFILIATES and/or sublicensees in any MAJOR MARKET(S), the rights and licenses granted to LICENSEE under this Agreement shall be terminated with respect to any such MAJOR MARKET(S).

6. EXCHANGE OF INFORMATION AND CONFIDENTIALITY

6.01 During the term of this Agreement, LICENSOR shall promptly disclose to LICENSEE and/or supply LICENSEE with all KNOW-HOW. LICENSOR shall not be authorized to make any publication with respect to the KNOW-HOW nor disclose it to any THIRD PARTY provided that, LICENSOR shall, upon LICENSEE's prior consent in writing which consent shall not be unreasonably withheld, be authorized to publish the data from the Phase II clinical trial referred to in Paragraph 5.02 hereof and prior studies and, without consent, be authorized to disclose KNOW-HOW to its licensor as per the Gamble Agreement.

6.02 During the term of this Agreement, the parties shall promptly inform each other of any information that a party obtains or develops regarding the utility and safety of VACCINE and shall promptly report to the other party any confirmed information of serious or unexpected reactions or side effects related to the utilisation or medical administration of VACCINE.

6.03 During the term of this Agreement and for seven (7) years thereafter, irrespective of any termination earlier than the expiration of the term of this Agreement, LICENSOR and LICENSEE shall not reveal or disclose to THIRD PARTIES any confidential information received from the other party without first obtaining the written consent of the disclosing party, except as may be required for purposes of investigating, developing, manufacturing or marketing VACCINE

or for securing essential or desirable authorisations, privileges or rights from governmental agencies, or is required to be disclosed to a governmental agency, or is necessary to file or prosecute patent applications concerning VACCINE or to carry out any litigation concerning VACCINE provided that in each case the disclosing party exerts best efforts to maintain the confidentiality thereof under such circumstances and notifies the owner of the confidential information prior to any such disclosure. This confidentiality obligation shall not apply to such information which is or becomes a matter of public knowledge, or is already in the possession of the receiving party, or is disclosed to the receiving party by a THIRD PARTY having the right to do so, or is subsequently and independently developed by employees of the receiving party or AFFILIATES thereof who had no knowledge of the confidential information disclosed. The parties shall take reasonable measures to assure that no unauthorised use or disclosure is made by others to whom access to such information is granted.

6.04 Nothing herein shall be construed as preventing a party hereto from disclosing any information received from the other party to an AFFILIATE, sublicensee, distributor or to a THIRD PARTY as may be required for purposes of investigating, developing, manufacturing or marketing VACCINE, provided such AFFILIATE, sublicensee, distributor or THIRD PARTY has undertaken a similar obligation of confidentiality with respect to the disclosed confidential information.

6.05 All confidential information disclosed by one party to the other shall remain the intellectual property of the disclosing party. In the event that a court or other legal or administrative tribunal, directly or through an appointed master, trustee or receiver, assumes partial or complete control over the assets of a party to this Agreement based on the insolvency or bankruptcy of such party, the bankrupt or insolvent party shall promptly notify the court or other tribunal (i) that confidential information received from the other party under this Agreement remains the property of the other party and (ii) of the confidentiality obligations under this Agreement. In addition, the bankrupt or insolvent party shall, to the extent permitted by law, take all steps necessary or desirable to maintain the confidentiality of the other party's confidential information and to insure that the court, other tribunal or appointee maintains such information in confidence in accordance with the terms of this Agreement.

6.06 No public announcement or other disclosure to THIRD PARTIES concerning the existence of or the terms of or the subject matter covered by this Agreement

shall be made, either directly or indirectly, by any party to this Agreement, without first obtaining the approval of the other party and agreement upon the nature and text of such announcement or disclosure. The party desiring to make any such public announcement or other disclosure shall inform the other party of the proposed announcement or disclosure in reasonable sufficient time prior to public release, and shall provide the other party with a written copy thereof, in order to allow such other party to comment upon such announcement or disclosure. If such public announcement or other disclosure is required under securities laws or rules or pursuant to a public or private financing the concerned party needs not obtain the consent of the other party but shall provide the other party with a five (5) working days notice allowing the other party to review and comment upon such proposed disclosure and/or announcement and such other party shall cooperate fully with the concerned party with respect to all disclosures regarding this Agreement to the United States Securities Exchange Commission and any other governmental or regulatory agencies, including requests for confidential treatment of proprietary information of either party included in any such disclosure.

6.07 Neither LICENSEE nor LICENSOR shall submit for written or oral publication any manuscript, abstract or the like which includes data or other information generated and provided by the other party without first obtaining the prior written consent of the other party, which consent shall not be unreasonably withheld. The contribution of each party shall be noted in all publications or presentations by acknowledgement or coauthorship, whichever is appropriate.

7. PATENT PROSECUTION AND LITIGATION

7.01 LICENSOR, or any entity having granted or granting rights to LICENSOR, shall be responsible for the filing, prosecution and maintenance of PATENTS which, subject to Paragraph 7.02, shall be at the cost and expense of LICENSOR (or the entity having granted or granting rights to LICENSOR). LICENSOR shall disclose to LICENSEE the complete texts of all patent applications within PATENTS as well as all information received concerning the institution or possible institution of any interference, opposition, re-examination, reissue, revocation, nullification or any official proceedings involving a PATENT anywhere in the TERRITORY. LICENSEE shall have the right to review all such pending applications and other proceedings and to make comments and/or recommendations to LICENSOR concerning them and their conduct and

LICENSOR shall consider, in good faith, all such LICENSEE's comments and/or recommendations. LICENSOR agrees to keep LICENSEE promptly and fully informed of the course of patent prosecution or other proceedings including by providing LICENSEE with copies of substantive communications, search reports and THIRD PARTY observations submitted to or received from patent offices throughout the TERRITORY. LICENSOR shall provide such patent consultation to LICENSEE at no cost to LICENSEE. LICENSEE shall hold all information disclosed to it under this section as confidential subject to the provisions of Paragraphs 6.03 and 6.04.

7.02 LICENSOR shall notify LICENSEE in sufficiently reasonable time in advance of any PATENT or subject matter or claim contained in PATENT which LICENSOR intends to abandon or otherwise cause or allow to be forfeited and LICENSEE shall have the right to assume responsibility for filing, prosecution and maintenance of any such PATENT or subject matter or claim contained in PATENT at LICENSEE's expense provided LICENSOR has the right to permit LICENSEE to assume such responsibility.

7.03 In the event of the institution of any suit by a THIRD PARTY against LICENSOR, LICENSEE or its AFFILIATES or sublicensees for patent infringement involving the manufacture, use, sale, distribution or marketing of VACCINE anywhere in the TERRITORY, the party sued shall promptly notify the other party in writing. Subject to Section 21 below, LICENSEE shall have the right but not the obligation to defend such suit at its own expense. LICENSOR and LICENSEE shall reasonably assist one another and cooperate in any such litigation at the other's request without expense to the requesting party.

7.04 In the event that LICENSOR or LICENSEE becomes aware of actual or threatened infringement of a PATENT anywhere in the TERRITORY, that party shall promptly notify the other party in writing. LICENSEE shall have the first right but not the obligation to bring, at its own expense, an infringement action against any THIRD PARTY and to use LICENSOR's name in connection therewith. If LICENSEE does not commence a particular infringement action within ninety (90) days, LICENSOR, after notifying LICENSEE in writing, shall be entitled, but not obligated, to bring such infringement action at its own expense. The party conducting such action shall have full control over its conduct, including settlement thereof provided that LICENSEE shall not take any steps, including settlement, which would have an adverse effect on PATENTS unless LICENSOR's consent is obtained. In any event, LICENSOR and LICENSEE

shall reasonably assist one another and cooperate in any such litigation at the other's request without expense to the requesting party.

7.05 LICENSOR and LICENSEE shall recover their respective actual out-of-pocket expenses, or equitable proportions thereof, associated with any litigation or settlement thereof, from any recovery made by any party. Any excess amount shall before the party which has conducted the litigation or settlement thereof.

7.06 The parties shall keep one another informed of the status of and of their respective activities regarding any litigation or settlement thereof concerning VACCINE.

