

A Summary of ATP-Funded Innovations for America's Aging Population



***Quality of Care ...
Quality of Life***

January 2007

NIST

**National Institute of
Standards and Technology**

Technology Administration
U.S. Department of Commerce

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ACKNOWLEDGEMENTS

The Advanced Technology Program (ATP) would like to acknowledge the contributions and cooperation of the award recipients highlighted within this report, and the following ATP project managers and staff who contributed substantially to the report's completion:

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INTRODUCTION

Since 1900, the U.S. population has tripled, but the number of older adults has increased 11-fold from 3.1 million in 1900 to 35 million in 2000. In 1900, life expectancy was 47 years old; in 2003, life expectancy was 77.6 years.¹ By 2030, when all of the baby boomers have reached age 65, the number of older Americans is expected to reach 71 million or roughly 20% of the U.S. population.²

Increased human life expectancy brings new societal and individual challenges as well as benefits:

- the need for long-term care and support services for an elderly population especially for those with physical, mental and cognitive limitations,
- ability to manage a wider array of illness and more serious medical conditions in a home setting, and
- cost-effective early detection, diagnosis, and supportive treatment of chronic diseases in an older population.

The impact of an aging population on our society is significant. According to a 2005 news report, the federal health care spending on the elderly is expected to reach \$1.2 trillion in 2015, up from \$473 billion in 2004.³ The assumption behind these large costs is that only today's technology will be available, and using that technology entails tremendous costs to individuals, to insurance companies and to governments. Opportunities exist for new technologies that help reduce costs of care while maintaining, and even improving, the quality of that care and improving the quality of life of seniors. If successful, new technologies offer the potential to provide much needed help to society and to seniors and their families.

"New technology solutions offer great promise to improve the quality of care while reducing healthcare costs...It is time now for technology to transform the experience of aging."

Center for Aging Services Technologies
*Technologies Issues Brief: Why We Need a National Consortium on the Impact of Technology in Aging Health Services*⁴

¹ *Health, United States, 2005*, Centers for Disease Control
<http://www.cdc.gov/nchs/data/hs/hs05.pdf>

² *The State of Aging and Health in America, 2004* Centers for Disease Control, p. 1.
http://www.cdc.gov/aging/pdf/State_of_Aging_and_Health_in_America_2004.pdf

³ "Aging Population Poses Global Challenges," Jonathan Weisman, *Washington Post*, February 2, 2005.

⁴ http://www.agingtech.org/documents/issues_brief.doc.





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THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY'S (NIST) ADVANCED TECHNOLOGY PROGRAM (ATP)

The mission of the National Institute of Standards and Technology (NIST) is "to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life."⁵ Within that broader mission, the Advanced Technology Program (ATP) acts as a catalyst with the private sector to accelerate the development of innovative technologies for broad national benefit by co-funding R&D partnerships with the private sector. This unique role enables ATP to provide funding for technologies that are too early in the R&D stage for private investment, and have the potential to enable broad-based national economic, social, or quality of life benefits. Precisely the kind of new technical ideas, and new approaches needed to address the challenges of an aging population.

During its 16 year history, ATP has received proposals from U.S. companies that operate in all fields of science and technology and from a wide range of industries that benefit from new innovation. ATP awards are based on the results of peer-reviewed competitions open to all technology areas and adhere to a demanding set of technical and business criteria. ATP awards are not direct grants to companies but rather cooperative agreements that require cost sharing from awardees. In the 43 competitions that were held between 1990 and 2004, 768 projects have been selected for cost-shared funding from over 6,000 submitted proposals.



⁵ http://www.nist.gov/public_affairs/general2.htm.



