Research News …
from Albany Medical Center

Quickening the Pace of Medical Discovery

As northeastern New York’s only academic medical center, Albany Med has a mission of advanced patient care, medical education and research. Our research enterprise drives innovation in both patient care and education while also fueling the local economy.

The promise of biomedical and clinical research, and the combination of the two, has never been greater, and research projects at Albany Medical Center are flourishing. Grants from the National Institutes of Health, the American Heart Lung Association, the American Heart Association and other private, government and corporate sources are supporting studies both with patients and in the laboratories at Albany Medical College.

This support sustains the work of our researchers and physician scientists who collaborate in four interdisciplinary teams to further their knowledge and discover the basic underpinnings of cancer, heart disease, stroke, addiction, asthma, high blood pressure, allergies, autoimmune diseases, chronic pain, Alzheimer’s disease, epilepsy, influenza and depression, among many others. Albany Med’s interdisciplinary teams include The Center for Neuropharmacology and Neurosciences, the Center for Immunology and Microbial Disease, the Center for Cardiovascular Sciences and the Center for Cancer and Cell Biology.

Since 2011, Albany Med has been a member of the NY Cap Research Alliance, along with the University at Albany and Rensselaer Polytechnic Institute. By providing seed funding for collaborative research projects, the Alliance leverages funding from New York State into potential new jobs and millions of dollars in investment. The Alliance also serves to grow the reputation of the Capital Region as a hotspot for biomedical research.

In the search for medical breakthroughs and to offer our patients hope by providing access to the best available treatment options, at any time Albany Med physicians are conducting more than 100 clinical studies. These include clinical trials of new treatments and drugs for people with illnesses that have no standard cure.

With this newsletter, each quarter, we will bring you up-to-date on some of the many exciting research activities at Albany Medical Center.
Biomedical Research

Pathologist’s Pioneering Work Holds Promise for Cancer Patients

New research led by Albany Medical College pathologist Jeffrey Ross, MD, indicates that genomic profiling could offer new treatment options for people with widespread cancer where the primary origin is unknown.

More than 30,000 patients in the U.S. each year have a cancer whose primary site is never identified. There are no FDA-approved therapies for these patients, response rates to treatment average only 20 percent and there are rarely survivors beyond two years of diagnosis.

While researchers traditionally seek to locate the primary site of these cancers in the hope of unlocking treatment options, Dr. Ross and his colleagues have, instead, chosen to sequence the cancer-related genes driving the tumors in patients diagnosed with cancer of unknown primary origin, or CUP.

In studies published in the inaugural issue of JAMA Oncology last February, data from a study of 200 individuals diagnosed with CUP identified clinically relevant genomic alterations in 85 percent of patients, many of which could be associated with approved anti-cancer drugs.

“The hope is to match these mutations to clinical treatments that are already available,” said Dr. Ross, Cyrus Strong Merrill Professor and chair of the Department of Pathology and Laboratory Medicine. He has been conducting ongoing research in this area for the past five years with a team of scientists at Foundation Medicine, Inc., a molecular information company located in Cambridge, Mass.

“We hope these data show oncologists that genomic profiling can provide an immediate opportunity to influence therapy decisions and potentially improve outcomes for patients living with CUP,” Dr. Ross said.

While genomic profiling is typically used on patients who have rare or complex cancers, Dr. Ross said, patients with solid tumors where the primary tumor site is known and hematologic cancers could potentially benefit from the approach, as well. “Broadly,” he said, “I believe these data point to the potential for molecular information to transform cancer care.”
Clinical Research

New Collaborations, Providers Mean Even Greater Patient Access to Diabetes Clinical Trials

Albany Med is enrolling patients in the INTREPID clinical trial to evaluate Deep Brain Stimulation (DPS) as an alternative therapy for Parkinson’s disease (PD).

