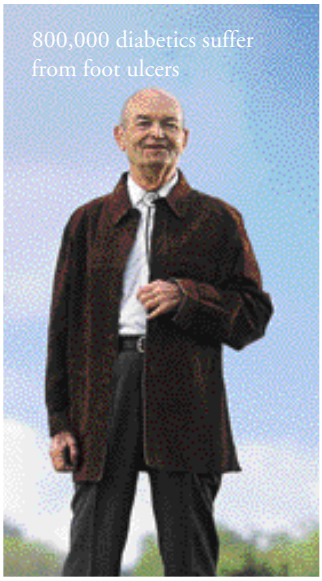
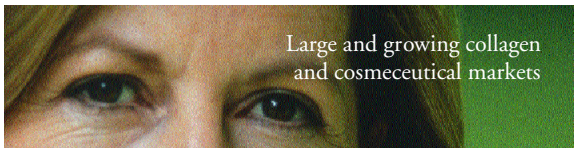
Advanced Tissue Sciences





Redefining Tissue Repair and Transplantation

2000 Annual Report

The mission of Advanced Tissue Sciences is to redefine tissue repair and transplantation with products developed and derived from our tissue engineering technology. Our achievements will enhance the quality of human life and create an environment that fosters innovation and employee satisfaction while delivering sustainable value to our shareholders.

Advanced Tissue Sciences Corporate Strategy

- Leverage our technology and intellectual property
- Invest in broad, innovative research and development, internally and through collaborations, to drive our product pipeline to achieve our mission
- Focus development and manufacturing efforts on commercializing off-the-shelf fibroblast-based products
- Market, distribute and sell products through strategic partners or directly where the opportunity is compelling
- Create new strategic alliances and initiatives to unlock shareholder value

Dear Shareholders:

As this annual report goes to press, we are in discussions with the Food and Drug Administration (FDA) regarding approval of Dermagraft®. Since so much attention has been focused on this by the investment community, some people may think that Advanced Tissue Sciences is a one-product company. As we believe you'll realize from reading this report, the reality is very different.

One of our strengths is that our technology allows us to produce many different types of products from a common platform. As a result, we have four separate business areas and multiple, near-term opportunities for product applications across several unmet needs.

…we plan to invest aggressively in strong, near-term opportunities and work to shorten the time to market to generate revenue and income.

To ensure that we will be prepared to deliver on the promise of our technology, we have reviewed and revised our company's strategic plan. You can see the elements of our corporate strategy on the first page of this report. This strategy, we believe, will optimize our return on capital.

To implement this strategy, we plan to invest aggressively in strong, near-term opportunities and work to shorten the time to market to generate revenue and income.

We are on track to have four products on the market by the end of this year. In addition to TransCyte®, and pending FDA approval, these include the launch of Dermagraft for the treatment of diabetic foot ulcers in the United States and the commercialization of injectable human collagen for wrinkle revision. In addition, the company is planning the introduction of NouriCel™ as an additive in skin care products.

Our near-term opportunities include cosmeceuticals - the very large market for products to treat aging skin. Agreements we reached during the year with Biozhem Cosmeceuticals, Inc. and SkinMedica, Inc. are the beginning of our efforts to explore the potential of new products in the cosmeceutical area. These relationships focus on using NouriCel, which is derived from our proprietary manufacturing process, as an additive in skin care products. NouriCel has shown an ability to thicken and otherwise improve the appearance of aging skin. We expect to see these products on the market before the end of this year. The skin care market is very large and we are exploring additional opportunities to make this a new and important source of revenue for the company.

Another opportunity is substituting our human-based collagen for bovine-based collagen in wrinkle treatment and other cosmetic and therapeutic applications. This year we plan to commercialize our human collagen for wrinkle revision, subject to regulatory approval, through our strategic alliance with Inamed Corporation. We are also in the early stages of developing human collagen for urinary incontinence.

The skin care market is very large and we are exploring additional opportunities to make this a new and important source of revenue for the company.

