

The Connecticut Stem Cell Research Program

Taking a Measure of the Progress After the First Six Years

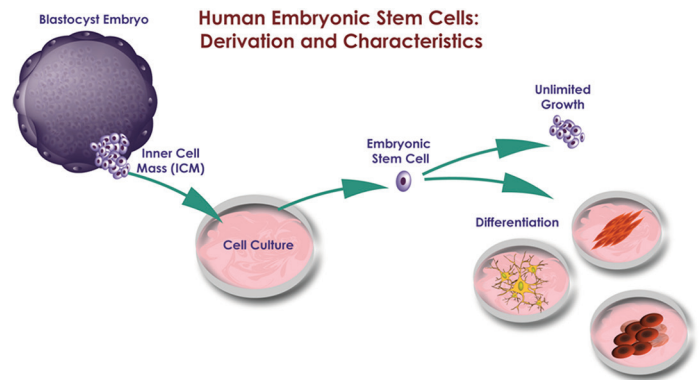
Although stem cells and regenerative medicine are terms often heard in the news these days, stem cell research is a relatively new area of exploration for scientists. It is frequently featured in the media because many scientists believe that these special cells have the potential to significantly benefit human health. This is due to the two unique qualities of stem cells: the ability to develop into different cell types and their capacity for indefinite growth or “self-renewal.” Scientists can use these special cells to study the growth and development of tissues and organs, to develop new drugs and to study genetic diseases from the earliest stages. Because their growth can be guided in the laboratory, researchers can use them to produce specific cell types via a process called differentiation. For example, a scientist researching spinal cord injury can culture new nerve cells from stem cells to replace those that have been injured. Stem cells have the potential to become a new tool for physicians to treat patients and for scientists to uncover cures.

It is worth noting that much of this groundbreaking work with stem cells is taking place right here in Connecticut. Examples of innovative studies are not difficult to come by.

- At Yale University researchers have uncovered a key link between stem cell factors that fuel ovarian cancer’s growth. This research may lead to new targets for ovarian cancer therapies.
- Scientists in three biology labs at Wesleyan University are working on stem-cell based treatments for temporal-lobe epilepsy, a type of the disorder that is currently lacking effective treatments.
- At the University of Connecticut researchers are using stem cells alongside gene therapy techniques to explore possible therapies for genetic diseases.

These examples are just the tip of the iceberg. In fact, Connecticut is viewed by many scientists as a “hub” for this type of research. In 2005, Connecticut joined California and New Jersey as the only states to allocate public funds for stem cell research when Public Act 05-149, an Act Permitting Stem Cell Research and Banning the Cloning of Human Beings, was enacted by the General Assembly. Under the legislation, which established the Connecticut Stem Cell Research Program, \$20 million dollars was set aside for stem cell research. The act allocated an additional \$80 million dollars to be used over the course of seven years (2008-2015) from the state’s Tobacco Settlement Fund to support future research. While a few other states have since created stem cell grant programs, Connecticut was among the very first to recognize the importance of funding this type of research.

There were several important reasons why Connecticut took this visionary stance. At the time the legislation was enacted, researchers were struggling to find funding due to a federal ban on embryonic



The key characteristics of stem cells are that they can self renew and differentiate into different cell types. [Image created by Priscilla Vazquez for the University of Massachusetts Medical School Stem Cell Center, 2008]

stem cell research. On August 9, 2001, President George W. Bush had introduced a ban on federal funding for research on newly cre-

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From the National Academies

The following is excerpted from press releases and other news reports from the National Academies (www.national-academies.org).

◆ For Americans: Shorter Lives, Poorer Health

According to a new report from the National Research Council and Institute of Medicine, Americans die sooner and experience higher rates of disease and injury on average than people in other high-income countries. The report finds that this health disadvantage exists at all ages and that even “advantaged” Americans—those who have health insurance, college education, higher incomes, and healthy behaviors—appear to be sicker than their peers in other wealthy nations.

The report, the first comprehensive look at multiple diseases, injuries, and behaviors across the entire life span, compares the United States with 16 nations including Australia, Canada, Japan, and many western European countries. Among these countries, the United States is at or near the bottom in nine key areas of health: infant mortality and low birth weight; injuries and homicides; teenage pregnancies and sexually transmitted infections; prevalence of HIV and AIDS; drug-related deaths; obesity and diabetes; heart disease; chronic lung disease; and disability.

The panel did find that the United States outperforms its peers in some areas of health and health-related behavior: people over age 75 live longer, and Americans have lower death rates

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ated human embryonic stem cell lines. The policy specified that research on the 71 lines created prior to that date would still be eligible for funding from federal agencies such as the National Institutes of Health (NIH). Unfortunately, only 21 of these stem cell lines proved to be useful for research purposes, leaving many stem cell scientists ineligible to receive federal funding for continuing their research. In 2009, President Barack Obama repealed the executive order banning federal funding, allowing researchers access to more funding than before.

Another reason Connecticut set aside these funds was because dedicating funding for stem cell research was a means of securing Connecticut's place as a leader and resource in this burgeoning field. While the political and scientific environments of today are quite changed from when the act was adopted, the need for funding stem cell research has not diminished. Scientists as a group are facing record lows in federal funding for basic biological research. This is particularly true of the NIH, the organization where stem cell scientists traditionally have looked for research funding.

