



ST. LOUIS BIOBELT NEWS

The latest news and information from the St. Louis region.

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www.gotostlouis.org

BIOLOGICS

Pharmaceutical Giant Makes St. Louis Home for Biologics

Pfizer's research and development campus is home for clinical testing of biologics

www.pfizer.com



Pfizer, the world's leading research-based pharmaceutical company, has made St. Louis the Center of Emphasis for Global Biologics in Pharmaceutical Sciences—locating its center for the production of early clinical supplies of biologics at its St. Louis Laboratories campus. Biologics is an area of significant growth for both Pfizer and the research-based pharmaceutical industry.

"Once a biologic has been identified and is transferred to St. Louis, we first develop a consistent process for characterization of the biologic in our non-GMP (Good Manufacturing Process) pilot plant facilities," explains Ed Bryant, Senior Advisor, Public Affairs at Pfizer.

Biologics are generally protein-based, injectable medicines that may be used to treat many different kinds of illnesses, ranging from cancer to hormone deficiencies. These medicines already have an important role in the therapy of many different diseases and are likely to be even more important in the future.

"These therapies will become a significant portion of our drug pipeline and we are committed to biologics as an integral part of our growth strategy."

—Ed Bryant,
Senior Advisor—Public Affairs,
Pfizer St. Louis Laboratories

"These therapies will become a significant portion of our drug pipeline and we are committed to biologics as an integral part of our growth strategy," Bryant said.

Pfizer is investing \$300 million in St. Louis-area research facilities. This includes nearly \$200 million for a new research building, scheduled for completion in 2008. Additional capital investment projects offering increased capacity will be finished in 2009 and 2010.

Pfizer currently employs nearly 1,200 in the St. Louis region, with almost 1,000 in research.

BIOFUELS



Andrew C. Taylor, chairman and CEO of Enterprise Rent-A-Car, explains what will happen with the \$25 million donation given by Jack and Susan Taylor to the Donald Danforth Plant Science Center. The funding will be used to speed up the development of plant-based renewable biofuels that will decrease the level of greenhouse gases in the atmosphere and reduce the dependency on fossil fuels in future years.

New Institute for Renewable Fuels at the Danforth Plant Science Center Adds to St. Louis' Position as a National Focal Point in Biofuels

Enterprise Rent-A-Car Institute for Renewable Fuels will speed up plant-based renewable fuels development



ENTERPRISE RENT-A-CAR
INSTITUTE FOR RENEWABLE FUELS
AT THE DONALD DANFORTH PLANT SCIENCE CENTER

www.danforthcenter.org



A \$25 million gift from Jack and Susan Taylor will endow a team of scientists at the Donald Danforth Plant Science Center to expand the center's research in the growing renewable biofuels industry. The Enterprise Rent-A-Car Institute for Renewable Fuels is named for the company founded in St. Louis by Jack Taylor in 1957, which has become the largest car rental company in North America.

"This commitment from Jack and Susan Taylor will advance our efforts to unlock novel scientific ideas that ultimately lead to renewable biofuels that are plentiful and cost-effective," said Dr. Roger N. Beachy, president of the Danforth Center.

Research will begin on improving yields of current biofuel crops to meet the demand for fuels, while maintaining food supplies. Researchers will also look at developing corn varieties with an increased starch content grown specifically for biofuel processing. Later research will focus

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on increasing the viability of cellulose resources, such as switchgrass and poplar trees.

The Institute's work will dovetail with continuing research at Washington University in St. Louis and at the National Corn-to-Ethanol Research Center on the campus of Southern Illinois University in Edwardsville.

St. Louis is a **large, multicounty, metro area** that is specialized in research, testing and medical laboratories and **"concentrated"** in drugs and pharmaceuticals.

—*"Growing the Nation's Bioscience Sector: A Regional Perspective"*
Battelle, January 2007

Passage of Stem Cell Amendment Ensures Path for Life Science Growth

Missouri is a leader in protecting ground-breaking research

This past November, Missouri voters enshrined constitutional protections for stem cell research guaranteeing that Missouri biotech businesses and research institutions can continue attracting top talent and research funding in pursuit of lifesaving cures.