A third opportunity is to use our fibroblast-based products to treat periodontal disease. Also, product application expansion continues with early clinical trials underway using Dermagraft for the treatment of venous and pressure ulcers.

TransCyte continues to gain acceptance in the burn community. Although a modest market, worldwide product sales increased significantly in 2000.

We're continuing our work on the longer-term applications of our technology. In the cardiovascular area, we have advanced preclinical studies using fibroblast technology to induce the formation of new blood vessels in damaged heart tissue. Our cardiovascular program also includes the development of tissue-engineered vascular grafts. Funding for a significant portion of this early-stage research comes from government grants and awards, including two, $2 million grants from the National Institutes of Standards and Technology.

Perhaps most exciting, as one looks to the future of tissue engineering, is our collaborative work with the University of Washington and others on the development of beating heart muscle and ultimately a ventricle for the heart. These studies are conducted under a shared $10 million grant from the National Institutes of Health. This is one of the largest government grants awarded to date for a project developing human organ replacements.

Although we have a robust product pipeline with both near- and long-term potential, we realize that first and foremost on everyone's mind is the approval of Dermagraft by the FDA. While we look forward to approval this year, we recognize that we will not be first to market with a product containing human cells. Nevertheless, we will be first with a product containing human collagen, other proteins and cells. We believe that caregivers and patients will recognize its advantages over products that are derived primarily from bovine or other animal sources.

While the initial delay in 1998 was definitely a disappointment to us, our employees and to you, our shareholders, we've made effective use of the intervening time in several important areas.

We have accelerated the innovative process by identifying new and exciting opportunities to generate additional value from our technology and intellectual property. We are also pleased to report that we have made progress in developing our internal systems and processes, solidified our business strategy and business model, and increased the number and quality of our alliances.

We have used the time to shed new light on the mechanism of action of fibroblast-based products and to target new clinical applications and indications which can benefit from these products' unique properties. This has led to early clinical trials using these tissues in facial reconstruction following tumor removal and traumatic injuries and, as previously mentioned, in treating periodontal disease and the demonstration of their ability to stimulate blood vessel formation in damaged heart tissue.

In addition, and most importantly, we've strengthened our management team. We've added new members to the team who bring with them solid experience, strong skill sets, plus the energy and commitment to make our company successful.

