Medicine@Yale

Advancing Biomedical Science, Education and Health Care

Volume 4, Issue 4 September/October 2008

Van will bring much-needed mammography to Uganda's poor

JOHN CURTIS

The mammography van's ocean journey to East Africa was fully funded by the medical charity Doc to Dock.

For women in the developed world, mammography is a familiar ritual. The test is a routine way to screen for breast cancer. Once a woman reaches her 40s (or earlier, in women with risk factors for cancer) a mammogram is recommended every one to two years.

But for most women in the impoverished East African country of Uganda, getting a mammogram is next to impossible. Little advanced medical care is available there, and many women don't know about the test and wouldn't have access to it if they did. As a result, breast cancer in Ugandan women usually goes undetected until it is in advanced stages.

But with a 35-foot van refitted by School of Medicine faculty members with the help of Johnson & Johnson, Fred Okuku, M.D., an internal medicine resident at Makerere University in Uganda's capital city of Kampala, is bringing breast cancer screening to his home country. Okuku visited Yale this year because "I want to know what is the ideal therapy given here, and how I can modify this to fit [our resources] back home," he says. At his Ugandan teaching hospital, Mulago Hospital, even necessities like gloves and IV fluids are in short supply. Amidst such poverty small things can make an enormous difference, says Okuku. That's the idea behind the

Uganda, *page 6*

Quick study, bighearted contributor

United Technologies chief sees a path to better care with new cancer hospital

HAROLD SHAPIRO

Louis Chênevert, president and CEO of United Technologies Corporation (UTC), and his wife, Debbie, made a personal donation of $540,000 to complement UTC's $1 million gift to the new Smilow Cancer Hospital. Hartford, Conn.-based UTC is one of the world's largest companies serving the aerospace and building industries.

When Louis Chênevert was named president of United Technologies Corporation (UTC) in 2006, his mentor, Chairman of the Board George David, described him as a quick study with "remarkable skills at learning." David said, "I think that's one of the most important challenges in life. People need to rise to new things, new situations, new fact patterns, and to learn from what has gone before. Louis is just awfully good at that."

As a Director's Advisory Board member at Yale Cancer Center (YCC) since 2001, Chênevert has been a dedicated student of cancer research and treatment, asking probing questions of faculty members and helping plan the YCC component of the new 14-story Smilow Cancer Hospital that is rising on Park Street, as well as the cancer biology research center envisioned for Yale's recently acquired West Campus.

"People talk about interdisciplinary research and the multidisciplinary care of patients. Louis really grasps it," said YCC Director Richard L. Edelson, M.D., the Aaron B. and Marguerite Lerner Professor of Dermatology. "He understands the importance of having all the services for cancer patients in the same place, rather than dispersed throughout the medical center."

With his interest has come financial involvement. Chênevert and his wife, Debbie, were tapped as co-chairs of the Campaign for Smilow Cancer Hospital, along with Jonathan and Jody Bush and Marvin and Helaine Lender. In July of this year, several months after Chênevert's appointment as CEO of UTC, the company announced a $1 million gift to the cancer hospital. The Chêneverts also are making a personal gift of $540,000 to fund facilities in pediatric oncology and a patient room.

Having studied Yale in depth, Chênevert applied a business logic to the goal of helping cancer patients, while making his philanthropic decisions. He was moved by the impressive contributions of Yale School of Medicine scientists and physicians, beginning in the 1940s with the development of the first chemotherapy agents by pharmacologists Louis S. Goodman, M.D., and Alfred G. Gilman, M.D., PH.D., and thoracic surgeon Gustav E. Lindskog, M.D. "Yale has a superb track record of finding

UTC, *page 6*

Vessel researcher is appointed as new cardiovascular chief

The medical school has appointed Michael Simons, M.D., as chief of the Department of Internal Medicine's Section of Cardiovascular Medicine. Simons is a leader in research on the role of angiogenesis, the growth of new blood vessels, in cardiovascular diseases.

He will come to Yale this fall from Dartmouth Medical School in Lebanon, N.H., where he was A.G. Huber Professor of Medicine, professor of pharmacology and toxicology and director of the Cardiovascular Center and the Angiogenesis Research Center at Dartmouth-Hitchcock Medical Center.

"Michael Simons is an outstanding cardiologist, scientist and educator who will lead our program to new heights," says Jack A. Elias, M.D., chair and Waldemar Von Zedtwitz Profes-

Simons, *page 6*

MARK WASHBURN/DHMC

Michael Simons has advanced our knowledge of angiogenesis.

Inside this issue

Online: Yale Netcasts

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HAROLD SHAPIRO

Richard Flavell says that he and colleagues who founded Yale's Department of Immunobiology in 1988 set two criteria for recruiting faculty: "We decided we would hire people who were outstanding and who were easy to get along with—no prima donnas." Twenty years later, the department is at the top of its field.