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ATP's INVESTMENT IN TECHNOLOGIES FOR AN AGING POPULATION

This report examines ATP's investment in innovative technologies for an aging population. It encompasses a broad class of technologies including products and services used in hospitals, nursing homes, continuing care retirement communities, assisted living and senior housing facilities, community service organizations, and home-based care services. Many of these technologies extend greater support for treating or managing health issues within non-traditional settings and by non-medical experts, including the seniors themselves. The technologies developed seek to improve the quality of life and meet the special needs of people 65 and older. An ATP awarded project is included in this cluster if its primary focus is to provide benefit to the aging population or it addresses problems that disproportionately affect the U.S. aging population. For example, arthritis, osteoporosis, and other chronic diseases have a disproportionate impact on those over 65. The included projects can and do benefit other age groups as well. Examples of the types of technologies developed through ATP include, but are not limited to, monitoring and sensor devices, communication tools, medication dispensing systems, telehealth applications, work place support, electronic health and wellness records, and new diagnosis and treatment options (including organ replacement).

To date, ATP has enabled **\$108.2 million** total research and development investment in technologies for an aging population through investing **\$63.6 M** in **34 projects** with 37 participant organizations. ATP has funded these projects through general or open competitions to which technologies in any technology area can apply and through specific healthcare related focus programs in the mid-1990s. ATP began funding projects in the healthcare area in the 1991 general competition and continued including healthcare related projects in its funded projects through the 2004 open competition. The projects researching technologies for an aging population were funded predominantly out of general or open competitions starting as early as the 1994 general competition right through the 2004 open competition. Some projects in this area were funded through the Information Infrastructure for Healthcare focus program (in 1994 and 1995) and the Tissue Engineering focus program (in 1997). Table 1 provides information on the investments that ATP and these companies have made in these projects, and Table 2 provides summary data on the participant organizations in these projects. It is important to note that small companies have received 29 out of the 32 single company awards ATP has made in this area and small companies have led both of the joint venture awards⁶. Studies have shown that small businesses produce 13-14 times more patents per employee as large patenting firms and that small

⁶ "Company means a for-profit organization, including sole proprietors, partnerships, limited liability companies (LLCs), or corporations." 15 CFR Part 295.2 (b)

"Award means Federal financial assistance made under a grant or cooperative agreement." 15 CFR Part 295.2 (a).

"Joint venture means a business arrangement that consists of two or more separately-owned, for-profit companies that perform research and development in the project; control the joint venture's membership, research directions, and funding priorities; and share total project costs with the federal government. The joint venture may include additional companies, independent research organizations, universities, and/or government laboratories" 15 CFR Part 295.2 (i).





businesses are particularly innovative in health care.⁷ Small, for-profit companies are at the core of this emerging market segment. Industry's cost share of more than \$47 million demonstrates the commitment of these predominantly small companies to the technologies and the opportunities within this market arena.

Table 1. ATP Investments in Technologies for the Aging Population

Award Type	ATP Funds (millions)	Industry Funds (millions)	Total Funds (millions)
Single Company	\$60.1	\$40.9	\$101.0
Joint Venture	\$3.5	\$3.7	\$7.2
Total	\$63.6	\$44.6	\$108.2

Table 2: ATP Participants in Awards by Company Size

Company Size ⁸	Single Awards	Joint Ventures (3 Awards)	Total
Small Businesses	29	3	32
Medium Businesses	1	--	1
Large Businesses	2	1	3
Non-profits	--	1	1
Total Participants	32	5	37

⁷ Chi Research, Inc. "Small Serial Innovators: the Small Firm Contribution to Technical Change" Report for SBA Office of Advocacy under contract number SBAHQ-01-C-0149, February 27, 2003. <http://www.sba.gov/advo/research/rs225tot.pdf>.

⁸ ATP defines small business as "a business that is independently owned and operated, is organized for profit, and is not dominant in the field of operation in which it is proposing and meets the other requirements found in 13 C.F.R. Part 121" 15 CFR Part 295.2 (p) ATP defines a large business "[to] mean any business, including any parent company plus related subsidiaries, having annual revenues in excess of the amount publish[ed] by ATP in the relevant annual notice of availability of funds...In establishing this amount, ATP may consider the dollar value of the total revenues of the 500th company in *Fortune* magazine's Fortune 500 listing." 15 CFR 295.2 (k). For the most recent ATP competition, this was annual revenues above \$3.034 billion. ATP defines medium size businesses as all businesses that do not meet the criteria for a small business or a large business.