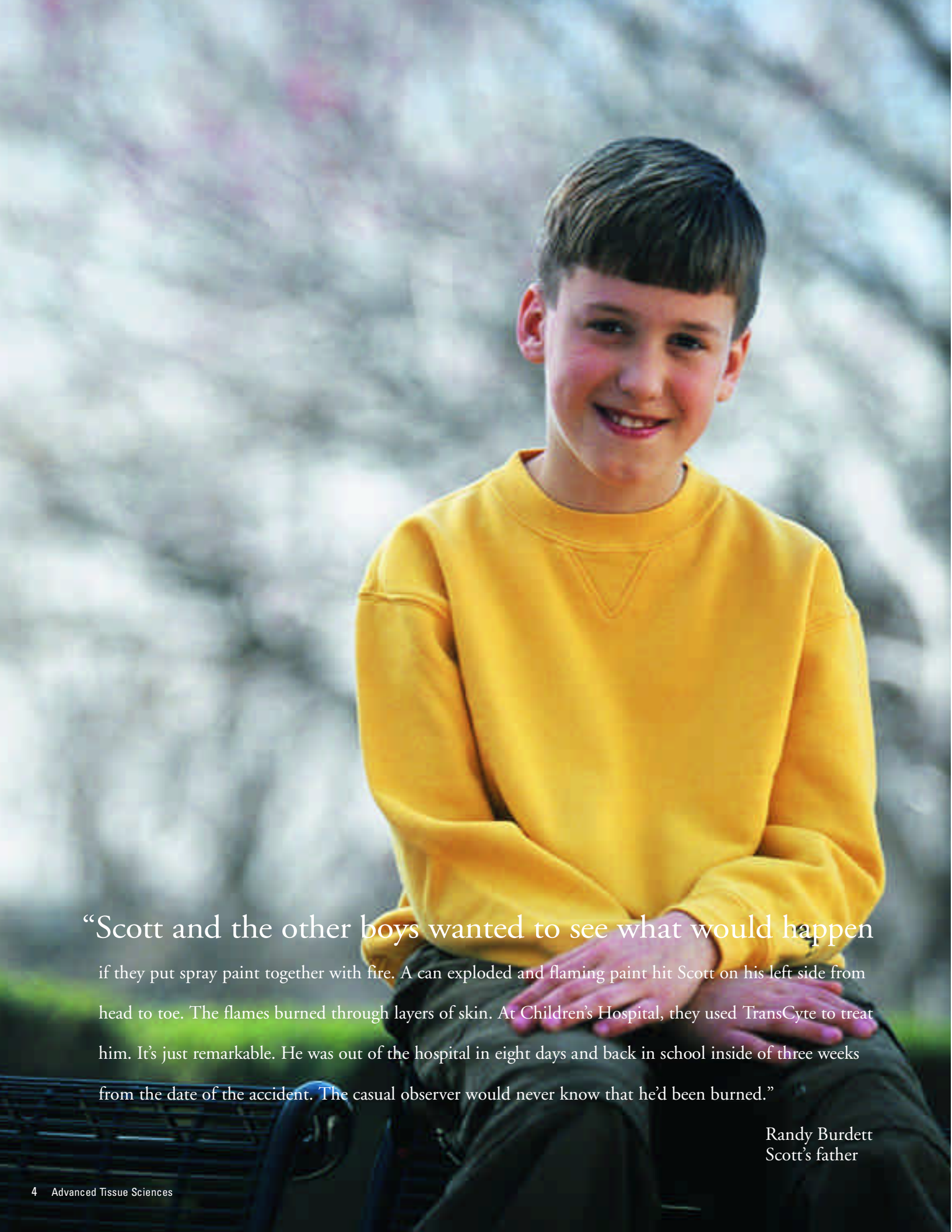
Our versatile and broadly applicable core technology provides a foundation that we believe is unmatched in the tissue engineering industry. We have the patent position, processes, skills, resources and infrastructure, combined with talented and dedicated employees, to bring a well-balanced mix of products to market, both on our own and with our partners. All of these things have helped us chart a course that we expect will lead to profitability and increased shareholder value. Our enthusiasm for the future remains high and we thank you for your continued support.

Our versatile and broadly applicable core technology provides a foundation that we believe is unmatched in the tissue engineering industry.

Sincerely yours,

Arthur J. Benvenuto
Chairman & Chief Executive Officer

Gail K. Naughton, Ph.D.
President



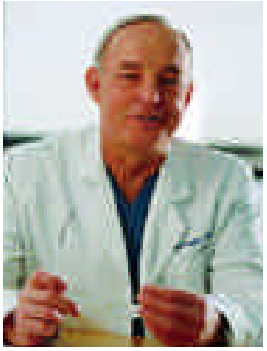
"Scott and the other boys wanted to see what would happen if they put spray paint together with fire. A can exploded and flaming paint hit Scott on his left side from head to toe. The flames burned through layers of skin. At Children's Hospital, they used TransCyte to treat him. It's just remarkable. He was out of the hospital in eight days and back in school inside of three weeks from the date of the accident. The casual observer would never know that he'd been burned."

Randy Burdett
Scott's father

TransCyte®

TransCyte is the first human-based, bioengineered, temporary skin covering for the treatment of burns to be approved by the FDA. It is being sold through a joint venture with Smith & Nephew, the global advanced medical devices group. TransCyte consists of human dermal tissue (the lower layer of skin) combined with a synthetic epidermal layer (the upper layer of skin).

Each year in the U.S., 30,000 to 40,000 patients suffer from second-degree burns. Another 13,000 patients suffer from third-degree burns, 1,500 of whom require extensive skin grafts.



"TransCyte has changed the way we take care of children with burns. In common childhood burn injuries, it has raised the standard of care to the point where parents expect their children to return to normal daily lifestyles.