Led by neurosurgeon Julie Pilitsis, MD, PhD, and neurologist Adolfo Ramirez-Zamora, MD, the Philly Dake Chair in Movement Disorders at Albany Medical College, this study will examine the safety and effectiveness of the Boston Scientific Vercise DBS System as a therapy for reducing some of the debilitating symptoms associated with PD that are not adequately controlled with medication, including tremors or slow movement.

“We’re actively seeking Parkinson’s disease patients who are under treatment, but who might also benefit from an alternative therapy like Deep Brain Stimulation,” said Dr. Pilitsis. “Earlier studies of DBS indicate its potential in Parkinson’s disease patients, so we’re enthusiastic about evaluating our own results.”

DBS involves the placement of a device that stimulates targeted areas of the brain using electrical signals to potentially help reduce Parkinson’s disease symptoms. The Vercise DBS System is investigational and not available for use. The INTREPID clinical trial will evaluate the safety and effectiveness of the Vercise DBS System for the treatment of PD.

“New York is geographically located in the ‘Parkinson’s disease belt’ in the Northeast and Midwest, which means we have a higher prevalence and incidence of Parkinson disease, although it’s hard to say why,” said Dr. Ramirez-Zamora.

For more information on the INTREPID study enrollment, call 1-800-545-8075.
Drs. Deisseroth and Xie Selected to Receive Albany Prize

A pair of scientist/inventors who developed widely used modern research technologies that promise to accelerate medical discoveries were announced as the recipients of the 2015 Albany Medical Center Prize in Medicine and Biomedical Research.

Karl Deisseroth, MD, PhD, D.H. Chen Professor, Professor of Bioengineering, Professor of Psychiatry and Behavioral Sciences at Stanford University and Howard Hughes Medical Investigator, and Xiaoliang Sunney Xie, PhD, Mallinckrodt Professor of Chemistry and Chemical Biology at Harvard University and director of BIOPIC at Peking University, are the recipients of the 2015 Albany Prize.

The $500,000 award has been given annually since 2001 to those who have altered the course of medical research and is one of the largest prizes in medicine and science in the United States. It will be formally awarded in Albany on May 15.

“These two prolific scientists saw a need for new technology to help move their research forward and then actually developed it. Researchers worldwide are now using their techniques, including novel imaging and sequencing, which are fast providing insights into previously mysterious biological functions, especially those in the brain,” said Vincent Verdile, MD, the Lynne and Mark Groban, MD ’67, Distinguished Dean of Albany Medical College and chair of the Albany Prize National Selection Committee.

Among his many accomplishments, Dr. Deisseroth, of Stanford, pioneered the groundbreaking technology known as optogenetics in an attempt to better understand the mysteries of psychiatric illness and of the brain itself. This technology inserts genetically altered microbial proteins, called opsins, into mammalian brain cells, where pulses of light can control, turn on or off, specific kinds of neurons, even deep within the brain. By doing so, scientists can better determine which nerve-cell circuits are playing a role in specific behaviors. It is revolutionizing brain research, providing insight into the “circuitry” underlying not only psychiatric diseases such as depression and bipolar disorder, but also other conditions such as Parkinson’s disease, addiction, OCD and chronic pain as well as normal processes like memory, metabolism, hunger, sleep, fear and learning.

“Developing and employing novel molecular tools, Dr. Deisseroth has brilliantly demonstrated a new way of understanding how the brain functions and provided neuroscientists, along with other medical researchers, new tools for exploring function and connectivity at the cellular level, ultimately shedding light on disease development and treatment,” said Thomas R. Insel, MD, director of the National Institute of Mental Health.

In a further attempt to understand how the brain works, in 2013, Dr. Deisseroth introduced another groundbreaking technology called CLARITY for chemically transforming biological tissue into a fundamentally new state. As a result of creating this new state, all the molecules that are not of interest or that impair visualization deep into the structure can be dissolved away and removed, resulting in an organ that is transparent to light and allows laboratory scientists to see what kinds of cells and connections are present deep inside the brain, without slicing or disassembling it.
Drs. Deisseroth and Xie Selected to Receive Albany Prize (cont’d)

Many papers since have been published describing CLARITY-based strategies for performing ultra-high-resolution microscopy on this transformed biological tissue, as well as describing applications of CLARITY to human and animal brains, to organs beyond the brain and even to whole animals.