PROJECTS HELP WITH SPECIFIC CHALLENGES

ATP projects address challenges for America's aging population in four key areas:

- Chronic Disease Diagnosis and Treatment,
- Improving Healthcare Delivery,
- Independent Living, and
- Tissue Engineering and Organ Transplantation.

ATP's enabling investments in these areas are shown below in Table 3 and discussed within the sections that follow. Appendix A provides a list of all 35 projects in this cluster.

Table 3. Summary of Awards for Technologies for the Aging by Category

Category	ATP Awards	ATP Funds (in millions)	Industry Funds (in millions)	Total Funds (in millions)
Chronic Disease Diagnosis and Treatment	13	\$23.6	\$17.7	\$41.3
Improving Healthcare Delivery	3	\$5.8	\$2.1	\$7.9
Independent Living	2	\$3.4	\$2.8	\$7.2
Tissue Engineering and Organ Transplantation	16	\$30.8	\$21.0	\$51.8
Total	34	\$63.6	\$44.6	\$108.2

Chronic Disease Diagnosis and Treatment

The technologies included in this area are those for the prevention, diagnosis and/or treatment of chronic diseases which disproportionately affect the elderly population. The Center for Disease Control reports that "80% of older Americans are living with at least one chronic condition, and 50% have at least two... [and]





among older Americans, almost 95% of healthcare expenditure is for chronic disease."⁹ The most common of these chronic diseases include diabetes, Alzheimer's disease, heart disease, and arthritis. Chronic diseases were the leading cause of death among for age 65 and older population.¹⁰

Primary Impact: Diagnostic tests, new treatments and new supportive technologies to diagnose chronic disease faster, provide better treatments and help seniors care for themselves in their own homes in the presence of chronic disease.

The following examples illustrate ATP-funded awards that impact the Chronic Disease Diagnosis and Treatment technical area:

Kine-assist for Physical Therapists

Chicago PT, LLC

Chicago, IL

(Project No. 2002-11-5107)

Develop and demonstrate a prototype robotic tool, the kine-assist, that will enable physical therapists to safely deliver more intensive and effective rehabilitation therapy with reduced concern about falls to stroke patients.

Project Brief: <http://jazz.nist.gov/atpcf/prjbriefs/prjbrief.cfm?ProjectNumber=00-00-5107>



Caption: Kine Assist Device
Courtesy of Chicago PT, LLC and
Tom Probst, Movco Media
Productions

BioBattery™ Technology: An Innovative Medical Treatment for Arrhythmia
Engineering & Research Associates, Inc.

Tucson, AZ

(Project No. 1998-01-0039)

Develop an innovative technology to treat dangerous heart arrhythmias that introduces new precision control into the technique of destroying abnormal heart tissue electrical pathways with radiofrequency energy by using the heart's tissue as part of the feedback circuit to monitor the progress of the treatment.

Project Brief: <http://jazz.nist.gov/atpcf/prjbriefs/rjbrief.cfm?ProjectNumber=98-01-0039>

⁹ *The State of Aging and Health in America, 2004*, p. 2
http://www.cdc.gov/aging/pdf/State_of_Aging_and_Health_in_America_2004.pdf

¹⁰ *Health, United States, 2005*, Centers for Disease Control
<http://www.cdc.gov/nchs/data/hus/hus05.pdf>

Integrated Platform for Implantable Biosensor

GlySens, Inc.

San Diego, CA
(Project No. 2000-1A-4217)

Develop a long-term implantable sensor for blood glucose, enabling people with diabetes to better monitor and regulate their blood glucose levels, thus greatly reducing the incidence of severe complications caused by wide blood glucose variations.