7.07 LICENSOR shall authorise LICENSEE to act as LICENSOR's agent for the purpose of making any application for any extensions of the term of PATENTS, including SPC, and shall provide reasonable assistance therefor to LICENSEE, at LICENSEE's expense. (In the United States of America as permitted under Title 35 of the United States Code).

7.08 LICENSOR, on behalf of itself, its officers, agents and successors hereby waives any and all actions and causes of action, claims and demands whatsoever in law or equity of any kind against LICENSEE'S and its AFFILIATES' exercize of LICENSEE's rights under Paragraphs 7.02 and 7.07, and, subject to LICENSEE's obligations under Paragraph 7.04, against LICENSEE's and its AFFILIATES' exercize of LICENSEE's rights under Paragraph 7.04.

8. TRADEMARKS

8.01 LICENSEE, at its expense, shall be responsible for the selection, registration and maintenance of all trademarks which it employs in connection with VACCINE and COMBINATION and shall own and/or control such trademarks. Nothing in this Agreement shall be construed as a grant of rights, by license or otherwise, to LICENSOR to use such trademarks for any purpose.

9. STATEMENTS AND REMITTANCES

9.01 LICENSEE shall keep and require its AFFILIATES and sublicensees to keep complete and accurate records of all sales of VACCINE and COMBINATION under the licenses granted herein. LICENSOR shall have the right, at LICENSOR's expense, through a certified public accountant or like person reasonably acceptable to LICENSEE, to examine such records during regular business hours during the life of this Agreement and for six (6) months after its termination; provided, however, that such examination shall not take place more often than once a year and shall not cover such records for more than the preceding two (2) years and provided further that such accountant shall report to LICENSOR only as to the accuracy of the royalty statements and payments. In the event that such inspection shall indicate in any calendar year that the royalties which should have been paid by LICENSEE are at least five percent (5%) greater than those which were actually paid by LICENSEE, then LICENSEE shall pay the cost of such inspection in addition to the underpaid royalties.

9.02 Within sixty (60) days after the close of each calendar quarter, LICENSEE shall deliver to LICENSOR a true accounting of all VACCINES and COMBINATION sold by LICENSEE, its AFFILIATES and its sublicensees during such quarter, and shall at the same time pay all royalties due. Such accounting shall show sales, NET SALES and deductions against royalties on NET SALES on a country-by-country and product-by-product basis.

9.03 Any tax paid or required to be withheld by LICENSEE on behalf of LICENSOR on account of royalties payable to LICENSOR under this Agreement shall be deducted from the amount of royalties otherwise due. LICENSEE shall secure and send to LICENSOR proof of any such taxes withheld and paid by LICENSEE or its sublicensees for the benefit of LICENSOR.

9.04 All royalties due under this Agreement shall be payable in United States Dollars. Monetary conversions from the currency of a foreign country in which VACCINE is sold into US currency shall be made at the exchange rate in force on the last business day of the period for which the royalties are being paid as published by Banque Generale de Belgique, Brussels, Belgium, or on another basis mutually agreed to by both parties in writing.

10. TERM AND TERMINATION

10.01 Unless otherwise terminated, this Agreement shall expire upon the expiration, lapse or invalidation of the last remaining PATENT in the TERRITORY. Expiration of this Agreement under this provision shall not preclude LICENSEE from continuing to market VACCINE and to use KNOW-HOW without any further royalty or other payments to LICENSOR.

10.02 If either party fails or neglects to perform covenants or provisions of this Agreement and if the party in default has not corrected such default within sixty (60) days (the period shall be thirty (30) days for a payment default) after receiving written notice from the other party with respect to such default, such other party shall have the right to terminate this Agreement by giving written notice to the party in default provided the notice of termination is given within six (6) months of the default and prior to correction of the default. If the default other than a payment default is not curable in sixty (60) days and the defaulting party in good faith notifies the other party in writing prior to the sixty (60) days that it is initiating cure of the default and initiates cure of such default within the sixty (60) days and in good faith continues to attempt to cure the default, and in fact cures the default within one hundred and twenty (120) days, then this Agreement shall not be terminable hereunder.

10.03 LICENSEE may terminate this Agreement in its entirety or with respect to any country by giving LICENSOR at least three (3) months prior written notice thereof.

10.04 Either party may terminate this Agreement if, at any time, the other party shall file in any court or agency pursuant to any statute or regulation of (the United States or of) any (individual) state or (foreign) country, a petition in bankruptcy or insolvency or for reorganisation or for an arrangement or for the appointment of a receiver or trustee of the party or of its assets, or if the other party proposes a written agreement of composition or extension of its debts, or if the other party shall be served with an involuntary petition against it, filed in any insolvency proceeding, and such petition shall not be dismissed with sixty (60) days after the filing thereof, or if the other party shall propose or be a party to any dissolution or liquidation, or if the other party shall make an assignment for the benefit of creditors.

10.05 Notwithstanding the bankruptcy of LICENSOR, or the impairment of performance by LICENSOR of its obligations under this Agreement as a result of bankruptcy or insolvency of LICENSOR, LICENSEE, if it has not then been notified for breach by LICENSOR, shall be entitled to retain the licenses granted herein, subject to LICENSOR's right to terminate this Agreement for reasons other than bankruptcy or insolvency as expressly provided in this Agreement.

10.06 LICENSEE shall be entitled to terminate this Agreement by written notice to LICENSOR in the event of change of control of LICENSOR, provided such notice is given within thirty (30) days after LICENSOR has notified LICENSEE of such change of control or after the date which LICENSOR can demonstrate is the date on which LICENSEE has been otherwise informed of such change of control.

11. RIGHTS AND DUTIES UPON TERMINATION

11.01 Upon termination of this Agreement, LICENSOR shall have the right to retain any sums already paid by LICENSEE hereunder, and LICENSEE shall pay all sums accrued hereunder which are then due.

11.02 Upon termination of this Agreement in its entirety or with respect to any country under Paragraph 10.02, 10.03 or 10.04, LICENSEE shall notify LICENSOR of the amount of VACCINE LICENSEE and its AFFILIATES, sublicensees and distributors then have on hand, the sale of which would, but for the termination, be subject to royalty, and LICENSEE and its AFFILIATES, sublicensees and distributors shall thereupon be permitted to sell that amount of VACCINE provided that LICENSEE shall pay the royalty thereon at the time herein provided for.

11.03 Termination of this Agreement shall terminate all outstanding obligations and liabilities between the parties arising from this Agreement except those described in Paragraphs 2.03, 6.03, 6.04, 6.05, 6.06, 6.07, 7.03, 7.06, 7.08, 8.01, 9.01, 9.02, 9.03, 9.04, 9.05, 11.01, 11.02, 11.03, 14.01, 15.01, 18.01, 20.01 and 21.01.

11.04 Upon termination of this Agreement by LICENSOR pursuant to Paragraph 10.02 for breach of LICENSEE, LICENSEE agrees not to use KNOW-HOW and/or

PATENTS for the research, development, making, using or selling of any product or process, including, but not limited to, VACCINES.

12. WARRANTIES AND REPRESENTATIONS

12.01 LICENSOR warrants that it has the right to grant the rights and licences under PATENTS and KNOW-HOW as provided throughout this Agreement including, but not limited to, the Rotavirus 89.12 strain and that it has the right to enter into this Agreement.

12.02 Nothing in this Agreement shall be construed as a warranty that PATENTS are valid or enforceable or that their exercise does not infringe any patent rights of THIRD PARTIES. Without having made an investigation or search, LICENSOR hereby warrants and represents that it has no present knowledge from which it can be inferred that PATENTS are invalid or that their exercise would infringe patent rights of THIRD PARTIES or that the Rotavirus 89.12 strain or the use thereof in VACCINE infringes any patent rights of THIRD PARTIES. Subject to other provisions contained herein, a holding of invalidity or unenforceability of any PATENT, from which no further appeal is or can be taken, shall not affect any obligation already accrued hereunder, but shall only eliminate royalties otherwise due under such PATENT from the date such holding becomes final.