Dr. Xie, of Harvard, also used light-induced signals, in this case fluorescence, to probe previously invisible single molecules in living cells. The groundbreaking experiments, one described in 1998 in Science that allowed researchers to monitor enzymatic reactions of a single enzyme molecule in real time, and another reported in 2006 in Science and Nature that made it possible to watch, for the first time, the process of gene expression in a live cell one molecule at a time, allowed gene regulation to be investigated at an unprecedented level.

With these and more pioneering studies, Dr. Xie has played a leading role in the advancement of the field of single-cell biology, which has yielded new knowledge about how individual molecules and their behavior can affect cellular life and even human diseases.

In a recent advancement, Dr. Xie and his team made significant contributions to single-cell genomics by developing an accurate single-cell whole genome amplification method (MALBAC) that allows pinpointing where genomic changes occur in a single cancer cell. The MALBAC technique enables reporting of nearly the entire genomic sequence of a single cell and has already been utilized to select healthy embryos in in vitro fertilization (IVF).

Dr. Xie also pioneered coherent Raman scattering microscopy. Among other uses, this technique may soon be employed during surgery to distinguish whether a particular brain region has cancer that cannot be seen using more traditional imaging techniques.

The Albany Medical Center Prize was established in 2000 by the late Morris “Marty” Silverman, a New York City businessman and philanthropist who grew up in Troy, N.Y., to honor scientists whose work has demonstrated significant outcomes that offer medical value of national or international importance. A $50 million gift commitment from the Marty and Dorothy Silverman Foundation provides for the prize to be awarded annually for 100 years.
You’re Invited to Join us for a Special Albany Prize Grand Rounds

**WHAT:** A lecture and Q&A session presented by X. Sunney Xie, Ph.D., and Karl Deisseroth, M.D., Ph.D., the 2015 recipients of the Albany Medical Center Prize in Medicine and Biomedical Research

**WHEN:** 8:30 a.m. Friday, May 15, 2015

**WHERE:** Albany Medical College, ME-700

To register, contact Carter Chaskey at Chaskey.mail.amc.edu or 518-262-8043.

Free parking is available at the Physicians Pavilion entrance to the Medical Center. Inform the parking attendant you are here for the Albany Medical Center Prize in Medicine and Biomedical Research lecture.

‘Albany Med is my lifeline’

“Lifeline: The Campaign for Albany Medical Center” is nearing its current $125 million goal to ensure that Albany Med continues to provide the most advanced care available in northeastern New York, including its research enterprise.

Albany Medical Center Foundation
518.262.3322 • 1.877.810.5437
Biomedical Acceleration and Commercialization Center (BACC) Opens

A new business incubator located on the Albany Medical Center campus will help businesses discover and develop breakthrough biotechnologies that will improve patient care and promote economic growth.

The Biomedical Acceleration and Commercialization Center (BACC) at Albany Medical College, expected to be operational by June, is a designated site for STARTUP NY, a program created by Governor Andrew M. Cuomo to help businesses relocate to or expand within New York State, align with a college or university’s academic mission, create new jobs and contribute to the economic development of the local community.

Albany Med President Jim Barba, who serves as co-chair of the Capital Region Economic Development Council, said, “By creating an organization that will connect the region’s entrepreneurs with the biomedical researchers at Albany Medical College, this incubator will help create new solutions to medical challenges, and spur job creation in our region.”

As a START-UP NY site, the BACC will provide businesses exemption from state taxes for 10 years. The BACC will target businesses in biomedicine, bioengineering, biotechnology and pharmaceuticals.