Project Brief: <http://jazz.nist.gov/atpcf/prjbriefs/rjbrief.cfm?ProjectNumber=00-00-4217>

Additional Information is available on the ATP web site at the following link:
<http://www.atp.nist.gov/factsheets/1-b-3.htm>

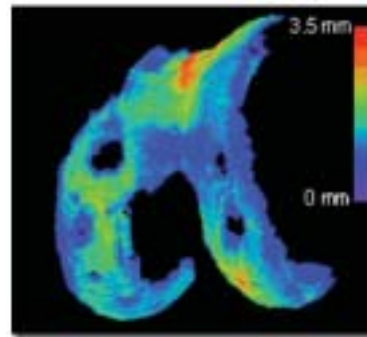
Novel Internet Enabled Techniques for Diagnosis and Management of Patients with Arthritis

Imaging Therapeutics, Inc.

Menlo Park, CA
(Project No. 2000-1C-4357)

Develop new, more accurate methods for quantitative diagnosis and monitoring of arthritis patients on the basis of automated analysis of magnetic resonance imaging (MRI) data.

Project Brief: <http://jazz.nist.gov/atpcf/prjbriefs/prjbrief.cfm?ProjectNumber=00-00-4357>



Caption: MRI-based cartilage thickness analysis of the knee
Courtesy of Imaging Therapeutics

Improving Healthcare Delivery

The technologies included in this area are those for improving the delivery of healthcare that are aimed at the elderly population or disproportionately impact the elderly population. This includes technologies aimed at supporting delivery of healthcare into the home, senior living facilities, or hospitals. These technologies support the delivery of healthcare without being specific to any one disease or condition or group of diseases or conditions. Medication management is one example of an area that disproportionately affects seniors. "People age 65 and older make up 13% of the U.S. population, yet they account for 34% of all prescription medications and 30% of all nonprescription medications."¹¹ Medication

¹¹ *The State of Aging and Health in America, 2004* Centers for Disease Control
http://www.cdc.gov/aging/pdf/State_of_Aging_and_Health_in_America_2004.pdf





management is, therefore, a challenge for many seniors in all types of living arrangements and a variety of technologies depending on the severity and nature of the medications can help manage the medications involved and reduce costs associated with medication management and medication error.

Primary Impact: Equipping older Americans' homes and skilled nursing facilities with better applications and better devices for managing the delivery of critical needed health care.

The following example illustrates ATP-funded awards that impact the Improving Healthcare Delivery technical area:



Multi-Drug, Portable Infusion System for the Treatment of Cancer and AIDS

Integrated Sensing Systems, Inc.
Ypsilanti, MI
(Project No. 2002-3B-5812)

Develop a highly portable multidrug infusion system that integrates the technology of microelectromechanical systems with a passively pressurized drug reservoir, thereby dramatically improving control of drug delivery, while operating on low power.

Project Brief: <http://jazz.nist.gov/atpcf/prjbriefs/prjbrief.cfm?ProjectNumber=00-00-5812>

Caption: MEMS flow sensor and single drug prototype sensing unit for IV drug infusions
Courtesy of Integrated Sensing Systems, Inc.

Independent Living

The technologies included in this area are those for supporting the elderly population in remaining independent and in a home environment or in an environment providing fewer services than a skilled nursing facility (e.g., senior apartment or assisted living) in the presence of actual or potential debilitating conditions. These technologies address a range of daily living and are not focused strictly on managing specific health care needs or conditions. The costs of long term care have increased dramatically. Being able to allow seniors greater options for a longer period of time is a substantial benefit to both quality of life and costs of providing health care services to an aging population.

Primary Impact: Sensors, automated devices, monitoring equipment, and other tools for making daily life in the home easier and safer for seniors.

The following example illustrates ATP funded awards that impact the Independent Living technical area:

Independent Life Style Assistant

Honeywell International Inc.