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With the initiation of the act, strategies for managing the program also were created. Advisory and peer review committees were formed. The Stem Cell Research Advisory Committee (SCRAC) oversees the program with the goal of ensuring that the grants are awarded in a fair, transparent and timely manner. The commissioner of the Connecticut Department of Public Health (DPH) serves as the chair and the committee is composed of experts from the fields of stem cell research, bioethics, embryology, genetics, cellular biology and business or financial investments. Connecticut Innovations, Incorporated (CI) serves as administrative staff for the program on behalf of DPH and SCRAC. CI administers the annual RFP (Request for Proposal) process and serves as the fiduciary agent for the program. The legislation that created the Stem Cell Research Program also established a Stem Cell Research Peer Review Committee. The purpose of this committee is to review all grant applications for scientific and ethical merit and make recommendations on grant recipients to the SCRAC.

Additionally, the DPH with SCRAC developed collaborative relationships with members of the local, national and international stem cell research communities, including scientists, policy makers, advocates and consumers.

Through 2012, the Connecticut Stem Cell Research Program has awarded 129 grants for a total of \$68.8M of the \$100M allocated for the program. Five types of proposals have been accepted over the course of the program to date, each with its own criteria and award amounts. The five types, and the number of awarded grants for each, is listed below:

- Core Facilities (9 awards)
- Established Investigators (50 awards)
- Group Projects (4 awards), including Disease Directed Collaboration Group Projects (starting in 2011) (2 awards)
- Hybrid (in 2006 only) (1 award)
- Seed (63 awards)

While anyone can apply for these grants, they have been most suited to the large academic institutions within the state. This is because of the expensive equipment and high level of expertise that was necessary to manipulate these cells. Through 2012, all but one grant was awarded to the University of Connecticut/University of Connecticut Health Center (UCHC), Wesleyan University or Yale University. In 2011, Chondrogenics, Inc., a private stem cell company, received a Group grant award. It is anticipated that as this research becomes more common, more private companies and smaller institutions will have the capacity to conduct this research and to compete successfully for grants.

At year six of the Connecticut Stem Cell Research Program, the DPH and CI asked the Connecticut Academy of Science and Engineering (CASE) to conduct an analysis of the accomplishments of the program. At the end of 2012, approximately half of the grants have been allocated, though many projects were still ongoing. Therefore, timing was opportune to assess what accomplishments the program had funded to date.

What this assessment found was that there were several areas in which funding from the program has already yielded results. These areas include leveraging the Connecticut funding, creation of new Connecticut jobs in the field of stem cell research, and development of partnerships and collaborations.

Leveraging the funding: Many of the Principal Investigators (PIs) reported that as a result of the funding they had received from the Connecticut Stem Cell Research Program, they pursued and/

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Biomedical Research

NEW FLU VACCINE GETS FDA NOD. Meriden's **Protein Sciences Corporation** announced in January that the US Food and Drug Administration (FDA) approved Flublok, a flu vaccine for people ages 18-49. Unlike other vaccines, Flublok uses recombinant DNA technology. It is the first vaccine made without the live virus or eggs. It is highly purified and manufactured without preservatives (thimerosal), antibiotics or adjuvants (agents added to vaccines to increase the body's immune response) and has three times the active ingredient typically found in traditional vaccines. Karen Midthun, director of the FDA's Center for Biologics Evaluation and Research, stated, "The new technology offers the potential for faster start-up of the vaccine manufacturing process in the event of a pandemic, because it is not dependent on an egg supply or on availability of the influenza virus." Flublok will be available for the 2013-2014 flu season.

BIOSCIENCE INNOVATION ACT PROPOSED. On January 17 at a groundbreaking ceremony for the **Jackson Laboratory for Genomic Medicine (JAX)** in Farmington, Governor **Dannel Malloy** proposed a \$200 million Bioscience Innovation Act intended to enhance Connecticut's biotechnology sector. The act, which will be monitored and administered by **Connecticut Innovations**, includes an advisory board to oversee fund allocation and a vetting process for investments. JAX Genomic Medicine, after full development, is expected to support 6,800 permanent jobs. The act is part of a legislative package for the 2013 legislative session.

CI GRANTS \$1.5M TO CT FIRMS. On December 7, **Connecticut Innovations (CI)** granted \$1.5 million to Branford's **Axiomx** and New Haven's **CMD Bioscience** in addition to Farmington-based **Synbody Biotechnology**. Axiomx got \$750,000 and CMD received \$500,000, while the remaining \$250,000 went to Synbody. "We continue to build on Connecticut's strength in bioscience, an industry that the Malloy administration has targeted for growth, by investing in promising companies such as Axiomx, CMD and SBI," said **Claire Leonardi**, chief executive officer and executive director of CI. CMD, located at Science Park, specializes in computer-enabled analysis, modeling and design of therapeutic protein-peptide interactions. In March, CI invested \$750,000 in Synbody, which relocated from Pennsylvania and currently collaborates with the **University of Connecticut** and **Hartford Hospital** on developing a drug discovery technology generating synthetic antibodies.