12.03 LICENSOR acknowledges that, in entering into this Agreement, LICENSEE has relied upon technical and clinical information and KNOW-HOW disclosed and/or supplied by or on behalf of LICENSOR and that LICENSEE has relied upon LICENSOR's obligation to disclose and/or supply further information pursuant to Paragraph(s) 6.01 and/or 6.02 hereof. LICENSOR warrants and represents that LICENSOR has no knowledge that the technical and/or clinical information and/or KNOW-HOW disclosed and/or supplied to LICENSEE prior to the date of this Agreement is inaccurate in any material respect. LICENSOR warrants and represents that it will use its reasonable efforts to review the technical and/or clinical information and/or KNOW-HOW to be disclosed and/or supplied to LICENSEE under Paragraph(s) 6.01 and/or 6.02 hereof after the date of this Agreement for any inaccuracies therein and that, to the extent LICENSOR has any knowledge of any material inaccuracies in such technical and/or clinical information and/or KNOW-HOW, it shall inform LICENSEE of such inaccuracies. LICENSOR and LICENSEE warrant and represent to each other that they have not, up to the date of this Agreement, omitted to disclose and/or supply to each

other any information known to them concerning VACCINE or the transactions contemplated by this Agreement which would, to the best of their knowledge, be material to the other's decision to enter into this Agreement and to undertake the commitments and obligations set forth herein.

12.04 LICENSOR warrants and represents that it has no present knowledge of the existence of any pre-clinical or clinical data or information concerning VACCINE which suggests that there may exist toxicity, safety and/or efficacy concerns which may materially impair the utility and/or safety of VACCINE.

13. FORCE MAJEURE

13.01 If the performance of any part of this Agreement by either party, or of any obligation under this Agreement other than a payment provision, is prevented, restricted, interfered with or delayed by reason of any cause beyond the reasonable control of the party liable to perform, unless conclusive evidence to the contrary is provided, the party so affected shall, upon giving written notice to the other party, be excused from such performance to the extent of such prevention, restriction, interference or delay, provided that the affected party shall use its reasonable best efforts to avoid or remove such causes of non-performance and shall continue performance with the utmost dispatch whenever such causes are removed. When such circumstances arise, the parties shall discuss what, if any, modification of the terms of this Agreement may be required in order to arrive at an equitable solution. In the event agreement is not reached or the force majeure event cannot be cured within six (6) months, the other party shall have the right to terminate this Agreement by serving a written notice to the party affected by the force majeure event.

14. GOVERNING LAW

14.01 This Agreement shall be deemed to have been made in the United States of America and its form, execution, validity, construction and effect shall be determined in accordance with the laws of the Commonwealth of Massachusetts, USA, without regard to its choice of law principles.

15. RESOLUTION OF DISPUTES

15.01 Prior to initiating legal action, the parties agree to attempt to settle any dispute by discussions between the parties, provided, however that this Paragraph 15.01 shall not prevent either party from seeking injunctive relief where necessary. If the parties have not resolved the dispute amicably, legal action may be introduced.

16. SEPARABILITY

16.01 In the event any portion of this Agreement shall be held illegal, void or ineffective, the remaining portions hereof shall remain in full force and effect.

16.02 If any of the terms or provisions of this Agreement are in conflict with any applicable statute or rule of law, then such terms or provisions shall be deemed inoperative to the extent that they may conflict therewith and shall be deemed to be modified to conform with such statute or rule of law.

16.03 In the event that the terms and conditions of this Agreement are materially altered as a result of Paragraphs 16.01 or 16.02, the parties will renegotiate the terms and conditions of this Agreement to resolve any inequities.

17. ENTIRE AGREEMENT

17.01 This Agreement, entered into as of the date first written above, constitutes the entire agreement between the parties relating to the subject matter hereof and supersedes all previous writings and understandings. No terms or provisions of this Agreement shall be varied or modified by any prior or subsequent statement, conduct or act of either of the parties, except that the parties may amend this Agreement by written instruments specifically referring to and executed in the same manner as this Agreement.

18. NO WAIVER

18.01 The failure of either party at any time to exercise any of their respective rights under this Agreement shall not be deemed a waiver thereof, nor shall such failure in any way prevent either party, as the case may be, from subsequently asserting or exercising such rights.

19. NOTICES

19.01 Any notice required or permitted under this Agreement shall be sent by certified mail, return receipt requested, postage pre-paid to the following addresses of the parties:

if to LICENSOR:
Virus Research Institute, Inc.,
61 Moulton Street
Cambridge, MA 02138,
USA
Attention: President

cc: Elliot M. Olstein, Esq.
Carella, Byrne, Bain, Gilfillan, Cecchi,
Stewart & Olstein
6 Becker Farm Road
Roseland, New Jersey 07068
USA

if to LICENSEE:

SmithKline Beecham P.L.C.
New Horizons Court
Brentford
Middlesex TW8 9EP
United Kingdom

with a copy to :
SmithKline Beecham Biologicals Manufacturing
S.A.
rue de l'Institut 89

1330 Rixensart, Belgium
Attention : Senior Vice President,
General Manager

19.02 Any notice required or permitted to be given concerning this Agreement shall be effective upon receipt by the party to whom it is addressed.

20. ASSIGNMENT

20.01 Without prejudice to Paragraph 10.06, this Agreement and the licenses herein granted shall be binding upon and inure to the benefit of the successors in interest of the respective parties. Neither this Agreement nor any interest hereunder shall be assignable by either party without the written consent of the other provided, however, that LICENSEE may, without the consent of LICENSOR, assign this Agreement to any AFFILIATE or to any corporation with which it may merge or consolidate or to which it may sell all or substantially all of its assets, and that LICENSOR may without obtaining the consent of LICENSEE assign this Agreement to any corporation with which it may merge or consolidate or to which it may sell all or substantially all of its assets.

20.02 In the event of a permitted assignment hereunder the assignee must accept in writing the obligations of this Agreement, whereupon the assignor shall be relieved of its obligations under this Agreement.

21. INDEMNIFICATION

21.01(a) LICENSEE agrees to defend, indemnify and hold harmless LICENSOR, its AFFILIATES and any of their licensors that have granted a license under which LICENSEE has received a license under this Agreement as well as each of their respective directors, officers, employees, shareholders, and agents (hereinafter individually and collectively referred to as "Indemnitee") against any and all actions, claims (specifically including, but not limited to, any damages based on product liability claims), suits, losses, demands, judgments, and other liabilities (including attorneys' fees until LICENSEE assumes the defense as described below) asserted by THIRD PARTIES, government and non-government, resulting from or arising out of the manufacture, use or sale of VACCINES by LICENSEE, its AFFILIATES or sublicensees provided however that LICENSEE's indemnification to an

Indemnitee hereunder shall not apply to any liability, damage, loss or expense to the extent that it is directly or indirectly attributable to the gross negligence or intentional misconduct of such Indemnitee. If any such claims or actions are made, Indemnitee shall be defended at LICENSEE's sole expense by counsel selected by LICENSEE and reasonably acceptable to LICENSOR; provided that LICENSOR may, at its own non-refundable expense, also be represented by counsel of its own choosing.

(b) Any such Indemnitee shall notify LICENSEE promptly of any claim or threatened claim under this Section 21, shall fully cooperate with all reasonable requests of LICENSEE with respect thereto, and shall give LICENSEE the right to control the defence and settlement of any such claim provided such Indemnitee shall be fully indemnified under this Section 21.

(c) The provision of this Section 21 shall apply whether or not an act or claim is rightly brought or asserted.

IN WITNESS WHEREOF, the parties, through their authorised officers, have executed this Agreement as of the date first written above.

VIRUS RESEARCH INSTITUTE Inc.

/s/ William A. Packer

BY: WILLIAM A. PACKER
TITLE: PRESIDENT

SMITHKLINE BEECHAM P.L.C.

/s/ Jean Stephenne

BY: JEAN STEPHENNE
TITLE: Senior Vice President, General Manager

APPENDIX A

PATENT INFORMATION

[*]

/*/ Confidential material omitted and filed separately with the Securities and Exchange Commission.

APPENDIX B

VRI PROPRIETARY INFORMATION AND KNOW-HOW,
89-12 ROTAVIRUS VACCINE
8 October 1997

[*]

/*/ Confidential material omitted and filed separately with the Securities and Exchange Commission.