"(With this vote), we've said loud and clear Missouri is a state that wants to move forward in medical research and explore all the possibilities that it holds," said Marcia Mellitz, president of the Center for Emerging Technologies, a St. Louis-based business incubator.

The passage of the Missouri Stem Cell Initiative guarantees the freedom for companies and research organizations to conduct medical research in the newest areas of science. This predictable research climate makes Missouri a leading science-friendly environment.

Anchored by leading medical research facilities like the Washington University School of Medicine and Saint Louis University School of Medicine, Missouri has been on



www.missouricures.com

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President, Center for Emerging Technologies

a recent path of extraordinary progress in the life sciences. The stability ensured by constitutional research protections will only help accelerate this growth.

The **National Science Spotlight** was on Missouri in 2006 as Missouri citizens sent the message that they support stem cell research.

"For now, **all eyes are on Missouri**, where voters in November will decide on a constitutional amendment that would **guarantee the right** of scientists to conduct stem cell research."

—USA Today, April 7, 2006

"Missouri **win a boon** for stem cell work."

—Washington Times, November 9, 2006

"Missouri shows that the **heart of America, the heart of the country, supports this research."**

—Gail Pressman, co-author of *"The Promise and Politics of Stem Cell Research"*
November 8, 2006

"In less than 10 years, St. Louis has increased its pool of venture capital from close to zero to almost \$1 billion," said Kurt Weigle, director of New Orleans' Downtown Development District. "It's increased its number of bioscience firms to **close to 400 firms, including 30 recent startups."**

—*"Officials: Katrina doubled cost of planned biotech buildings"*
Associated Press, February 16, 2007

SLU Researcher is 'Sweet' on Biodegradable Batteries Powered by Sugar

New, biodegradable fuel cell operates three to four times longer than lithium ion battery

www.slu.edu



Saint Louis University electrochemist Shelly Minter, Ph.D. recently led an important study showing the development of a battery that is powered from virtually any sugar source and operates three to four times longer than conventional lithium ion batteries.

Dr. Minter presented her findings in March at the 233rd national meeting of the American Chemical Society in Chicago.

Like other fuel cells, this sugar battery contains enzymes that convert fuel into electricity, leaving water behind as a main byproduct. But unlike other fuel cells, all of the materials are biodegradable. "(This study) demonstrates that, by bridging biology and chemistry, we can build a better battery that's also cleaner for the environment," said Dr. Minter.

In the study, Dr. Minter ran batteries on glucose, flat sodas, sweetened drink mixes and tree sap, with promising results. The best fuel source, however, was ordinary table sugar (sucrose) dissolved in water.

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—Shelly Minter, Ph.D.,
Electrochemist, Saint Louis University

Dr. Minter envisions initial uses of the new sugar fuel cell cartridge in a portable cell phone recharger —allowing users to instantly charge their cell phones 'on the go.' Ultimately, she hopes the sugar battery could be used as a stand-alone battery replacement in a wide range of portable electronic devices.

Future work includes modifying the battery's performance for varying environmental conditions, including high temperatures and extending the battery's life. Funding for this study was provided by the U.S. Department of Defense.

National Cancer Institute Recognizes Molecular Imaging Center at Washington University

Center combines latest imaging technologies, molecular biology for improved cancer patient care

www.wustl.edu



Washington University School of Medicine gained national recognition in its development of methods to track molecular events in the body—working to diagnose disease long before symptoms appear and predict the effectiveness of drug therapies.

The School of Medicine's Molecular Imaging Center at the Mallinckrodt Institute of Radiology in St. Louis received a renewal of a \$10 million, five-year grant by the National Cancer Institute to develop new technologies in molecular imaging.

“Molecular imaging is the process of investigating the spatial and temporal relationships of biological processes in live cells, whole animals and humans at the molecular and cellular levels utilizing non-invasive imaging,” said David Piwnica-Worms, M.D., Ph.D., professor of radiology and of molecular biology and pharmacology and director of the Center.

Molecular imaging streamlines the pre-clinical investigative process by studying the effects of the therapy on the organism: whether it hits on-target, off-target, or toxic targets. The streamlined process can get new therapies

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—David Piwnica-Worms, M.D., Ph.D., Professor, Washington University; Director, Molecular Imaging Center

to market sooner and reveal therapy toxicities earlier in the process.