GRAPHENE MAPPING FOCUS OF BRIDGEPORT GRANT. On January 18, the **University of Bridgeport (UB)** announced it received \$100,000 for work with graphene blood mapping as part of a \$1.1 million research effort led by **Connecticut Analytical Corporation (CAC)**. The Defense Advanced Research Projects Agency awarded funding to CAC for the two-year project. Research will be conducted at the laboratory of **Prabir Patra**, professor in the department of biomedical engineering and department of mechanical engineering at UB, and by researchers at Harvard, MIT, **Yale**, and Case Western Reserve University. The research focuses on developing innovative methods, materials, and devices to improve collection, storage, material recovery and processing of dried biological specimens such as dried blood, urine, or saliva used for various diagnostics.

CT ANTIVIRUS-DRUG DEVELOPER GETS FUNDING. On December 27, **NanoViricides Inc.**, a West Haven antiviral-drug

developer, received \$2.5 million, the second half of its promised \$5 million capital commitment from Florida investor, Seaside 88 LP, providing necessary cash to sustain NanoViricides for an additional 24 months of operation with no income. In exchange, Seaside 88 LP received 2,500 shares of series C preferred stock priced at \$1,000 apiece. NanoViricides is pursuing US Food & Drug Administration review and approval of its FluCide antiviral drug. Currently, NanoViricides plans to convert a former light-manufacturing facility into a bio-lab for production of antiviral agents including treatments for bird and swine flu, herpes, HIV, Ebola and Dengue fever.



Business & Industry

UTC POWER SOLD TO OREGON COMPANY. **United Technologies Corp.** announced December 22 that it is selling its South Windsor fuel cell manufacturer, **UTC Power**, to Oregon-based ClearEdge Power, an energy company. UTC Power has the highest revenue of any fuel cell company in the world and along with **FuelCell Energy** of Danbury, is the cornerstone of Connecticut's fuel cell industry, with more than \$500 million in annual revenue. The decision is part of a restructuring that began with \$16 billion purchase of North Carolina aerospace manufacturer Goodrich Corp. The deal is expected to close in early 2013.

CHEMTURA PROPOSES SOLAR PANEL INSTALLATION ON BROWNFIELDS SITE. **Chemtura**, a Middlebury-based chemical manufacturing company, proposed a solar panel installation project behind its Spencer Street building on a brownfield-designated site. The company intends to cover five acres of brownfields with about 4,000 solar panels between Elm Street and Cherry Street Extension. Chris Clark, vice president of business development for Nexamp, a Boston-based solar company, said Nexamp would fund the \$3 million project. The solar panels can produce 1 megawatt of electricity, or 1.4 million kilowatt hours per year, enough to power about 70% of 12 Spencer St., which houses labs of analytical, diagnostic and small-scale production equipment. Chemtura is paying for the environmental cleanup, which is estimated to cost about \$1 million.

SAINT FRANCIS CARE TO PARTNER WITH ASCENSION. On January 17, **Saint Francis Care, Inc.**, signed a letter of intent forging a partnership with **Ascension Health Care Network** to create a statewide integrated healthcare delivery system. Ascension Health Care Network is an affiliate of Ascension Health Alliance, the largest Catholic health system in the nation. Saint Francis Care includes **Saint Francis Hospital and Medical Center**, **The Mount Sinai Rehabilitation Hospital**, the **Connecticut Joint Replacement Institute**, the **Hoffman Heart and Vascular Institute of Connecticut**, the **Saint Francis/Mount Sinai Regional Cancer Center**, and the **Joyce D. and Andrew J. Mandell Center for Comprehensive Multiple Sclerosis Care and Neuroscience Research**. Specific terms have not been disclosed.



Communication

MOBILE TECH FIRM GETS CI FUNDING. In November, **Connecticut Innovations (CI)** invested \$750,000 in Westport-based mobile technology company, **Deets Inc.**, which recently moved from California to **Westport**. CI's investment is part of \$1.5 million that includes money from individual investors. Deets makes soft-

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ware designed to facilitate collaboration between users of Apple devices such as the iPhone and iPad. **Linda Miller**, chief executive officer and founder of Deets, states, "Our platform gives control back to the individual so communication is quick and relevant. With an estimated one billion smart phone users in the market today, we believe productive communication is the next step."

CT FUNDS NEW MEDICAL COMMUNICATION TECHNOLOGIES.

Connecticut Innovations announced on January 28 that it has committed \$200,000 to Norwalk-based **MedAdherence**, a company using cloud and mobile technologies to provide automated communication systems for monitoring patient care, allowing healthcare providers to intervene remotely to ensure patients adhere to care plans. Patients can manage their own care with messages from healthcare practitioners delivered through a range of communications tools including cell phones, landlines, text messaging and the Internet. MedAdherence seeks to improve patient compliance, thus reducing financial risks associated with unnecessary healthcare costs.



Education & Cognition

AUTISM STUDY SUGGESTS BENEFITS OF EARLY INTERVENTION.