CONFIDENTIAL TREATMENT

APPENDIX C

PHASE II CLINICAL ENDPOINTS

[*]

/*/ Confidential material omitted and filed separately with the Securities and Exchange Commission.

APPENDIX D

MANUFACTURING ENDPOINT

- - - Yield a minimum of 1 dose/ml

- - - This yield should be achieved in a cell line acceptable for commercial production and acceptable to regulatory authorities.

APPENDIX E

EXCERPTS OF LICENSE AND CLINICAL TRIALS AGREEMENT
DATED FEBRUARY 27, 1995 BETWEEN VIRUS RESEARCH INSTITUTE, INC AND JAMES N. GAMBLE INSTITUTE OF MEDICAL RESEARCH

2.4 (a)

(b)

(c) VRI agrees to forward to GAMBLE a copy of any and all fully executed sublicense agreements within thirty (30) days of execution thereof, and further agrees to forward to Gamble annually a copy of such reports received by VRI from its Sublicensee during the preceding twelve (12) month period under the sublicenses as shall be pertinent to a royalty accounting under said sublicense agreements. VRI may delete from copies of sublicense agreements provided to GAMBLE hereunder commercial, research and development, manufacturing, financial and other provisions unrelated to VRI's or the Sublicensee's obligations to Gamble.

8. INDEMNIFICATION AND INSURANCE.

8.1 VRI shall defend, indemnify and hold harmless GAMBLE and its trustees, officers, medical and professional staff, employees, and agents and their respective successors, heirs and assigns against all losses, damages, expenses, including attorney's fees and against any claims, suits, actions, demands or judgments brought against any one or more of them, arising out of any theory of product liability (including, but not limited to, action in the form of tort, warranty, or strict liability) or negligence concerning any product, process or service made, used or sold pursuant to any right or license granted under this AGREEMENT. VRI shall have the right to control the defense settlement and/or compromise of any such claims or actions.

8.2 VRl's obligations under Section 8.1 above shall not apply to any liability, damage, loss or expense to the extent that it is directly attributable to the negligence or intentional misconduct of GAMBLE or any of its trustees, officers, medical and professional staff, employees, agents or their respective successors, heirs or assigns.

8.3 VRI shall add, at VRl's expense, GAMBLE as an additional insured on VRI's clinical trial insurance policy, which provides limits of liability of $2,000,000 per incident and aggregate, effective upon the Effective Date of this AGREEMENT, to provide insurance coverage for GAMBLE for the clinical trials.

8.4 VRI, at VRl's expense, shall maintain policies of comprehensive general liability insurance and will obtain product liability insurance in amounts not less than $1,000,000 per incident and $2,000,000 annual aggregate and shall add GAMBLE as an additional insured on VRI's policy, which provides such limits of liability. Such insurance shall provide (i) product liability coverage, (ii) negligence, and (iii) broad form contractual liability coverage, for VRI's indemnification under Section 8.1 of this AGREEMENT. The minimum amounts of insurance coverage required under these provisions shall not be construed to create a limit of VRI's liability with respect to VRI's indemnification obligation under Section 8.1 of this AGREEMENT. VRI shall maintain such comprehensive general liability insurance and product liability insurance beyond the expiration or termination of this AGREEMENT and for a reasonable period after the termination of the clinical trials, which in no event shall be less than fifteen (15) years after the clinical trials.

8.5 This Section 8 shall survive expiration or termination of this AGREEMENT.

10. CONFIDENTIALITY

10.1 CONFIDENTIAL INFORMATION. As used in this AGREEMENT, "Confidential Information" means all information transmitted by a party hereto or obtained by a party hereto in connection with the performance of the clinical trials and other services described in Section 3 hereof or of any such other services to be provided by the parties as described herein, subject to the exceptions specified below. "Confidential Information" means information of any type, not generally known, about the business, processes, services, products, suppliers, customers, clients or plans of GAMBLE or VRI ("the parties hereto") of any client of the parties hereto (regardless of whether the parties hereto have executed a confidentiality agreement with such customer), which is used or useful in the conduct of business of the parties hereto, or which confers or tends to confer a competitive advantage over one who does not possess such information. Such information includes, but is not limited to, information relating to trade secrets, Technical Information, patent applications, know-how, research, development, design, engineering, quality control or service techniques, information about existing, new or envisioned products, processes or services and their development, performance, scientific, engineering or technical information, laboratory notebooks, notes, computer programs, source codes, object codes, software manuals, sketches, drawings, reports, formulae, gels, slides, sequences, biological materials living or otherwise, photographs, negatives, prototypes, models, correspondence, and other documents and things, and information relating to purchasing, sales, marketing, licensing, contracts with third parties, and pricing, whether or not in writing and whether or not labeled or identified as confidential or proprietary. Confidential Information may be disclosed in writing or orally or may be obtained by observation or inspection. All data, materials, information, and records developed by a party hereto in the course of performing this AGREEMENT shall be considered Confidential Information. However, Confidential Information shall not include information that a party hereto can demonstrate: (i) is in or enters the public domain through no fault of such party; (ii) is disclosed to a party hereto by a third party entitled to disclose it; (iii) was known to a party hereto before the date of this AGREEMENT; OR (iv) is required by law to be disclosed, provided reasonable advance notice of such requirement is given to a party hereto before such disclosure.

10.2 CONFIDENTIALITY. Without prior written consent, the parties hereto will not disclose the other party's Confidential Information to any third party other than employees, agents or others of the parties hereto who must necessarily be informed thereof, but only if and to the extent that any such person has a need for such information. A party hereto will only use Confidential Information for the purpose of fulfilling its obligations under this AGREEMENT. The parties hereto agree that they will take such reasonable steps as may be necessary to prevent the disclosure or use of any such materials by their officers, employees or agents except as provided herein, including but not limited to obtaining and enforcing appropriate confidentiality agreements with such persons. All obligations of confidentiality and nondisclosure set forth in this AGREEMENT shall survive the termination or expiration of this AGREEMENT.

10.3 The parties agree that clinical trial data generated by GAMBLE under the terms of the AGREEMENT will not be published by VRI prior to its publication by GAMBLE's principal investigators. To the extent not published, the results of the clinical trials will be held in confidence by GAMBLE. Subject to the foregoing, VRI will have the unrestricted right to use or disclose such clinical trial data.

EXHIBIT 10.21

LICENSE AGREEMENT

This Agreement is made and entered into between President and Fellows of Harvard College (hereinafter HARVARD) having offices at the Office for Technology and Trademark Licensing, 124 Mt. Auburn Street, Suite 410 South, Cambridge, MA 02138 and Virus Research Institute (hereinafter LICENSEE), a corporation of Massachusetts, having offices at 61 Moulton Street, Cambridge, MA 02139.

Whereas HARVARD is the owner by assignment of the entire right, title and interest in a patent application [*] in the foreign patent applications corresponding, thereto, and in the inventions described and claimed therein and any patents issuing thereon:

Whereas HARVARD is committed to a policy that ideas or creative works produced at HARVARD should be used for the greatest possible public benefit; and

Whereas HARVARD accordingly believes that every reasonable incentive should be provided for the prompt introduction of such ideas into public use, all in a manner consistent with the public interest; and

Whereas LICENSEE is desirous of obtaining, an exclusive worldwide license in order to practice the above-referenced invention covered by PATENT RIGHTS in the United States and in certain foreign countries, and to manufacture, use and sell in the commercial market the products made in accordance therewith; and

Whereas HARVARD is desirous of granting a license to LICENSEE in accordance with the terms of this Agreement.

Now therefore, in consideration of the foregoing premises, the parties agree as follows:

ARTICLE I

DEFINITIONS

1.1 PATENT RIGHTS shall mean any and all patents or patent applications attached hereto in Appendix A, the inventions described and claimed therein, and any divisions, continuations, continuations-in-part directed to subject matter specifically described in the applications and patents listed in Appendix A, patents issuing thereon, foreign counterparts thereof or reissues or reexaminations thereof, which will

be automatically incorporated in and added to this Agreement and shall periodically be added to Appendix A and made a part thereof.