Minneapolis, MN

(Project No. 200-1C-4174)

Develop an intelligent home automation system with a sophisticated knowledge base, situation awareness and decision-making capability that can be easily integrated with a diverse set of sensors, medical devices and "smart" appliances to enable elderly and infirm users to live and function safely at home.

Project Brief: <http://jazz.nist.gov/atpcf/prjbriefs/prjbrief.cfm?ProjectNumber=00-00-4174>

Additional Information on this project in ATP's Healthcare Brochure at:

<http://www.atp.nist.gov/atp/brochures/healthcare.pdf>



Tissue Engineering and Organ Transplantation

The technologies included in this area are those for supporting the more widespread use of tissue engineering and organ transplantation, since the elderly are disproportionately affected by organ failure. Heart disease remains the leading cause of death for those 65 and older with kidney failure also high on the list.¹²

Primary Impact: Increasing the availability of organs for transplantation by making artificial tissues or organs that will integrate with the body, or improving the ability of hospitals to preserve available organs.

The following examples illustrate ATP-funded awards that impact the Tissue Engineering and Organ Transplantation technical area:

¹² Health, United States 2005, Centers for Disease Control. <http://www.cdc.gov/nchs/data/hus/hus05.pdf>





Caption: Image series showing a damaged animal knee joint being repaired using a bioresorbable implant with growth factors
 Courtesy of Kensey Nash Corporation (formerly THM Biomedical, Inc.)

***Biocompatible Resorbable Polymers
 Designed for Tissue Engineering***
Integra LifeSciences Corporation

Plainsboro, NJ
 (Project No. 1997-07-0051)

Synthesize and characterize biocompatible polymeric implant materials with the structural, chemical, and biological properties needed to support cartilage repair, potentially a billion dollar market in the U.S.

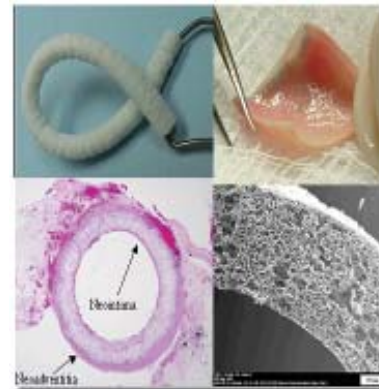
Project Brief: <http://jazz.nist.gov/atpcf/prjbriefs/prjbrief.cfm?ProjectNumber=97-07-0051>

***A Functionally Specific Three-Dimensional
 Polymer Implant for Articular Cartilage Repair
 and Regeneration***

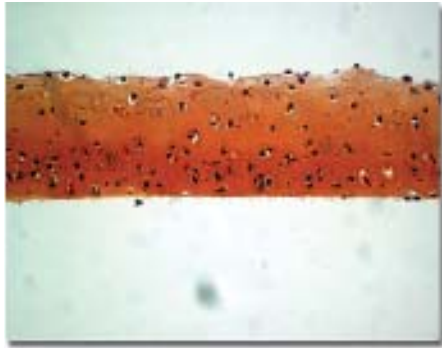
Kensey Nash Corporation
 Duluth, MN
 (Project No. 1999-01-1009) (formerly at THM Biomedical, Inc.)

Design, fabricate, and demonstrate a bioresorbable implant that stimulates the repair and regeneration of articular cartilage, including the cartilage layer that attaches to the bone, potentially providing a simple, rejection-free device that will greatly reduce the need for hip and knee replacements.

Project Brief: <http://jazz.nist.gov/atpcf/prjbriefs/prjbrief.cfm?ProjectNumber=99-01-1009>



Caption: Images of a polymer scaffold for a synthetic vascular graft and growth of tissue on the scaffold
 Courtesy of Kensey Nash Corporation



Caption: Cross-section of neo-cartilage tissue graft
Courtesy of ISTO Technologies

Dual-Phase Small Caliber Vascular Prosthesis

Kensey Nash Corporation
Exter, PA
(Project No. 2001-2B-4466)

Research and develop a tissue-engineered small diameter vascular prosthesis that provides reliable long-term clinical performance for coronary artery bypass grafting and other medical applications.