The center's technologies offer potential benefits in the early diagnoses and treatment of cancer and auto-immune diseases. Dr. Piwnica-Worms is currently working with Dr. John DiPersio, also from Washington University School of Medicine, on a genetically-encoded process utilizing the “suicide gene” of the herpes simplex virus to image and control graft vs. host disease during post-bone marrow transplants in leukemia patients.

Abengoa Bioenergy Receives \$76 million Grant from Department of Energy

Lignocellulosic biomass breakthrough to be funded in St. Louis

St. Louis-based Abengoa Bioenergy, one of the world's largest ethanol producers, recently received a \$76 million grant from the U.S. Department of Energy (DOE) to lower the initial deployment risk of developing, building and opening the first generation of lignocellulosic plants dedicated to ethanol production.

Lignocellulosic biomass feedstocks include agricultural residue, such as corn stover, wheat and rice straw; forestry residue; pulp and paper production residue; and high cellulose content plants such as switchgrass.

The grant will help the company increase ethanol research and refining capacity, including expansion of an engineering management facility in St. Louis.

The company will also invest \$200 million to build a dry mill ethanol facility at the Tri-City Regional Port District in Southwestern Illinois. “The St. Louis area is a national hub for our feedstocks and products, and the port specifically has excellent access to rail, road and river transportation,” said Gerson Santos, Director of R&D at Abengoa

www.abengoabioenergy.com

ABENGOA BIOENERGY

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Bioenergy. The Illinois refinery will produce 88 million gallons of ethanol and employ 50-60 people when it is finished in 18-24 months.

Abengoa Bioenergy is a subsidiary of Abengoa S.A., of Sevilla, Spain.

New Center Reinforces St. Louis' Position as a Hub for Biofuel Technology

Center for Evergreen Energy will link research, technology, business and policy

www.centergreen.org



A new St. Louis-based national think tank, called the Center for Evergreen Energy, will link research, technology, business and policy to advance sustainable energy solutions.

“The St. Louis metro area is a logical choice for the Center. It is in the heart of our nation's agriculture and energy distribution systems and is on the leading edge of biotechnology innovation with several significant research universities, Monsanto, the Donald Danforth Plant Science Center, and a host of other private and public entities developing energy solutions for tomorrow,” said Jim S. McLaren, Ph.D., CMC, president of StrathKern, Inc. Dr. McLaren is the author of the principal study, underwritten by the St. Louis Regional Chamber and Growth Association (RCGA) and the Danforth Center, used as a roadmap to jumpstart the formation of the Center.

The study concluded that a national center was needed to focus the work of biofuels researchers, identify critical unmet market needs and ensure maximum return on efforts.

“The goal is to constantly link technical development in the St. Louis region to the market place.”

—Dr. Ganesh M. Kishore, Managing Director, Burrill & Company

“The goal is to constantly link technical development in the St. Louis region to the market place,” says Dr. Ganesh M. Kishore, former vice president for science and technology and chief biotechnology officer for DuPont Agriculture and Nutrition, and chair of the multi-year efforts of the RCGA Biofuels Working Group out of which the Center grew.

“We must make sure there is consistent local, state and federal government policy to develop new businesses, support research, and make sure we have an independent think tank approach to highlight the need for alternative energy solutions and keep this on the minds of the people.”

“Dr. Danforth, a cardiologist, says that St. Louis is **better positioned** than many cities to capitalize on biotech because of the number of universities and other institutions in the area. The city also has a **number of research sites** run by large agricultural and pharmaceutical companies, like Monsanto and Pfizer.”

—“Keeping the Fruits of Research Close to Home in St. Louis”
The New York Times, February 7, 2007

Washington University is Major National Resource in Genomic Research

New \$156 million grant to unlock secrets of cancer through DNA sequencing underscores university's Genome Sequencing Center expertise

www.wustl.edu

www.genome.wustl.edu



The Washington University in St. Louis' Genome Sequencing Center has been awarded a \$156 million, four-year grant to use the powerful tools of DNA sequencing to uncover the genetic mutations that underlie many diseases, including cancer.