1.2 LICENSED PRODUCTS shall mean products which in the country where sold or manufactured are covered by (i) an issued, unexpired claim contained in PATENT RIGHTS which has not been declared invalid or unenforceable by a court of competent jurisdiction or administrative agency or (ii) a claim of a pending patent application of PATENT RIGHTS which application has been pending for a period of no more than five years including the pendency of any parent application in which the claim is supported. The period of pendency of a United States provisional application shall not be considered in determining such five (5) year period.

1.3 LICENSED PROCESSES shall mean processes which in the country where used are covered by (i) an issued, unexpired claim contained in PATENT RIGHTS which has not been declared invalid or unenforceable by a court of competent JURISDICTION OR administrative agency or (ii) a claim of a pending patent application of PATENT RIGHTS which application has been pending for a period of no more THAN FIVE YEARS including the pendency of any parent application in which the claim is supported. The period of pendency of a United States provisional application shall not be CONSIDERED IN determining such five (5) year period.

1.4 NET SALES means the total received by LICENSEE from sale of LICENSED PRODUCTS less transportation charges and insurance, sales taxes, use TAXES, EXCISE taxes, value added taxes, customs duties or other imports, to the extent itemized on invoice, normal and customary quantity and cash discounts (to THE EXTENT ALLOWED), allowances and credits on account of rejection or return of LICENSED PRODUCTS and rebates including but not limited to those REQUIRED BY A GOVERNMENT OR AGENCY THEREOF. In the event that a LICENSED PRODUCT includes, a component which has therapeutic and/or prophylactic activity ("Active Component(s)") covered by a PATENT RIGHT (Patented Component(s)) and Active Components not covered by a PATENT RIGHT (Unpatented Component(s)) (such PRODUCT being a Combined Product), then NET SALES shall be the amount which is normally received by LICENSEE FROM A SALE OF THE PATENTED Component(s) when sold separately in an arm's length transaction with an unaffiliated third party. If the Patented Component(s) are not sold SEPARATELY, THEN NET SALES upon which royalty is paid shall be the NET SALES of the Combined Produce multiplied by a fraction, the numerator of which is the cost for producing the Patented Components and the denominator of which is the cost for PRODUCING THE COMBINED Product.

1.5 AFFILIATES shall mean any company, corporation, or business (i) in which LICENSEE directly or indirectly owns or controls at least fifty percent (50%) of the VOTING STOCK, or (ii) which directly or indirectly owns or controls at least fifty percent (50%) of the voting stock of LICENSEE or (iii) the majority ownership of which is DIRECTLY or indirectly under common control with LICENSEE.

1.6 BIOLOGICAL MATERIAL shall mean the materials supplied by HARVARD (identified in Appendix B).

1.7 TECHNOLOGY shall mean any and all information or PATENT RIGHTS, or BIOLOGICAL MATERIAL supplied by HARVARD to LICENSEE.

1.8 The term "SUBLICENSEE" shall mean any non-AFFILIATE third party licensed by LICENSEE to make, have made, use or sell any product or use any process under PATENT RIGHTS.

1.9 NON-ROYALTY SUBLICENSE INCOME shall mean sublicense issue fees, sublicense maintenance fees, sublicense milestone payments other than those listed in Article 3.6, and similar lump-sum royalty payments made by SUBLICENSEES to LICENSEE on account of sublicenses pursuant to this Agreement but excluding any payments by SUBLICENSEES constituting (i) bona fide product research and development expenses and (ii) loans.

1.10 IMPROVEMENT INVENTIONS shall mean any inventions or discoveries that ENHANCE, substitute for, or are useful with the products, procedures or processes described in PATENT RIGHTS (and which are not included in PATENT RIGHTS) to the extent they are (i) dominated by any claims of a pending and/or issued patent or patent application which is then included in the PATENT RIGHTS, and HARVARD'S OWNERSHIP INTEREST in any United States or foreign patents and patent application thereon, and (ii) made (i.e., conceived and reduced to practice) by Dr. John Collier and/or Michael Starnbach solely or jointly with others directly supervised in their laboratories at Harvard Medical School.

ARTICLE II

GRANT

2.1 For the term of this Agreement, HARVARD hereby grants to LICENSEE and LICENSEE accepts, subject to the terms and conditions hereof, a worldwide license under PATENT RIGHTS and a worldwide license to use the BIOLOGICAL MATERIAL, to make and have made, to use and have used, to sell and have sold the LICENSED PRODUCTS, and to practice the LICENSED PROCESSES. SUCH LICENSE shall include the right to grant sublicenses. HARVARD agrees it will not grant licenses to others except as required or as permitted in paragraph 2.2 (b). To the extent required by an agreement with a government agency that funded research which LED TO PATENT RIGHTS, LICENSEE agrees during the period of exclusivity of this license in the United States that any LICENSED PRODUCT produced for sale in the United States will be manufactured substantially in the United States.

2.2 The granting and acceptance of this license is subject to the following conditions:

(a) HARVARD's "Statement of Policy in Regard to Inventions, Patents and Copyrights" dated March 17, 1986, Public Law 96-517, Public Law 98-620. Any right granted in this Agreement greater than that permitted under Public Law 96-517 or Public Law 98-620 shall be subject to modification as may be required to conform to the provisions of that statute.

(b) HARVARD's right to make and to use and to grant non-exclusive licenses to make and to use, for academic research purposes only and not for any commercial purpose, the subject matter described and claimed in PATENT RIGHTS, or the BIOLOGICAL MATERIAL.

2.3 HARVARD hereby grants to LICENSEE the right to extend the licenses granted or to be granted in paragraph 2.1 to an AFFILIATE subject to the terms and conditions hereof.

2.4 All rights reserved to the United States Government and others under Public Law 96-517 and 98-620 shall remain and shall in no way be affected by this Agreement.

2.5 LICENSEE has provided HARVARD with a development plan for developing and obtaining regulatory approval of the LICENSED PRODUCT selected BY LICENSEE, which development plan includes milestones.

LICENSEE shall exert reasonable efforts under THE CIRCUMSTANCES TO ACHIEVE SUCH milestones. In the event LICENSEE subsequently indicates in writing to HARVARD that such milestones cannot be met or fails to meet such milestones, LICENSEE shall promptly notify HARVARD, and LICENSEE and HARVARD shall promptly ENTER INTO good faith negotiations to reconsider such milestones. In the event that the parties cannot agree to the milestones within sixty (60) days after beginning good FAITH NEGOTIATIONS, THE matter shall be submitted to arbitration to determine the milestones and the time period therefor which should be met pursuant to this Section. THE ARBITRATOR IN SETTING AND determining milestones shall consider the state of technology; the efforts exerted by LICENSEE, the business circumstances of LICENSEE and the public INTEREST OBJECTIVES to HARVARD'S licensing program; and technical and regulatory problems. Thereafter, LICENSEE shall exert reasonable efforts to achieve such milestones.

In the event that LICENSEE cannot meet the milestones set by arbitration because of technological or regulatory problems, HARVARD shall not unreasonably deny an extension of time to meet the milestones, upon a showing by LICENSEE that it has made good faith reasonable efforts to meet the milestones.

If LICENSEE (i) fails to meet the milestones established by agreement of the parties and (ii) fails to obtain extensions of such milestones established by arbitration and (iii)

LICENSEE has not exerted good faith reasonable efforts to meet such milestones, as its sole and exclusive remedy HARVARD shall have the right to terminate or convert the licenses to non exclusive licenses by providing to LICENSEE sixty (60) days prior written notice.

LICENSEE shall ensure that for any PRODUCT being developed or commercialized by a SUBLICENSEE, such SUBLICENSEE shall assume the obligations imposed on LICENSEE under this paragraph.

The efforts of an AFFILIATE, SUBLICENSEE or collaborator of LICENSEE shall be considered as efforts of LICENSEE.

2.6 The above licenses to sell any LICENSED PRODUCT include the right of LICENSEE, its AFFILIATES, and SUBLICENSEES to grant to the purchaser thereof the right to use or resell such purchased LICENSED PRODUCT without payment of a further royalty.