Project Brief: <http://jazz.nist.gov/atpcf/prjbriefs/prjbrief.cfm?ProjectNumber=00-00-4466>

Neocartilage Osteochondral Allograft Development

ISTO Technologies
St. Louis, MO
(Project No. 2001-2B-4433)

Develop and characterize a cartilage-like tissue graft that could be used to resurface or replace joint articular cartilage, greatly reducing the costs and suffering associated with arthritis and other cartilage defects and injuries.

Project Brief: <http://jazz.nist.gov/atpcf/prjbriefs/prjbrief.cfm?ProjectNumber=00-00-4433>

Cardiac Muscle Regeneration Using Mesenchymal Stem Cells

Osiris Therapeutics, Inc.
Baltimore, MD
(Project No. 2001-5B-4814)

Demonstrate that mesenchymal stem cells from bone marrow can differentiate into cardiac muscle and restore function to damaged heart tissue, potentially enabling a significant new cell-replacement therapy for heart patients. Coronary disease is the number one killer in the United States and costs the economy over \$150 billion annually.

Project Brief: <http://jazz.nist.gov/atpcf/prjbriefs/prjbrief.cfm?ProjectNumber=97-07-0049>

Additional Information on this project in a Success Story Description at: <http://www.atp.nist.gov/atp/bheart.htm>





Caption: Elastic biopolymer scaffold for a tissue engineered heart valve

Courtesy of Tepha, Inc.

Treatment of Cardiovascular Disease Using Tissue Engineering

Tepha, Inc.

Cambridge, MA

(Project No. 2002-1B-5173)

Develop novel elastic biomaterials and scaffolds seeded with a patient's own cells to engineer structures (valves, vessel, patches) for use in repair of damaged cardiovascular tissue. The biocompatible materials created in this project are also expected to have widespread use in other implantable, absorbable medical devices.

Project Brief: <http://jazz.nist.gov/atpcf/prjbriefs/rjbrief.cfm?ProjectNumber=00-00-5173>



ATP's BROADER INVESTMENT IN TECHNOLOGIES FOR HEALTHCARE AND BIOTECHNOLOGY

Technologies to help the aging population and assist society in reacting to the challenge of growing eldercare costs are part of a much larger investment ATP has made in healthcare and biotechnology. ATP has enabled more than \$1.1 billion of total investment in research and development in more than 224 projects in healthcare and biotechnology. This funding represents \$620 million of ATP investment and \$517 million of industry costshare. These are technologies cutting across all areas of healthcare and biotechnology including "some of the era's most important health advances - DNA diagnostic tools, telemedicine, and tissue engineering, among others."

SUMMARY

A key challenge for older Americans is improving quality of life in the presence of serious medical conditions, chronic disease, or impairment while mitigating the financial burdens to society and to families of eldercare. ATP has responded to this need by supporting the development of technologies that help to diagnose, manage and treat chronic diseases in a wider variety of settings from hospitals to home care and through projects that deliver greater level of services to the home or otherwise help seniors remain more independent in their homes. ATP projects are meeting that challenge with innovations that overcome barriers previously thought insurmountable and making new opportunities available to older Americans.





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**APPENDIX A:
COMPLETE LIST OF PROJECTS RESEARCHING TECHNOLOGIES
FOR THE AGING**