TransCyte has changed the paradigm of care by decreasing the length of hospital stay, decreasing the amount of pain, reducing nutritional requirements, increasing mobility, decreasing medications for pain, improving nutrition, and it is cost-effective. TransCyte permits us to take advantage of the best basic science techniques to benefit children at the bedside.

While it is clear that prevention of burn injury is most important, TransCyte provides a technique that can mitigate the challenges that children with injury must face."

Martin R. Eichelberger, M.D.
Professor of Surgery and Pediatrics
George Washington University School of Medicine
Director, Trauma and Burn Services
Children's National Medical Center
Washington, DC

"Dermagraft means freedom for me.

I had a foot ulcer for about five years. It grew progressively larger and larger. Then I was referred to Dr. Sowell. After seven weeks of treatment with Dermagraft, I have a fully healed foot. I can do things now that I haven't been able to do for five years - like exercise. I can live normally again."

Paul Roblyer
Diabetic
Dermagraft patient

Dermagraft®

Dermagraft is a human, living dermal replacement designed for treating skin ulcers and other conditions where the skin has been injured or destroyed. As a living, metabolically active human tissue, Dermagraft is capable of interacting with the wound bed to promote healing. It is being sold through a joint venture with Smith & Nephew, the global advanced medical devices group.

Each year in the U.S., there are 800,000 patients with diabetic foot ulcers, with approximately half of these being classified as difficult-to-heal. In addition, 700,000 patients each year have venous ulcers and 1.5 million have pressure ulcers.

"Paul Roblyer came to us after having an ulcer on the bottom of his foot for many years as a result of his diabetes and neuropathy that he suffers from. He was very frustrated and fearful because he'd been told by other physicians that he needed to have a leg amputation. We were able to treat him successfully with Dermagraft in the protocol for the treatment IDE, which calls for weekly applications of the product. With seven applications of Dermagraft, we were able to close the ulcer.

Our experience with Dermagraft in our Wound Care Clinic has been very exciting in terms of the potential we have for treating patients into the future. This new technology to help heal wounds that we couldn't heal before will save patients from possible amputations and enhance their lifestyle by keeping them active. Every modality that we can institute to heal these ulcerations saves limbs and actually saves lives because diabetics that have to undergo a below-the-knee amputation have a very poor prognosis into the future. Many times the survival rate is less than five years. So if we can keep them with their lower extremities, keep them walking, keep them active, they live longer."

Robert D. Sowell, D.P.M.
Wound Care Center
Deaconess Hospital
Oklahoma City, OK

Collagen

Our tissue-engineered human injectable collagen is designed as an alternative to products like bovine collagen and botox for correcting wrinkles. It has been developed from our extensive manufacturing experience with products like Dermagraft and TransCyte.

During 2000, in the United States alone, there were 592,000 collagen injection procedures for aesthetic and reconstructive purposes.

Collagen is a family of naturally occurring proteins

that serve as the basic structural building blocks of the tissues found in many parts of the body. It is a major component of our TransCyte and Dermagraft products. We have applied our existing technology, processes and expertise to manufacture human collagen for a product which can be sterilized and easily injected or implanted into the human body.

Injections of collagen are already used in the marketplace to help eliminate wrinkles. We plan to commercialize our human collagen for wrinkle revision, subject to regulatory approval, through our strategic alliance with Inamed Corporation.

Collagen injections are used as urethral bulking agents for the treatment of urinary incontinence. In the future, when combined with an extracellular matrix, collagen injections could also be used for breast reconstruction following lumpectomies or to treat deformities.

We believe that our human collagen may offer important advantages over the animal-based collagen currently on the market. That is why we are working with Inamed to obtain a bovine collagen equivalency approval from the FDA. In addition to the procedures already mentioned, it would allow our product to be used in other applications that currently rely on bovine collagen, such as coatings on medical devices.

NouriCel™
A by-product of our tissue and collagen manufacturing processes is the nutrient media in which the human fibroblast cell expansion takes place. The cells produce collagen, proteins, antioxidants and other growth factors which naturally occur in human skin. These proteins and growth factors remain behind in the enriched nutrient media.