In a study published in the November issue of the *Journal of Autism and Developmental Disorders*, **Yale Child Study Center** researchers **Fred Volkmar** and **Kevin A. Pelphrey** state that given early treatment, children with autism spectrum disorders (ASD) make significant improvements in behavior, communication, and brain function. The study results suggest that brain systems supporting social perception respond well to an early intervention behavioral program called pivotal response treatment that includes parent training, and play. For the first time, researchers used functional magnetic resonance imaging (MRI) to measure changes in brain activity after two five-year-olds with ASD received pivotal response treatment. The researchers are currently conducting a study of 60 children. Children who received this treatment showed improvements in behavior and verbal interaction. In addition, the MRI and electroencephalogram revealed increased brain activity in the regions supporting social perception.

DARIEN HIGH SCHOOL TECHNOLOGY PROGRAM WINS TOP HONOR.

In December, the **Connecticut Technology and Engineering Education Association** selected the **Technology and Engineering Education Department** of **Darien High School** as **Connecticut Technology and Engineering Education High School Program of the Year**. There are approximately 500 students in the department enrolled in several different classes including wood-working, architecture, drafting and systems of technology. Recently, the department started a new class where students will be shadowing professionals in the engineering field. In addition, the program will bring in professionals from the engineering community to speak to students about their jobs.

CT TO HELP PILOT 'EXPANDED TIME SCHOOLS.' Connecticut will be one of five states where state leaders, the Ford Foundation, and the National Center on Time & Learning (NCTL) will work to develop expanded-time schools. The states will use federal and state funding to add 300 hours of instruction to select schools. Teams will develop an expanded-time schedule for all students; offer individualized help for struggling students; use technology to improve instruction; enhance teacher collaboration; provide arts enrichment opportunities, and promote a culture of high achievement. Schools in the three districts planning to implement the longer hours include: **Thomas S. O'Connell Elementary School** in East Hartford,

Casimir Pulaski Elementary School and **John Barry Elementary School** in Meriden and **Jennings Elementary School, Winthrop Magnet Elementary School, Nathan Hale Elementary School** and the **Bennie Dover Jackson Middle School** located in New London.



Energy

P&W SELLING POWER SYSTEMS. **Pratt & Whitney**, a division of parent company **United Technologies Corporation**, announced in December that it is selling **Pratt & Whitney Power Systems**, a division that makes industrial gas turbines, to Japan's **Mitsubishi Heavy Industries, Ltd.** Terms of the sale were not disclosed. The Pratt division uses aircraft engines as the basis for electric generation turbines that run on natural gas. Following the division's sale to Mitsubishi, the companies will enter into long-term agreements that will allow Pratt to continue engineering and manufacturing services on the turbines, according to **Bryan Kidder**, a company spokesman. Facilities for Pratt & Whitney Power Systems are in East Hartford and San Antonio, Texas. About half of the Pratt division's 380 employees are in Connecticut, Kidder said.

YALE TEAM REPORTS PROGRESS ON MICRO FUEL CELL. The November issue of the journal *Small* published results of work by **Yale** engineers on development of a micro fuel cell that can function as an alternative to a battery, providing long-lasting, low-cost, and eco-friendly power to portable electronic devices such as tablet computers, smart phones, and remote sensors. Major components of the new device are made of bulk metallic glasses which are very pliable metal alloys—more durable than the metals normally used in micro fuel cells. "These amorphous metal alloys are amazing materials that can be easily shaped into both large and small nanostructures, yet retain suitable properties for a wide range of electrochemical applications," said principal investigator **André D. Taylor**, an assistant professor of chemical and environmental engineering at **Yale School of Engineering & Applied Science**.

BRIDGEPORT FUEL CELL PROJECT TO BE LARGEST IN US. It was announced in December that the **Bridgeport Fuel Cell** project, developed and manufactured by **FuelCell Energy Inc.** in Danbury and now owned by Virginia-based **Dominion Resources**, will be fully operational and begin producing electricity by December 2013, making it the largest fuel cell power plant in North America. The fuel cell park is located on approximately 1.7 acres of land leased from Bridgeport and has been under development for six years. "This is the largest project that we have developed to date in the USA, working with three utilities, local, and state government to enhance the reliability of the electric grid with clean distributed power generation," said **Chip Bottone**, president and CEO of FuelCell Energy. The plant is part of a state program to increase renewable and clean energy projects. FuelCell Energy is receiving \$5 million in loans to be repaid to the state **Clean Energy Finance and Investment Authority** and a \$1.5 million grant.

STATE 'LEADS THE PACK' ON EFFICIENCY. On December 5, **The Northeast Energy Efficiency Partnerships (NEEP)** awarded Connecticut one of its "Leading the Pack" awards as a regional leader in energy efficiency. Northeast and Mid-Atlantic states were ranked in energy efficiency as part of NEEP's *Regional Roundup of Energy Efficiency Policy* report. Connecticut was recognized for the 716,200 businesses and homes that participated in energy efficiency programs in 2011, as well as for the state's commitment to improve energy code, building policy and the formation of the **Clean Energy Finance and Investment Authority**.