2.7 HARVARD hereby grants to LICENSEE an exclusive option to negotiate an exclusive license to IMPROVEMENT INVENTIONS. It is the intent of the parties that such license shall be under substantially the same terms and conditions as this LICENSE AND THAT LICENSEE shall only be required to pay one royalty for each LICENSED PRODUCT. HARVARD shall notify LICENSEE promptly, in writing, of any IMPROVEMENT INVENTION, and LICENSEE shall notify HARVARD, in writing, within thirty (30) days after receipt of the written notification from HARVARD as to whether or not LICENSEE is exercising the option. If the option is not exercised within such thirty (30) day period, LICENSEE shall no longer have ANY RIGHTS TO THE IMPROVEMENT INVENTION as to which notice was received. If the option is exercised, the parties shall negotiate a license in accordance with this PARAGRAPH 2.7, in good faith, and if an agreement is not reached within six (6) months thereafter, the rights granted under this paragraph 2.7 with respect to SUCH IMPROVEMENT INVENTION shall terminate. If during such thirty (30) days or six month period, HARVARD desires to file a patent application with respect TO THE IMPROVEMENT INVENTION, LICENSEE shall bear the cost of filing thereof if LICENSEE still desires a license thereunder, provided that the filing of such patent APPLICATION IS NECESSITATED BY A BAR DATE or the parties have reached final agreement as to the financial terms of the license or LICENSEE has requested such filing.

ARTICLE III

ROYALTIES

3.1 LICENSEE shall pay to HARVARD a non-refundable license fee as follows: [*]

3.2 (a) LICENSEE shall pay HARVARD, during the term of the license granted in Section 2.1, (i) a running royalty of [*], and (ii) [*] of running royalties [*] received by LICENSEE or its AFFILIATES from a SUBLICENSEE for LICENSED PRODUCTS sold by a SUBLICENSEE.

(b) In the event that a sublicense agreement does not require a SUBLICENSEE to pay running royalties, LICENSEE shall pay HARVARD [*].

3.3 Beginning in calendar year 2005 and each calendar year thereafter, HARVARD shall have the right to terminate or render non-exclusive this license IN THE EVENT that LICENSEE does not pay to HARVARD at least [*] in ROYALTIES.

In the event that actual royalties are not at least equal to the above amounts for a specified calendar year, LICENSEE shall have the right to pay any DIFFERENCE BETWEEN such minimum amounts and the actual royalties paid in satisfaction of its obligations under this Agreement, which shall be due and payable within sixty (60) days of the end of the applicable calendar year.

3.4 In the event that LICENSEE is required to pay royalties to one or more third parties under patents other than PATENT RIGHTS COVERING LICENSED PRODUCTS OR LICENSED PROCESSES, LICENSEE shall be entitled to a credit against royalties due HARVARD in an amount equal to [*].

3.5 LICENSEE shall pay HARVARD the following amounts within sixty (60) DAYS AFTER THE following milestone is achieved by LICENSEE or its SUBLICENSEE for each LICENSED PRODUCT:

(i) [*]

(ii) [*]

/*/ Confidential material omitted and filed separately with the Securities and Exchange Commission.

(iii) [*]

3.6 Only one royalty shall be due and payable for a LICENSED PRODUCT and use thereof irrespective of the number of patents included within PATENT RIGHTS which are applicable to such LICENSED PRODUCT and use.

3.7 Unless this agreement is earlier terminated, the initial payment under paragraph 3.1 and the payments due under paragraph 6.1 shall be due and payable on the earlier of (i) six (6) months after the effective date of this agreement or (ii) the date on which LICENSEE is granted a license under U.S. Patent No. [*] by the UNITED STATES Government.

ARTICLE IV

REPORTING

4.1 LICENSEE shall provide written annual reports within sixty (60) days after JUNE 30 of each calendar year which shall include but not be limited to: reports of PROGRESS on research and development, regulatory approvals, manufacturing, sublicensing, marketing and sales during the preceding twelve (12) months.

4.2 LICENSEE shall report to HARVARD the date of first sale of LICENSED PRODUCTS in each country within thirty (30) days of occurrence.

4.3 Commencing with the calendar year half in which NET SALES first occur, LICENSEE agrees to submit to HARVARD within sixty (60) days after the calendar half years ending June 30 and December 31, reports setting forth for the preceding six (6) month period the amount of the LICENSED PRODUCTS sold by LICENSEE, its AFFILIATES and SUBLICENSEES in each country, the NET SALES thereof, and the amount of royalty due thereon and with each such report pay the amount of royalty due. Such report shall be certified as correct by an officer of LICENSEE and SHALL INCLUDE a detailed listing of all deductions from NET SALES, or from royalties as specified herein. Such report shall also specify which PATENT RIGHTS are used in or by each LICENSED PRODUCT generating royalty income. If no royalties ARE DUE to HARVARD for any reporting period, the written report shall so state. If ROYALTIES FOR any calendar year do not equal or exceed the minimum royalties established in paragraph 3.3, LICENSEE shall include the balance of the minimum royalty with the PAYMENT for the half year ending December 31. All royalties due hereunder shall be PAYABLE in United States dollars and shall be made payable to President and Fellows of Harvard College. Conversion of foreign currency to U.S. dollars shall be made at the CONVERSION rate existing in the United States on the last business day in the reporting period as reported in the Wall Street Journal. All such reports shall be maintained in CONFIDENCE by HARVARD, except as required by law, including Public Law 96-517 and 98-620.

/*/ Confidential material omitted and filed separately with the Securities and Exchange Commission.

4.4 If by law, regulation, or fiscal policy of a particular country, conversion into United States dollars or transfer of funds of a convertible currency to the United States is restricted or forbidden, LICENSEE shall give HARVARD prompt notice in writing and shall pay the royalty and other amounts due through such means or methods as are lawful in such country as HARVARD may reasonably designate. Failing the designation by HARVARD of such lawful means or methods within thirty (30) days after such notice is given to HARVARD, LICENSEE shall deposit such royalty payment in local currency to the credit of HARVARD in a recognized banking institution designated by HARVARD, or if none is designated by HARVARD within the thirty (30) day period described above, in a recognized banking institution selected by LICENSEE and identified in a written notice to HARVARD by LICENSEE, and such deposit shall fulfill all obligations of LICENSEE to HARVARD with respect to such royalties.

4.5 Any tax required to be withheld by LICENSEE under the laws of any FOREIGN COUNTRY for the account of HARVARD, shall be promptly paid by LICENSEE for and on behalf of HARVARD to the appropriate governmental authority, and LICENSEE shall use its best efforts to furnish HARVARD with proof of payment of such tax. Payments to HARVARD shall be net of any such payments of taxes.

ARTICLE V

RECORD KEEPING

5.1 LICENSEE shall keep, and shall require its AFFILIATES AND SUBLICENSEES TO KEEP accurate and correct records of LICENSED PRODUCTS made, used or sold under this Agreement, appropriate to determine the AMOUNT OF ROYALTIES DUE HEREUNDER to HARVARD. Such records shall be retained for at least three (3) years following a given reporting period. They shall be available during normal business hours FOR INSPECTION at the expense of HARVARD by HARVARD's Internal Audit Department or by a Certified Public Accountant selected by HARVARD and approved by LICENSEE for the sole purpose of verifying reports and payments hereunder. Such accountant shall not disclose to HARVARD any information other than information relating to accuracy of reports and payments made under this Agreement. In THE EVENT THAT ANY SUCH INSPECTION shows an under reporting and underpayment in excess of five percent (5%) for any twelve (12) month period, then LICENSEE shall pay the cost of such EXAMINATION.

ARTICLE VI

DOMESTIC AND FOREIGN PATENT FILING
AND MAINTENANCE

6.1 LICENSEE shall reimburse HARVARD for all reasonable expenses HARVARD has incurred and shall incur for the preparation, filing, prosecution and maintenance of PATENT RIGHTS for which HARVARD has not been, and is not eligible to be reimbursed by any third party. HARVARD shall take responsibility for the preparation, filing, prosecution and maintenance of any and all patent applications and patents included in PATENT RIGHTS using patent counsel reasonably acceptable to LICENSEE, provided however that HARVARD shall first consult with LICENSEE as to the preparation, filing, prosecution and maintenance of such patent applications and patents and shall furnish to LICENSEE copies of documents relevant to any such preparation, filing, prosecution or maintenance.