NOURICEL™
PATENTED. PURE.

We continue to identify ways to leverage our technology for new opportunities to develop products with strong, near-term commercial potential. Cosmeceuticals comprise a multi-billion dollar segment of the skin care market. An aging population suggests that demand in this area will to continue grow.

NouriCel contains many of the essential nutrients that the human body naturally produces and that are important for healthy skin. It has shown the ability to make skin thicker and younger looking. There are currently no other products on the market that contain multiple growth factors and antioxidants. Our plans include building a brand identity for NouriCel as a high quality ingredient in skin care products.

We have entered into developmental marketing, license and supply agreements with SkinMedica, Inc. and Biozhem Cosmeceuticals, Inc. to investigate the commercial opportunities for NouriCel. SkinMedica plans to sell NouriCel in its unique formulation through dermatologists and plastic surgeons in the United States. Biozhem plans to sell NouriCel in its unique formulation through direct marketing channels. The packaging will carry the NouriCel logo and will identify it as an ingredient. Clinical and marketing information gained from our existing alliances may help us solidify additional partnering opportunities to take advantage of this market's potential.

In 1999, in the United States alone, there were approximately 1.8 million arthroscopic procedures of the knee performed, including procedures involving articular cartilage, meniscus and ligaments.

Articular Cartilage

Articular cartilage covers the opposing surfaces of all moving joints in the body. Even small defects can cause pain and restriction of joint motion. Our tissue-engineered articular cartilage could provide a significant opportunity to treat patients at an earlier stage of joint degeneration, thereby delaying, or in some cases eliminating, the need for total joint replacements. Products to repair articular cartilage may ultimately be used in any joint in the body, such as knees, shoulders, elbows, wrists, hips and ankles.

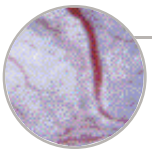
Meniscus

The meniscus is a cushion that acts as a shock absorber in the knee. It is frequently damaged or destroyed by sports injury or other trauma. Current repair procedures for avascular meniscal injuries have limited success in producing a long-term repair. We believe that our tissue engineering approach could offer a benefit in the repair and eventual total replacement of the meniscus.

The body has limited ability to repair

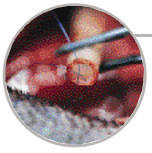
damaged cartilage in human joints. There are few treatment options available to replace this damaged tissue. Damage to cartilage often leads to further deterioration and osteoarthritis which can eventually require a total joint replacement.

We are developing orthopedic cartilage products through the NeoCyte Joint Venture with Smith & Nephew. By intervening early in the degenerative process, we hope to delay or perhaps even avoid some of the total knee replacement surgeries performed annually. In addition, we believe that our three-dimensional cell development technology and proprietary manufacturing systems allow the regulation of critical environmental factors that may provide the necessary conditions for the production of a high-tensile strength cartilage capable of withstanding the shear and load forces present in human joints.



Epicardial Angiogenesis Patch

Early preclinical work has shown that Dermagraft, in the form of an epicardial angiogenesis patch, may have the potential for improving blood flow to areas of the heart that have insufficient circulation due to coronary artery disease. Those who could benefit most from this therapy include patients with blood vessel disease that cannot be treated by stenting, angioplasty, or bypass grafting. We are currently conducting preclinical studies to fully evaluate this exciting opportunity.



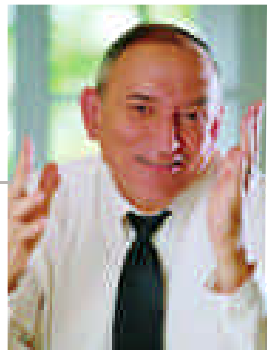
Peripheral and Coronary Vascular Grafts

There has been steady progress in our program to develop tissue-engineered blood vessels for small-diameter vascular grafts. The availability of tissue-engineered vascular grafts could be beneficial to bypass surgery patients, particularly those who need repeat procedures, since no satisfactory alternative to the use of native blood vessels for vascular grafts currently exists.