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HELPING FINANCE ENERGY UPGRADES. On January 24, the **Clean Energy Finance and Investment Authority** (CEFIA) announced the launch of the **Commercial and Industrial Property Assessed Clean Energy (C-PACE) Program**, a financial product created to assist building owners seeking financing for clean energy upgrades. CEFIA, assigned by the state legislature to design the program, included **Buonicore Partners** as the program's technical administrator and **Honest Buildings** to develop an interactive online portal. C-PACE is part of the state's **Energize Connecticut initiative**, developed to help consumers save money and use clean energy. The program affords access to low-cost financing for building owners using cleaner, cheaper, and more reliable energy.



Environment

GREENCIRCLE AWARDS. On November 26, as part of the GreenCircle Program, **Department of Energy and Environmental Protection** (DEEP) officials honored 19 people, businesses and civic groups for efforts to improve the environment. Among those recognized were a restaurant that composts food, cups and packaging into mulch; an inn that installed an electric vehicle charging station for its clients; and a company certified for environmental practices. The GreenCircle Award Program started in 1998 with approximately 1025 awards granted to people, businesses, schools and organizations for more than 1450 projects preserving natural resources and protecting the state's air, water and land quality.

EEL TRACKING ENDS. During the first week of December, tracking ended for eels being monitored with radio-transmitters after being released into the **Aspetuck River**. This endeavor was a collaborative effort between **Aquarion Water Company, The Nature Conservancy, Sacred Heart University, the US Geological Survey's Silvio O. Conte Anadromous Fish Laboratory** in Turner's Falls, and the **Connecticut Department of Energy and Environmental Protection**. The project's key goal was to further understanding of how American eels, proposed for federal endangered species listing, respond to river barriers and water diversions that create barriers to migrations critical for the species' survival.

CT JOINS CALL FOR EPA TO ACT ON METHANE. In December, Connecticut joined six other states in notifying the federal Environmental Protection Agency (EPA) they intend to sue if the EPA does not correct its failure under the Clean Air Act to set performance standards for new sources, and guidelines for existing sources, to curb methane emissions from the oil and gas sector. **Department of Energy and Environmental Protection Commissioner Daniel Esty** noted, "Reserves of domestic natural gas offer a very real and important opportunity to make cleaner and cheaper energy available to our residents and businesses, but, we must take advantage of this valuable resource in an environmentally responsible manner—and that means strong regulatory oversight of methane emissions by EPA."

PERCEPTION = REALITY WITH CLIMATE CHANGE. A study by Yale postdoctoral associate **Peter D. Howe** published in December's issue of *Nature Climate Change* attempted to determine whether people "have accurately detected the signal of a changing climate through their own local experience," which in turn may influence the public's response to climate change in future years. Researchers noted that the study, which was based on Gallup World Poll surveys of about 91,000 individuals in 89 countries, found that "perceptions tended to match reality—people who reported that their local area was getting warmer were indeed experiencing temperatures over the previous 6 to 12 months that were relatively higher, on average."



Food & Agriculture

ACCELERATING FARMLAND RESTORATION. Last fall, Governor **Malloy** and representatives of the **Connecticut Department of Agriculture** visited farms in the state to see how they are faring with grant money received as part of the department's **Farmland Restoration Program**. The program, which set aside \$5 million for restoration, is part of the October 2011 jobs bill intended to bring fallow state farmland back into production. Noting that about \$1 million has been set aside so far for 50 farms, Malloy noted the "increasing market for locally produced foods, whether it's milk or vegetables or meat production" and said, "I want more money spent. I want more land into production, faster."

FANS IN MOTION. It was announced in December that **CT FANS in Motion**—a collaboration between the **Department of Extension** at the **University of Connecticut's College of Agriculture and Natural Resources** and the **Department of Kinesiology** in the university's **Neag School of Education**—was funded through a \$2.5 million competitive grant from the US Department of Agriculture's National Institute of Food and Agriculture. The grant enhances a 4-H youth development program to reduce childhood obesity in 9 to 14 year-olds. The program started this fall at the **Roger Sherman Elementary School** in Meriden and will expand to schools in New Haven, Fairfield, and Windham counties. The program is year-round, providing fun and educational activities including a gardening component for families and their children.



Health

DOPAMINE LEVELS KEY TO MOTIVATION. In a November 8 review in the journal *Neuron*, **John Salamone, University of Connecticut** Board of Trustees Distinguished Professor of Psychology and longtime researcher of the brain chemical dopamine, says that numerous studies demonstrate that dopamine is responsible not for pleasure, but for motivation. Low levels of dopamine make people and other animals less likely to work for things, demonstrating the chemical has more to do with motivation and cost/benefit analyses than pleasure. Salamone's studies show that animals with lowered levels of dopamine almost always choose the easy, low-value reward, while animals with normal levels don't mind exerting effort to jump the fence for the high-value reward. Other studies in humans, such as research with depressed patients, have corroborated these results.