6.2 HARVARD and LICENSEE shall cooperate fully in the preparation, filing, prosecution and maintenance of PATENT RIGHTS and of all patents and patent applications licensed to LICENSEE hereunder, executing all papers and instruments or requiring members of HARVARD to execute such papers and instruments so as to enable HARVARD to apply for, to prosecute and to maintain patent applications and patents in HARVARD's name in any country. Each party shall provide to the other prompt notice as to all matters which come to its attention and which may affect the preparation filing, prosecution or maintenance of any such patent applications or patents.

6.3 If LICENSEE elects not to pay the expenses OF A PATENT APPLICATION OR PATENT INCLUDED within PATENT RIGHTS in a particular country, LICENSEE shall notify HARVARD not less than sixty (60) days prior to such action and shall thereby surrender its rights under such patent or patent application in such country.

6.4 HARVARD agrees not to allow any PATENT RIGHT to become abandoned or to lapse without the written permission of LICENSEE.

ARTICLE VII

INFRINGEMENT

7.1 With respect to any PATENT RIGHTS under which LICENSEE is exclusively licensed pursuant to this Agreement, LICENSEE or its SUBLICENSEE shall have the right to prosecute in its own name and at its own expense any infringement of such patent, so long as such license is exclusive at the time of the commencement of such action. HARVARD agrees to notify LICENSEE promptly of each infringement of such patents of which HARVARD is or becomes aware. Before LICENSEE or its SUBLICENSEES

commences an action with respect to any infringement of such patents, LICENSEE shall give careful consideration to the views of HARVARD and to potential effects on the public interest in making its decision whether or not to sue and in the case of a SUBLICENSE, shall report such views to the SUBLICENSEE.

7.2 (a) If LICENSEE or its SUBLICENSEE elects to commence an action described above and HARVARD is a legally indispensable party to such action, HARVARD shall join the action as a co-plaintiff. Upon doing so, LICENSEE shall reimburse HARVARD for reasonable legal expenses and other out-of-pocket costs incurred by HARVARD for its participation in such action as a nominal plaintiff.

(b) To the extent permitted by law, HARVARD shall have the right to intervene in any such action, and if HARVARD elects to do so, HARVARD shall jointly control such action with LICENSEE.

7.3 If LICENSEE or its SUBLICENSEE elects to commence an action as described above, LICENSEE may reduce, by [*], the royalty due to HARVARD EARNED UNDER THE patent subject to suit by the amount of the expenses and costs of such action, including reasonable attorney fees. In the event that such expenses and costs exceed the amount of royalties withheld by LICENSEE for any calendar YEAR, LICENSEE MAY TO THAT extent reduce the royalties due to HARVARD from LICENSEE in succeeding calendar years, but never by [*].

7.4 Recoveries or reimbursements from such action shall first be APPLIED TO REIMBURSE LICENSEE and HARVARD for litigation costs not paid from royalties (if any) and then to reimburse HARVARD for royalties withheld. Any REMAINING RECOVERIES or reimbursements shall be distributed as follows:

(i) If the amount is lost profits, LICENSEE shall RECEIVE AN AMOUNT EQUAL TO THE damages the court determines LICENSEE has suffered as a result OF THE INFRINGEMENT less the amount of any royalties that would have been due HARVARD ON SALES of LICENSED PRODUCTS lost by LICENSEE as a result of THE INFRINGEMENT HAD LICENSEE made such sales and HARVARD shall receive an amount equal to the royalties they would have received if such sales had been made by LICENSEE; OR

(ii) As to awards other than lost profits, 80% to LICENSEE and 20% to HARVARD.

7.5 In the event that LICENSEE and its SUBLICENSEE, if any, elect not to exercise their right to prosecute an infringement of the PATENT RIGHTS pursuant to the above paragraphs, or does not do so within sixty (60) days after written NOTICE FROM HARVARD, HARVARD may do so at its own expense, controlling such action and retaining all recoveries therefrom, and LICENSEE shall cooperate with HARVARD with respect thereto.

/*/ Confidential material omitted and filed separately with the Securities and Exchange Commission.

ARTICLE VIII

TERMINATION OF AGREEMENT

8.1 This Agreement, unless extended or terminated as provided herein, shall remain in effect for the life of the last to expire of PATENT RIGHTS licensed hereunder, at which time LICENSEE shall have a fully paid up license.

8.2 In the event that one party to this Agreement shall be in default in the performance of any obligations under this Agreement, and if the default has not been remedied within ninety (90) days after the date of notice in writing of such default, the party giving such notice may terminate this Agreement by written notice.

8.3 In the event that LICENSEE shall cease to carry on its business, HARVARD SHALL HAVE the right to terminate this entire Agreement by giving LICENSEE written notice of such termination.

8.4 In the event that the licenses granted to LICENSEE under this Agreement are terminated, any granted sub-licenses shall remain in full force and effect as a direct license from HARVARD to the SUBLICENSEE, provided that the SUBLICENSEE is not then in breach of its sub-license agreement and the SUBLICENSEE agrees to be BOUND (as a licensee) to HARVARD (as a licensor) under the terms and conditions of THE SUB-LICENSE agreement.

8.5 LICENSEE shall have the right to terminate this Agreement or its LICENSE UNDER ANY PATENT RIGHT in any country by giving thirty (30) days advance written notice to HARVARD to that effect. Upon termination, a formal report shall be submitted and any royalty payments and unreimbursed patent expenses due to HARVARD become immediately payable.

8.6 Sections 8.4, 8.6, 9.2, 9.3 and 9.4 of this Agreement shall survive termination.

8.7 In the event that LICENSEE disputes the termination of this Agreement or any license granted hereunder and initiates legal proceedings in this respect, then this Agreement or any such license shall not be terminated until there is a final decision from WHICH no appeal has been or can be taken.

ARTICLE IX

GENERAL

9.1 HARVARD represents and warrants that the entire right, title, and interest in the patent applications or patents comprising the PATENT RIGHTS have been or will be assigned

to it and that HARVARD has the authority to issue the licenses under said PATENT RIGHTS set forth herein and that there are and will be no rights and/or licenses inconsistent with the rights and licenses granted to LICENSEE under this Agreement. HARVARD does not warrant the validity of the PATENT RIGHTS licensed hereunder and makes no representations whatsoever with regard to the scope of the licensed PATENT RIGHTS or that such PATENT RIGHTS may be exploited by LICENSEE, an AFFILIATE, or sublicensee without infringing other patents.

9.2 EXCEPT AS PROVIDED IN SECTION 9.1, HARVARD EXPRESSLY DISCLAIMS ANY AND ALL IMPLIED OR EXPRESS WARRANTIES AND MAKES NO EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS OF THE TECHNOLOGY, LICENSED PROCESSES OR LICENSED PRODUCTS CONTEMPLATED BY THIS AGREEMENT.

9.3 (a) LICENSEE shall indemnify, defend and hold harmless HARVARD and its directors, governing board members, trustees, officers, faculty, medical and professional staff, employees, students, and agents and their respective successors, heirs and assigns (the "Indemnitees"), against any liability, damage, loss or expenses (including REASONABLE attorneys' fees and expenses of litigation) incurred by or imposed upon the Indemnitees or any one of them in connection with any claims, suits, actions, demands or judgments arising out of any theory of product liability (including, but not limited to, ACTIONS IN THE form of tort, warranty, or strict liability) concerning any product, process or service used or sold pursuant to any right or license granted UNDER THIS AGREEMENT.

(b) LICENSEE'S indemnification under (a) above shall not apply to any liability, damage, loss or expense t the extent to apply to any liability, damage, loss OR EXPENSE to the extent that it is attributable to the negligent activities or willful misconduct of the Indemnitees.

(c) HARVARD shall notify LICENSEE promptly of any claim OR THREATENED CLAIM under this Paragraph 9.3 and shall fully cooperate with all REASONABLE REQUESTS OF LICENSEE with respect thereto.

(d) LICENSEE agrees, at its own expense, to provide attorneys reasonably acceptable to HARVARD to defend against any actions brought or filed against any party indemnified hereunder with respect to the indemnity contained HEREIN, WHETHER OR NOT such actions are rightfully brought and LICENSEE shall have the right to control the defense, settlement or compromise of any such claim or action.