Lead Organization	Project Title	Award Dates	Project Number	Lead State
Chronic Disease Diagnosis and Treatment:				
APEX Medical, Inc.	A Long-Term Pressure-Sensing System for Use in the Human Body and Harsh Environments	11/1/1991-10/31/2001	1997-01-0259	MA
Bio-Nucleonics, Inc.	Development and Testing of a Coronary, Tubular, Radioactive Stent from a New Ternary Alloy	9/1/2001 - 8/31/2004	2001-1B-4389	FL
Chicago PT, LLC	Kine-assist for Physical Therapists	6/1/2003 - 7/31/2005	2002-1I-5107	IL
CytImmune Sciences, Inc.	The In Vitro Production of Human Monoclonal Antibodies	11/1/2004 - 10/31/2007	2004-1B-6100	MD
Engineering & Research Associates, Inc.	The BioBattery Technology: An Innovative Medical Treatment for Arrhythmia	11/1/1998 - 10/31/2007	1998-01-0039	AZ
GeITex Pharmaceuticals, Inc.	Molecular Recognition Polymers as Anti-Infectives	2/1/1995 - 1/31/1998	1994-01-0147	MA
GeITex Pharmaceuticals, Inc.	Molecular Recognition Polymers as Anti-Infectives	2/1/1995 - 1/31/1998	1994-01-0147	MA
GlySens, Inc.	Integrated Platform for Implantable Biosensors	11/1/2000 - 10/31/2003	2000-1A-4217	CA
Imaging Therapeutics, Inc.	Novel Low-Cost Techniques for Diagnosis and Management of Patients with Osteoporosis	6/1/2002 - 5/31/2004	2001-4I-4639	CA
Imaging Therapeutics, Inc.	Novel Internet Enabled Techniques for Diagnosis and Management of Patients with Arthritis	11/1/2000 - 10/31/2003	2000-1C-4357	CA
Integrated Surgical Systems, Inc.	Computer-Integrated Revision Total Hip Replacement Surgery	4/15/1995 - 1/31/2000	1994-01-0228	CA
Medtronic MiniMed	Non-invasive Glucose Measurement Using Chemical Amplification and Optical Sensing	1/1/1999 - 12/31/2001	1998-01-0154	CA
Nanospectra Biosciences, Inc.	The Seamless Detection and Treatment of Cancer With Near-Infrared Absorbing Nanoshells	10/1/2004 - 9/30/2007	2004-1B-6963	TX
Progenitor, Inc.	Application of Gene Therapy to Treatment of Cardiovascular Diseases	6/1/1995 - 5/31/1998	1994-01-0301	CA

Lead Organization	Project Title	Award Dates	Project Number	Lead State
Improving Healthcare Deliveries:				
Integrated Sensing Systems, Inc.	Multi-Drug, Portable Infusion System for the Treatment of Cancer and AIDS	10/1/2003 - 9/30/2005	2002-3B-5812	MI
Nuance, Inc.	A Multimedia Medical Dialog (MMD) System for Home Healthcare	10/1/1995 - 9/30/1998	1995-10-0014	MA
Titan Systems (formerly Averstar Inc.)	Enterprise Tools for the Continuously Available Medical Care (CAMC) Home Healthcare System	12/15/1994 - 3/17/1997	1994-04-0040	MA
Independent Living:				
Honeywell International, Inc.	Independent Life Style Assistant	11/1/2000 - 7/31/2003	2000-1C-4174	MN
Spry Learning Company	Technology for Early Detection and Intervention of Cognitive Decline	11/1/2004 - 10/31/2007	2004-1I-6357	OR
Tissue Engineering and Organ Transplantation:				
Advanced Tissue Sciences, Inc.	Development of Tissue-Engineered Vascular Grafts Based on Quantitative Cell and Tissue Biomechanics	1/1/1998 - 12/31/2000	1997-07-0017	CA
CryoLife, Inc.	Living Heart Valve Replacements	1/1/1999 - 12/31/2001	1998-01-0110	GA
Integra LifeSciences Corporation	Biocompatible Resorbable Polymers Designed for Tissue Engineering	4/1/1998 - 3/31/2001	1997-07-0051	NJ
ISTO Technologies	Neocartilage Osteochondral Allograft Development	10/1/2001 - 9/30/2004	2001-2B-4433	MO
Kensey Nash Corporation	Dual-Phase Small Caliber Vascular Prosthesis	10/1/2001 - 9/30/2004	2001-2B-4466	PA
Kensey Nash Corporation (formerly THM Biomedical, Inc.)	A Functionally Specific Three-Dimensional Polymer Implant for Articular Cartilage Repair and Regeneration	11/1/1999 - 10/31/2002	1999-01-1009	PA
NanoMatrix, Inc.	Living Vascular Implant	6/1/2002 - 5/31/2005	2001-4B-4688	TX