CT 6TH HEALTHIEST STATE. Connecticut ranked as the 6th healthiest state in the country in 2012, slipping from fourth healthiest in 2011, according to the study "America's Health Rankings: A Call to Action for Individuals & Their Communities," published in December by the United Health Foundation. The study found that while Connecticut has one of the lowest smoking rates in the country, 475,000 adults still smoke. Other highlights noted that in the past five years, public health funding increased from \$57 to \$71 per person, preventable hospitalizations decreased from 67.3 to 60.4 discharges per 1,000 Medicare enrollees and in the past year, infant mortality decreased from 6.3 to 5.8 deaths per 1,000 live births.

RUDD STUDY LOOKS AT WEIGHT-BASED DISCRIMINATION IN YOUTH. A study by researchers at the **Rudd Center for Food Policy & Obesity** at Yale and published December online in *Pediatrics* is the first comprehensive look at how weight-based victimization impacts youth seeking weight-loss treatment. Even as

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teens struggle to lose weight in treatment programs, they continue to experience weight-based discrimination from peers, parents and teachers. The study looked at 361 adolescents enrolled in two national weight-loss camps. Most reported teasing and bullying at school and victimization for over a year, with some stating teasing and bullying continued over five years and in some cases even after weight loss. Health providers, school personnel, and weight loss program staff can help by identifying teasing, bullying, or psychological distress, identifying support systems, sharing concerns with parents, and working to find resources for youth in need.

STATE OFFERS FREE VACCINES TO PEDIATRICIANS. A program started in January by the **Connecticut Department of Public Health** makes vaccines—including pneumococcal conjugate, influenza and hepatitis A—free at pediatric offices. Children are required to have vaccines including polio, measles, mumps and rubella vaccine; hepatitis B; varicella (chicken pox); diphtheria, tetanus and pertussis vaccine; and influenza and pneumococcal vaccine for entering kindergarten. Only 76% of children by age 3 receive the correct recommended dosages, placing Connecticut 30th in the nation in vaccination levels. “Giving vaccines is pretty expensive. The more the state does to expand the availability of vaccines the better,” said **Philip Brewer**, medical director for student health services at **Quinnipiac University**.



High Technology

UConn TECH PARK. On December 5, members of the UConn community were shown plans for the **University of Connecticut Technology Park** to be built at the Storrs campus and featuring research equipment, flexible-use laboratories, and business incubator space, with completion anticipated for 2015. The ultimate goal is to design about 900,000 square feet of building space divided into three “nodes” of several buildings. An allocation of \$170 million in state bonds will fund the initial costs. UConn Provost **Mun Choi** stated, “the goal is for the project not just to attract partnerships and faculty from the region, but to draw innovative companies and researchers from around the globe to Storrs.”

TRINITY HOSTS ‘HACKATHON.’ On December 1 and 2 volunteer software developers at 24 global sites including **Trinity College** met to seek innovative solutions to sanitation challenges. The **Sanitation Hackathon** resulted from a partnership initiated by The World Bank in collaboration with the Bill & Melinda Gates Foundation, Random Hacks of Kindness (RHoK), Eirene, Nokia, UNICEF and Civic Commons. This was the second consecutive year Trinity sponsored a RHoK gathering of software developers, and the fifth RHoK event held since 2009. RHoK is dedicated to using technology to make the world a better place by building a volunteer community of innovation. Participants convene for two days to create open source software solutions that can save lives and alleviate suffering. This year’s event at Trinity focused on global sanitation problems.

FISERV BUYS GLASTONBURY FIRM. In a deal priced at \$850 million, Wisconsin-based Fiserv Inc., a company selling banking technology, acquired **Open Solutions Inc.** of Glastonbury, the largest acquisition for Fiserv since it bought CheckFree Corp. for \$4.4 billion in 2007. The January acquisition adds several new technologies with the greatest benefit to Fiserv. Fiserv expects to cross-sell its products, including online bill payment and mobile payments, to its new Open Solutions clients. Fiserv currently has approximately 38% of the core account-processing customers in the United States, representing the biggest market share, while Open Solutions has about 5%.

APS GETS LOAN TO EXPAND. On January 25, the state’s **Bond Commission** approved a \$5 million loan to **APS Technology, Inc.**, a global provider of high technology and services to the oil and gas drilling industry, to aid expansion in **Wallingford**. The expansion adds 20,000 square feet to the 60,000 square-foot headquarters. APS—a leader in Measurement-While-Drilling, rotary steerable and vibration management products for the oil and gas drilling industry—anticipates increasing its state workforce from 155 in 2012 to at least 278 people by 2015. The **Department of Economic and Community Development** is supporting the expansion with a 10-year, \$5 million loan.



Transportation

FUEL CELL TO POWER CTTRANSIT FACILITY. On November 28, Governor **Dannel Malloy** and officials from the **Connecticut Department of Transportation** (ConnDOT) and **CTTRANSIT** dedicated the **United Technologies Company** (UTC) stationary fuel cell, which will power CTTRANSIT’s **Hartford** bus maintenance and storage facility. The project, funded by a \$5.2 million grant from the Transit Investments for Greenhouse Gas and Energy Reduction (TIGGER) Program through the Federal Transit Administration, provides 77% of the building’s power. The governor also announced a \$5.7 million Federal Transit Administration grant for similar technology at the **New Haven** bus maintenance and storage facility.