The grant underscores the expertise of the Genome Sequencing Center, which has been funded by the National Human Genome Research Institute (NHGRI) since 1990 and has been a world leader in the innovative high-speed sequencing of genomes, from primitive bacteria to complex humans.

“The Human Genome Project gave us the blueprint of the human genome, and now we're ready to comb that genome to find genetic changes that underlie the development of cancer and sustain its growth,” says Richard Wilson, Ph.D., director of Washington University's Genome Sequencing Center.

The cancer gene sequencing effort is part a \$460 million Cancer Genome Atlas, a joint pilot project of the NHGRI and the National Cancer Institute (NCI), both under the National Institutes of Health (NIH). Washington University is one of five centers in the United States that applied for funding.

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Other large-scale sequencing centers funded by the grant include Baylor College of Medicine, the Broad Institute of the Massachusetts Institute of Technology and Harvard University.

Together, the sequencing centers are studying DNA in tumors of the lung, ovaries and brain (glioblastoma) to determine how the cancer's DNA differs from that of the patient.



New research at the National Corn-to-Ethanol Research Center on the campus of Southern Illinois University at Edwardsville includes validating technology, generating data and determining the viability of the technology on a commercial level.

Unique National Corn-to-Ethanol Research Center Expands Services

New research, initiatives, capabilities announced

The National Corn-to-Ethanol Research Center (NCERC) at University Park on the campus of Southern Illinois University at Edwardsville has used its unique characteristic as a complete, yet compact, processor for biofuels breakthroughs in standards, testing and training.

Serving as a validation resource for experimental research, the facility is at the center of the federal government's challenge to develop alternative fuels to the equivalent capacity of 36 billion gallons by 2017.

“We're happy that for the third consecutive year, the NCERC is named the provider of USDA Baseline data,” said John Caupert, Director of NCERC. “Our facility establishes baselines for starch-based ethanol production yields using USDA #2 corn. That baseline is then used by government, industry, academia and trade associations as the benchmark for future technology.”

NCERC's work includes validating technology, generating data and determining commercial viability—whether the technology is scalable on a commercial level.

One of the latest breakthroughs for NCERC is fractionated corn. Research conducted for a proprietary fractionation process improved a yield 22% over baseline, outperforming theoretical calculations. The trials were conducted at NCERC because of its flexibility—

www.ethanolresearch.com



“Corn is the backbone of the biofuels industry and will play a key role in the future biofuels development.”

—John Caupert, Director, National Corn-to-Ethanol Research Center

utilizing the same ethanol production process used in standard dry-grind ethanol plants to convert whole kernel corn without any relevant processing difficulties.

The Center is also expanding research into the viability of other feedstocks. “Corn is the backbone of the biofuels industry and will play a key role in the future biofuels development,” said Mr. Caupert.

Another new capacity for the Center is Workforce Development Training. The NCERC is developing programs that will ensure there are trained employees in every capacity, from bench labs to commodity managers to plant operators.

UNIVERSITY RANKINGS

TOP MEDICAL SCHOOLS – RESEARCH MEDICAL SCHOOLS

1. Harvard University
2. Johns Hopkins University
3. University of Pennsylvania
4. Washington University in St. Louis

Source: U.S. News & World Report, April 9, 2007

NIH AWARDS AMONG MEDICAL SCHOOLS

- | | |
|---|---------|
| 1. Johns Hopkins University | \$449.3 |
| 2. University of Pennsylvania | \$399.2 |
| 3. University of California—San Francisco | \$398.1 |
| 4. Washington University in St. Louis | \$377.6 |

Source: National Institute of Health, Fiscal Year 2005

TOP LAW SPECIALTIES – HEALTHCARE LAW

1. Saint Louis University
2. University of Maryland
3. University of Houston

Source: U.S. News & World Report, April 9, 2007

The St. Louis Regional Chamber & Growth Association partners with the City of St. Louis and the surrounding 15 counties in the bi-state St. Louis region to provide a seamless, one-stop resource dedicated to your success. For fast, easy access to information on the plant and medical sciences in the St. Louis region, please call us at (314) 231-5555 or visit us on the web at www.stlouisbiobelt.org or www.gotostlouis.org and click on the economic development link.