“The BACC will be another milestone in Albany Medical College legacy of supporting innovations in research,” said Vincent Verdile, M.D., the Lynne and Mark Groban, M.D. ’67 Distinguished Dean of Albany Medical College. “We look forward to helping create new opportunities for biomedical innovation in the future.”

The BACC provides entrepreneurs with an environment of support where they can refine their technology, gain access to a variety of resources and facilities and connect with researchers and practitioners who can help grow their business.

Senior Vice-President of Business Development and Strategic Partnerships Kevin Leyden, who is overseeing development of the BACC, said “With the extraordinary entrepreneurial and scientific resources in our region, the BACC will be uniquely positioned to become a catalyst for entrepreneurial initiatives.”

Albany Medical College graduate and entrepreneur Christopher Macomber, MD ’09, Chief Medical Officer at UV Therapeutics, Inc. and the co-founder of the Surgical Technology Innovation and Commercialization Program at UMASS said, “I had hoped to build my business and career in Albany but found it extremely challenging. The BACC will provide an important hub for innovation.”

Harel Gadot, CEO and Company Group Chairman of MEDX Ventures Group, LLC, notes that the Capital Region’s concentration of scientists and health care has a unique structure to allow entrepreneurs to share ideas.

“With a structure designed to facilitate collaboration, an organization like the BACC can help create a ‘start-up region’ that attracts businesses and entrepreneurs from across the country and the world,” Gadot said.

For additional information or to submit an application to the BACC, please visit: http://albanymedbacc.org
Albany Med Researchers Win Top Prize for Back Pain Study

A groundbreaking research study of back pain therapies conducted by Albany Medical College researchers received the highest international award for spine research.

The study, which refutes long-accepted evidence that any physical impact on the spine, through exercise, manual labor or other forces, is detrimental to disc health, was awarded the prestigious International Society for the Study of the Lumbar Spine (ISSLS) Prize in lumbar spine research for 2015.

Conducted by James Lawrence, M.D., associate professor of surgery at Albany Medical College and orthopaedic spine surgeon at Capital Region Orthopaedics, and Eric Ledet, Ph.D., associate professor of biomedical engineering at Rensselaer Polytechnic Institute and adjunct professor of orthopaedic surgery at Albany Medical College, the study shows for the first time that some pressure on the spine through weight or exertion may actually be beneficial to an injured disc, and that this type of pressure, used therapeutically, could have the potential to arrest or even reverse degeneration of a painful intervertebral disc.

Back pain is one of the most common medical conditions in the U.S. Approximately 80 percent of adults experience lower back pain at some point in their lifetimes.

“We used experimental models to investigate and compare the impact of different types of stimulation on the spine, and the data suggest that some weight or pressure could be helpful,” Dr. Ledet said.

Dr. Lawrence said they plan to translate this preliminary work into a therapeutic study that will examine treatment possibilities for patients and identify high-risk groups along with what can be done to protect them.

“The ISSLS prize is the most prestigious honor worldwide in the field of basic spine research, which speaks to the high quality of this work as well as to the valued, longstanding relationship Albany Medical College has with Rensselaer” said Richard Uhl, M.D., head of the Division of Orthopaedic Surgery at Albany Medical College and orthopaedic surgeon at Capital Region Orthopaedics.

Funded by a grant from the Orthopaedic Research and Education Foundation, the research was led by Rensselaer alumna Sarah Gullbrand, Ph.D. Research assistants included Mostafa Abousayed, MD, and Timothy Roberts, MD, residents in orthopaedic surgery at Albany Medical College, Rensselaer alumni Rosemarie Mastropolo and Arun Fricker, and Rensselaer graduate student Joshua Peterson and undergraduate Jenna Ahlborn.

The ISSLS prize is awarded annually to the highest impact research related to the spine by a selection committee from the journal SPINE and the International Society for the Study of the Lumbar Spine. The prize will be presented at the 42nd annual meeting of the International Society for Study of the Lumbar Spine in San Francisco in June. The manuscript for which the research team was awarded the prize will be published in SPINE.