FORUM ADDRESSES STATUS OF INFRASTRUCTURE. Addressing a December 10 transportation forum, **Connecticut Department of Transportation Commissioner James Redeker** warned that Connecticut has a backlog of more than \$3 billion worth of repairs without money to pay for it. Conditions are expected to deteriorate after 2014, when a federal stopgap transportation bill expires. Governor **Dannel Malloy**, who also addressed the forum, said he believes part of the solution can come from successful private development around new transit stations. “With two major transit lines in the works, Connecticut is in great position to begin implementing transit-oriented development,” said **Roger Reynolds**, senior attorney for the **Connecticut Fund for the Environment**.

ANNUAL REPORT ON TRANSIT IN CT RELEASED. On January 23, the **Connecticut Public Transportation Commission** released its 2012 Annual Report, which includes nine recommendations for improving public transportation services in Connecticut. The recommendations stem from five public hearings the commission held across the state in 2012 and its twelve monthly meetings. The Commission’s first recommendation is to maintain funding to support current services. Other recommendations include relocating the Windsor Locks railroad station, increased marketing and information to inform the public of transit options, restoring previously cut funding for the state matching grant program supporting dial-a-ride services, and close involvement in a federal study of infrastructure and service upgrades along Amtrak’s Northeast Corridor.

PLAINVILLE AIRPORT REOPENS. On January 8, **Robertson Airport** in Plainville celebrated the reopening of its only runway. The Federal Aviation Administration paid 90% and the state **Department of Transportation** 7.5% of the costs involved in milling and pavement overlay of 3,165 feet of runway reconstruction and additional airport renovations. Robertson Airport is considered the oldest airport in Connecticut.

—Compiled and edited by Wendy Millstein

from stroke and cancer, better control of blood pressure and cholesterol levels, and lower rates of smoking.

www.nap.edu/catalog.php?record_id=13497

◆ US Needs Dedicated Geoengineering Research

In an article in the Winter 2012 issue of *The Bridge on Frontiers of Engineering* from the National Academy of Engineering, author Eli Kintisch states that "top science institutions around the world have called for studies into deliberate tinkering with the planet's climate or atmosphere to partially offset global warming, a practice known as climate engineering, or geoengineering." He goes on to define two major types of geoengineering: solar radiation management (known as SRM—orbiting sunshades, aerosols sprayed into the stratosphere); and carbon dioxide removal (known as CDR—e.g., carbon-sucking machines, catalysis of oceanic algal growth). "While the number of scientists studying both is steadily increasing," he says, "the United States has yet to follow the lead of a number of European countries that have dedicated programs for geoengineering research." Noting that local and national governments around the world now are creating plans to respond and adapt to warmer temperatures, higher seas, more pervasive drought, and other challenges, the author urges policymakers and researchers in this area to take the following considerations into account: "the need to address risks inherent to the two types of climate engineering through research despite a lack of dedicated funding for such work in the United States; the conduct of such studies, including possible field studies, in an ethical way; and ongoing, open debate on the study and use of climate engineering while mindful of public opinion on the prospect of deploying the technology."

www.nae.edu/Activities/Publications/Bridge/67677/67714.aspx

◆ Aging Population Has Long-Term Economic Impact

A new, congressionally mandated report from the National Research Council finds the aging of the US population will have broad economic consequences for the country, particularly for federal programs that support the elderly, and its long-term effects on all generations will be mediated by how—and how quickly—the nation responds. The unprecedented demographic shift in which people over age 65 make up an increasingly large percentage of the population is not a temporary phenomenon associated with the aging of the baby boom generation, but a pervasive trend that is here to stay, the report concludes. Social Security, Medicare, and Medicaid are on unsustainable paths, and the failure to remedy the situation raises a number of economic risks, the report says. The cost of the three programs together currently amounts to roughly 40% of all federal spending and 10% of the nation's gross domestic product. Because of overall longer life expectancy and lower birth rates, these programs will have more beneficiaries with relatively fewer workers contributing to support them in the coming decades. Combined with soaring health care costs, population aging will drive up public health care expenditures and demand an ever-larger fraction of national resources.

www.nap.edu/catalog.php?record_id=13465

◆ Fake Medications and Substandard Drugs

A new report from the Institute of Medicine calls for global agreement on an international code of practice on drug quality to help nations protect their citizens against the health risks posed by illegitimate medications. It also recommends establishing a mandatory drug tracking system and tightening the licensing requirements on medication wholesalers in the United States. Medicines often contain multiple ingredients that can come from more than one country, noted the committee that wrote the report. They urge the World Health Organization to lead the effort to develop a code of practice that includes international guidelines on surveillance, regulation, and law enforcement. The report also

The Main Features Are Creatures at Eleanor Buck Wolf Nature Center

The Eleanor Buck Wolf Nature Center in Wethersfield houses a collection of small animals and exotic pets, as well as mineral, insect, and other specimen collections from area residents. Since the center's namesake penned "Creatures at my Doorstep," a journal recounting Eleanor's encounters and misadventures with local wildlife, visitors have delighted in learning about habitats around the world through hands-on animal programs. Parrots, pythons, chinchillas and more provide the basis for early childhood enrichment, school vacation and summer camps, and animal care classes for teens and special needs adults.