An aging population is likely to increase the incidence of coronary artery diseases. The successful development of new tissue-engineered products such as blood vessels, heart valves, heart muscle, and devices to induce cardiac repair, could provide critical treatment options for these patients.

The dermal fibroblasts that we use to manufacture our existing skin products induce repair of connective tissue and are closely related to cardiac fibroblast cells. They may be valuable in the repair of heart muscle, such as in the formation of an epicardial angiogenesis patch, and growth of other cardiovascular products.

We are working with the University of Washington on a multi-center grant from the National Institutes of Health, to grow functional human heart tissue. The project is initially focusing on culturing cardiac muscle tissue that could be grafted onto damaged hearts to improve their efficiency. Eventually, the researchers hope their work will enable scientists to grow a fully functional human heart. Our patented cell-scaffold and bioreactor technology and cell seeding capabilities will play a key role in the project.



Robert M. Nerem, Ph.D.

Director of the Georgia Tech/Emory Center for the Engineering of Living Tissues

Residing at the interface of the biological revolution and the traditional medical implant industry, tissue engineering represents the transition of medical implants from ones based on synthetic materials to ones which are engineered as living cell, biological substitutes. Initial commercial applications have been largely in the area of skin substitutes used in the treatment of patients with severe burns or skin ulcers or for use in facial reconstruction. The next generation of products will involve such soft tissues as cartilage, tendons, ligaments and also bone. In the future, however, tissue engineering will begin to address the vital organs, i.e., the heart, the pancreas, the kidney and the liver. Already there is significant work being done to develop various components of the heart, and if these components can be successfully engineered, then the tissue engineering of an entire living heart becomes possible. If tissue engineering can create these vital organs, then it has the potential to confront the transplantation crisis, i.e., the tremendous disparity between patient need and the availability of tissues/organs from donors for use in transplantation. This is extremely important today and with our aging population will be even more so in the future.

SENIOR MANAGEMENT

Arthur J. Benvenuto
Chairman and Chief Executive Officer

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President

Joseph R. Kletzel
Executive Vice President and Chief Operating Officer

Nikhil A. Mehta
Senior Vice President and Chief Financial Officer

Charles E. Anderson
Vice President, Quality

Robert O. Gaskin, Jr.
Vice President, Human Resources

Mark J. Gergen
Vice President, General Counsel and Secretary

Kenneth R. Heilbrunn, M.D.
Vice President, Clinical Research

Anthony Ratcliffe, Ph.D.
Vice President, Research

CORPORATE HEADQUARTERS

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(858) 713-7300

SEC FORM 10-K

A copy of the Company's Annual Report to the Securities and Exchange Commission on Form 10-K is available without charge upon written request to:
Investor Relations
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La Jolla, California 92037-1005

BOARD OF DIRECTORS

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President
Advanced Tissue Sciences, Inc.

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Chief, Division of Experimental Medicine
Beth Israel Deaconess Medical Center
Dina and Raphael Recanati Professorship in Medicine
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FACTORS THAT MAY AFFECT FUTURE RESULTS:

This annual report includes a number of forward-looking statements that involve risks and uncertainties. Such statements include, but are not limited to, statements containing the words "believes," "anticipates," "expects," and words of similar import. The Company cannot predict with any certainty whether it will successfully obtain FDA or other regulatory approvals of Dermagraft or any other products, or that any such approval will be obtained on a timely basis, scale up manufacturing processes, launch its products within reasonable timeframes, obtain reimbursement for, or successfully commercialize any such products, or achieve any milestones for future funding under its joint venture with Smith & Nephew or alliance with Inamed Corporation. There can be no assurance that the Company's patents will afford protection against competitors with similar technologies or processes, or that such patents will not be infringed upon or designed around by others. Further, there can be no assurance that sources of funds will be available when needed, under existing arrangements or otherwise, or that any such funding will be on favorable terms. These and other risks are detailed in publicly available filings with the Securities and Exchange Commission such as the Company's Annual Report on Form 10-K for the year ended December 31, 2000. Actual results may differ materially from those currently anticipated as a result of such risks.

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