Lead Organization	Project Title	Award Dates	Project Number	Lead State
Organogenesis, Inc.	Bioengineering of a Liver Assist Device	12/1/1999 - 12/31/2001	1999-01-10-62	MA
Osiris Therapeutics, Inc.	Cardiac Muscle Regeneration Using Mesenchymal Stem Cells	3/1/1998 - 2/28/2001	1997-07-0049	MD
Osiris Therapeutics, Inc.	Neural Regeneration with Mesenchymal Stem Cells	6/1/2002 - 5/31/2005	2001-5B-4814	MD
Regeneration Technologies, Inc.	Gene Delivery System for Bone Regeneration	10/1/2001 - 9/30/2004	2001-3B-4624	FL
Revivicor, Inc. (formerly PPL Therapeutics, Inc.)	Autologous Stem Cell Production	1/1/2001 - 10/31/2003	2000-1A-4146	VA
Skillman (formerly-Ethicon, Inc)	Three Dimensional Fibrous Scaffolds for Tissue Engineering	6/1/1998 - 5/31/200	1997-07-0014	NJ
Tepha, Inc.	Treatment of Cardiovascular Disease Using Tissue Engineering	11/1/2002 - 10/31/2005	2002-1B-5173	MA
Tissue Regeneration Inc.	Engineered Rotator Cuff Tendon Tissue	5/1/2004 - 10/30/2006	2002-3B-5890	MA
Ximerex, Inc.	Human/Pig Hybrid Livers for Transplantation	11/1/2000 - 10/31/2003	2000-1A-4248	NE

About the Advanced Technology Program

The Advanced Technology Program (ATP) is a partnership between government and private industry to conduct high-risk research to develop enabling technologies that promise significant commercial payoffs and widespread benefits for the economy. ATP provides a mechanism for industry to extend its technological reach and push the envelope beyond what it otherwise would attempt.

Promising future technologies are the domain of ATP:

- Enabling or platform technologies essential to development of future new products, processes, or services across diverse application areas
- Technologies where challenging technical issues stand in the way of success
- Technologies that involve complex "systems" problems requiring a collaborative effort by multiple organizations
- Technologies that will remain undeveloped, or proceed too slowly to be competitive in global markets, in the absence of ATP support

ATP funds technical research, but does not fund product development—that is the responsibility of the company participants. ATP is industry driven, and is grounded in real-world needs. Company participants conceive, propose, co-fund, and execute all of the projects cost-shared by ATP. Most projects also include participation by universities and other nonprofit organizations.

Each project has specific goals, funding allocations, and completion dates established at the outset. All projects are selected in rigorous competitions that use peer review to identify those that score highest on technical and economic criteria. Single-company projects can have duration up to three years; joint venture projects involving two or more companies can have duration up to five years.

Small firms on single-company projects cover at least all indirect costs associated with the project. Large firms on single-company projects cover at least 60 percent of total project costs. Participants in joint venture projects cover at least half of total project costs. Companies of all sizes participate in ATP-funded projects. To date, nearly two out of three ATP project awards have gone to individual small businesses or to joint ventures led by a small business.

Contact ATP for more information:

- **On the Internet:** www.atp.nist.gov
- **By e-mail:** atp@nist.gov
- **By phone:** 1-800-ATP-FUND (1-800-287-3863)
- **By writing:**
Advanced Technology Program, National Institute of Standards and Technology, 100 Bureau Drive, Stop 4701, Gaithersburg, MD 20899-4701