The center also offers programs for adults and serves as a community center fostering local environmental initiatives. A monthly lecture series, wilderness first aid classes, and local field trips help central Connecticut residents explore the outdoors and understand current environmental issues. Members and staff support park clean ups, community gardens, energy efficiency projects, and water conservation efforts.

The Town of Wethersfield has operated the center since the late 1970s at the behest of residents concerned about environmental issues. In 2005 the Friends of the Nature Center helped open a renovated facility renamed in memory of longtime local natural and historical preservation advocate Eleanor Buck Wolf. Today the center raises approximately three-quarters of its budget through programs, donations, and volunteers.

The visitor center is open Tuesday through Saturday 10am–5pm, except Thursday 10am–7pm, with a suggested donation of \$3. The center is located in Mill Woods Park, 156 Prospect Street, Wethersfield, CT. Classes, camps, parties, rentals, and other programs are listed through the Town of Wethersfield Parks & Recreation Department. For more information, visit www.ebwnaturecenter.org.

recommends global adoption of the terms "substandard" and "falsified" to refer to products that pose a public health risk and urges all parties to refrain from using the term "counterfeit" except when specifically referring to trademark infringement.

www.nap.edu/catalog.php?record_id=18272

◆ Ocean Acidification Research and Monitoring

The world's ocean has already experienced a 30% rise in acidity since the industrial revolution, with acidity expected to rise 100 to 150% over preindustrial levels by the end of this century. Potential consequences to marine life and also to economic activities that depend on a healthy marine ecosystem are difficult to assess and predict, but potentially devastating. In 2009, Congress passed the Federal Ocean Acidification Research and Monitoring (FOARAM) Act, which required that an interagency working group create a "Strategic Plan for Federal Research and Monitoring of Ocean Acidification." A new report from the National Research Council reviews the strategic plan and concludes that, overall, it is strong and provides a comprehensive framework for improving our understanding of ocean acidification. Potential improvements include a better defined strategy for implementing program goals, stronger integration of the seven broad scientific themes laid out in the FOARAM Act, and better mechanisms for coordination among federal agencies and with other US and international efforts to address ocean acidification.

http://www.nap.edu/catalog.php?record_id=17018

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Stem Cells *(from page 2)*

or obtained funding from other sources to either continue their research or expand their research endeavors.

Additionally, the universities receiving Connecticut Stem Cell Research Program funding (UConn/UCHC, Wesleyan University, and Yale University) reported total stem cell research grant awards for the period of 2007–2012 including Connecticut Stem Cell Research Program funding (\$68.8M) and stem cell research funding from other sources (\$289.6M). Connecticut Stem Cell Research Program funding was 19.2% of total stem cell research funding awarded to these institutions during this period, indicating significant leveraging of Connecticut's funding.

Research outcomes: PIs reported the following outcomes attributed to Connecticut Stem Cell Research Program funding:

- 62 peer-reviewed articles and journals
- 59 new research methods
- 45 new theories
- 24 new laboratories
- 20 novel human stem cell lines
- 14 new practices (clinical, tools, instruments, procedures/techniques)
- 9 patent applications
- 7 software/databases
- 2 licenses

PIs cited, as examples of such results, the following achievements:

- creation of a stem cell line that was licensed to Pfizer Inc. (James Li, PhD, UCHC, Established Investigator Grant)
- establishment of a human cell culture laboratory (Jeffery Kocsis, PhD, Yale University; Established Investigator Grant)
- a blood vessel graft engineered using stem cells—hopefully in the future they will have properties that will enable them to be implantable (Sumati Sundaram, PhD, Yale University, Seed Investigator)
- improved methods of iPSC and liver cell differentiation (Theodore Rasmussen, PhD, University of CT, Established Investigator)
- initiation of three new companies, including Chondrogenics, Inc, a recipient of a grant in 2011.

Creation of new jobs in stem cell research:

Funding from the program has resulted in the employment of 222 employees/staff new to stem cell research in Connecticut. Also, Yale University and UCHC have a number of training programs in stem cell research and techniques. These programs contribute to in-state expertise and available resources

for staff trained in the highly specific techniques needed for stem cell research. One of the goals of the Connecticut Stem Cell Research Program funding is to attract talent and expertise in stem cell research to Connecticut. PIs reported that 92 individuals relocated to Connecticut as a result of the Connecticut Stem Cell Research Program-funded grants.

Development of partnerships and collaborations: This includes retreats, workshops, and conferences held annually—fostering a collaborative environment for conducting stem cell research in Connecticut.

The program is at a pivotal point as it enters its seventh year. With half of the grants awarded, both the state and researchers are poised to see if the investments that have been made will indeed yield therapies and treatments. From the accomplishments that have been seen to date, it appears that the program is positioned to build on these results and move toward clinical translation while maintaining basic research still needed in this emerging field. —**Maria Borowski**

[Maria Borowski is a Project Manager for the Cancer Center of Excellence at the University of Massachusetts and served as the Study Manager for the recently completed CASE study, "Connecticut Stem Cell Research Program Accomplishments."]