(e) At such time as any LICENSED PRODUCT is being commercially DISTRIBUTED or sold (other than for research purposes or for the purpose of obtaining regulatory approvals) by LICENSEE, or by an AFFILIATE, SUBLICENSEE or agent of LICENSEE (hereunder "Other Seller"), LICENSEE shall itself or in the ALTERNATIVE SHALL ensure that Other Seller either (i) at its sole cost and expense, procure(s) and maintain(s)

comprehensive general liability insurance in amounts not less than $2,000,000 per incident and $2,000,000 annual aggregate and naming the Indemnitees as additional insureds or (ii) pay(s) for the procurement and maintenance by HARVARD of insurance in the amounts and in the form set forth in this paragraph. Such comprehensive general liability insurance shall provide (i) product liability coverage and (ii) broad form contractual liability coverage for LICENSEE'S indemnification under Paragraph 9.3(a) of this Agreement. LICENSEE shall ensure that if LICENSEE or the Other Seller elects to self-insure all or part of the limits described above (including deductibles or retentions which are in excess of $250,000 annual aggregate) such self-insurance program must be acceptable to HARVARD and the Risk Management Foundation. The minimum amounts of insurance coverage required under this Paragraph 9.3(c) shall not be construed to create a limit of LICENSEE'S liability with respect to its indemnification under Paragraph 9.3(a) of this Agreement. At such time, or at any time, LICENSEE can request that HARVARD ascertain whether Risk Management Foundation has in effect Uniform Indemnification and Insurance Provisions more favorable than those of this Agreement, in which event LICENSEE and HARVARD shall amend this AGREEMENT TO include such more favorable provisions.

(f) LICENSEE shall provide HARVARD with written evidence of such INSURANCE upon request of HARVARD. LICENSEE shall provide HARVARD with written notice of at least thirty (30) days prior to the cancellation, non-renewal or MATERIAL CHANGE IN such insurance; if LICENSEE does not obtain replacement insurance providing comparable coverage within such thirty (30) days period, HARVARD SHALL HAVE THE RIGHT to terminate this Agreement effective at the end of such thirty (30) day period by written notice to LICENSEE.

(g) LICENSEE shall itself maintain, or shall ENSURE THAT OTHER SELLER MAINTAINS OR that payments are made for the maintenance by HARVARD of, as the case may be, such comprehensive general liability insurance beyond the expiration or termination of this Agreement during (i) the period that any LICENSED PRODUCT is being COMMERCIALLY distributed or sold (other than for research purposes or the purpose of obtaining regulatory approvals) by Other Seller and (ii) a reasonable period after period referred to in (g) (i) above which shall in no event be less than ten (10) years. The obligations of (g) (ii) above can be satisfied by the purchase of insurance by LICENSEE or a third party which covers claims resulting from occurrences during such period of (g)(ii) above for LICENSED PRODUCT commercially distributed or sold by LICENSEE or Other Seller during the period referred to in (g) (i) above.

9.4 LICENSEE shall not use HARVARD's name or any adaptation of it in any ADVERTISING, promotional or sales literature without the prior written assent of HARVARD.

9.5 Without the prior written approval of HARVARD, the entire license GRANTED PURSUANT to this Agreement shall not be transferred by LICENSEE to any party other than to a successor to the business interest of LICENSEE relating to the PATENT RIGHTS with

such transfer including but not being limited to mergers, consolidations, and transfer or sale of assets. This Agreement shall be binding upon the successors, legal representatives and assignees of HARVARD and LICENSEE.

9.6 The interpretation and application of the provisions of this Agreement shall be governed by the laws of the Commonwealth of Massachusetts.

9.7 LICENSEE agrees to comply with all applicable laws and regulations. In particular, it is understood and acknowledged that the transfer of certain commodities and technical data is subject to United States laws and regulations controlling the export of such commodities and technical data, including all Export Administration Regulations of the United States Department of Commerce. These laws and regulations, among other things, prohibit or require a license for the export of certain types of technical data to certain specified countries. LICENSEE hereby agrees and gives written assurance that it will comply with all United States laws and regulations controlling the export of commodities and technical data, that it will be solely responsible for any violation of such by LICENSEE or its AFFILIATES or sublicensees, and that it will defend and hold HARVARD harmless in the event of any legal action of any nature occasioned by such violation.

9.8 Written notices required to be given under this Agreement shall be addressed as follows:

If to HARVARD:
Office of Technology and
Trademark Licensing
Harvard University
124 Mt. Auburn Street
Suite 410 South
Cambridge, MA 02138

CC:
Office of Technology Licensing
and Industry Sponsored Research
Harvard Medical School
333 Longwood Ave.
Boston, MA 02115

If to LICENSEE:
Virus Research Institute
61 Moulton Street
Cambridge, MA 02139
Attn: President

or such other address as either party may request in writing.

9.9 Should a court of competent jurisdiction later consider any provision of this Agreement to be invalid, illegal, or unenforceable, it shall be considered severed from this Agreement. All other provisions, rights and obligations shall continue without regard to the severed provision, provided that the remaining provisions of this Agreement are in accordance with the intention of the parties.

9.10 Any matter under Section 2.3 of this Agreement which is to be resolved by arbitration shall be submitted to a mutually-selected single arbitrator to so decide any such matter or disagreement. The arbitrator shall conduct the arbitration in accordance with the then applicable Rules of the American Arbitration Association, unless the parties agree otherwise. If the parties are unable to mutually select an arbitrator, the arbitrator shall be selected in accordance with the procedures of the American Arbitration Association. The decision and award rendered by the arbitrator shall be final and binding. Judgment upon the award may be entered pursuant to this section and arbitration shall be held in Boston, MA, or such other place as may be mutually agreed upon in writing by the PARTIES.

9.11 This Agreement constitutes the entire understanding between the parties and neither party shall be obligated by any condition or representation other than those expressly stated herein or as may be subsequently agreed to by the parties hereto in writing.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement TO BE EXECUTED BY their duly authorized representatives.

The effective date of this Agreement is March 28, 1997.

PRESIDENT AND FELLOWS OF HARVARD COLLEGE

By: /s/ JOYCE BRINTON

Name and Title: Joyce Brinton, Director

Virus Research Institute:

By: /s/ WILLIAM A. PACKER

Name and Title: William A. Packer, President

Appendix A

The following comprise PATENT RIGHTS:

[*]

/*/ Confidential material omitted and filed separately with the Securities and Exchange Commission.

Exhibit 21.0

LIST OF SUBSIDIARIES

Name	State of Incorporation
Polmerix, Inc.	Delaware

Exhibit 23.0

CONSENT OF INDEPENDENT ACCOUNTANTS

We hereby consent to the incorporation by reference in the Registration Statement on Forms S-8, (Nos. 333-43640, 333-54372, 333-80036, 333-80048, 333-62017), in the Prospectus constituting part of the Registration Statement on Forms S-3 (Nos. 333-72172, 333-69950, 333-64021, 333-08607, 333-56755, 333-64761 and 333-89341) and in the Prospectus constituting part of the Registration Statement on Form S-4 (No. 333-59215) of AVANT Immunotherapeutics, Inc. (f/k/a T Cell Sciences, Inc.) of our report dated February 14, 2000 appearing in this Annual Report on Form 10-K for the year ended December 31, 1999.

PricewaterhouseCoopers LLP
Boston, Massachusetts
March 27, 2000

This schedule contains summary financial information extracted from the condensed financial statements of AVANT Immunotherapeutics, Inc. for the Twelve Months Ended December 31, 1999 and is qualified in its entirety by reference to such financial statements.

U.S. DOLLARS

12-MOS	
DEC-31-1999	
JAN-01-1999	
DEC-31-1999	
1	
13,619,000	
0	
0	
0	
0	
14,489,700	
4,710,300	
(3,453,500)	
19,882,700	
2,200,500	
0	
0	
0	
48,100	
17,364,900	
19,882,700	
0	
1,483,500	
0	
13,427,800	
0	
0	
(635,200)	
(11,309,100)	
0	
(11,309,100)	
0	
0	
0	
(11,309,100)	
(0.26)	
(0.26)	