Petri dishes, power chords

A scientific leader recharges his batteries with rock and roll

Outside on this humid July afternoon, an oppressive heat combines with the noise of road traffic and an Amtrak passenger train rolling through Wallingford, Conn. But inside a nondescript one-story building here, all is dim and cool. Richard A. Flavell, PH.D., a School of Medicine scientist who heads one of the world's top programs in immunology research, is in a recording studio laying down backing vocal tracks with his wife, Madlyn.

Clanging guitars and a vocal sound reminiscent of 1960s-era Kinks ballads fill the mixing booth. On the other side of the glass, Flavell is singing the harmony to a tune decrying the state of the American health care system. You can spend all your money in a week or two, to extend your life for three, he croons. Then it's on to the next track—penned by a bandmate, cell biologist and former Yale colleague Ira Mellman, PH.D.—which pays homage to DNA pioneer Rosalind Franklin, who died young with scant recognition of her role in the discovery of DNA's double helix.

The resulting album of songs inspired by biology will be the second by the Cellmates, a band Flavell and fellow scientists at Yale formed in 1991, several years after he came to New Haven to head the Section of Immunobiology. Back in the late 1950s, when he was discovering rock and roll as a young teenager in the English county of Norfolk, no one would have mistaken him for a budding academic, he says. "I was a totally unmotivated student," a situation that changed when he took chemistry, brought to life by an exceptional teacher when Flavell was 15.

After earning bachelor's and doctoral degrees in biochemistry at the University of Hull in the north of England, Flavell held a series of academic posts in Europe before finding himself at age 36 in Cambridge, Mass., heading the research division of biotechnology pioneer Biogen, Inc.

His switch to biotech and back makes him unusual among academic scientists. "It used to be that you made the jump in one direction; you never came back," says Carolyn W. Slayman, PH.D., deputy dean for academic and scientific affairs. "He's done it, and he's been extraordinarily successful."

Lifelines
Richard Flavell

Immunobiology at Yale is regarded as one of the top programs in the world, ranked No. 1 in the *Chronicle of Higher Education's* 2006 Faculty Scholarly Productivity Index, which counts scholarly publications, citations of those papers by other scientists, grant dollars, awards and honors.

Flavell, a Sterling Professor at Yale and a Howard Hughes Medical Institute (HHMI) investigator, runs the department in a way that invites participation and leads to group decisions. "Richard is very good at gathering information, building consensus and then making a decision," says colleague David G. Schatz, PH.D., professor of immunobiology. "It's very inclusive. He's not afraid to make a decision that will make someone upset, but he's extremely good at building agreement."

The department he leads now numbers 13 primary faculty. Flavell's own lab employs more than 30 people working on a combination of projects funded by HHMI, the National Institutes of Health and the Bill and Melinda Gates Foundation. In 2005, Gates awarded Flavell $17 million to engineer a mouse with a human immune system, a tool that will allow scientists to more readily conceive of and test potential vaccines.

Meanwhile, there is life outside the lab—gardening (Flavell cultivates several hundred species of rhododendron on five acres surrounding his home in Guilford, Conn.) and, of course, music. Science may be a lot harder than three-chord rock and roll, Flavell says, but there are moments in a band that rival those in science, when collaboration and synergy create something that no one person could have done on his own. Plus it's a good release: "I like rock and roll," he says. "It's part of my existence."

Online: Yale Netcast
"Mouse with a human immune system"

Yale Medical Group physicians shine on latest 'top docs' list

New York magazine's 2008 list of the region's top doctors once again includes many Yale Medical Group (YMG) physicians.

This year Yale boasts 62 "top docs" in 40 specialties, serving all age ranges from newborns and children to adults and seniors.

The list, published in the magazine's June 16 issue, is based on the annual *Top Doctors New York Metro Area* guidebook, published by Castle Connolly Medical Ltd., which invites doctors to nominate peers to be recognized for their medical excellence.

According to the company, the annual New York guidebook lists the top 10 percent of the metro area's physicians. *New York* magazine's list is more selective—the top quarter of the top 10 percent, or about 1,400 physicians.

"Our strong representation in the New York metro area highlights the fact that YMG is a regional—and in some cases national—practice. Patients throughout New York and New England are coming to see YMG as a medical destination of choice," explains David J. Leffell, M.D., CEO of YMG, deputy dean for clinical affairs and professor of dermatology and surgery.

Genetics researcher is named inaugural Cohen Professor

Matthew W. State, M.D., PH.D., an authority on the genetics of psychiatric disorders in children, has been named the first Donald J. Cohen Associate Professor of Child Psychiatry. State, also associate professor of genetics, and colleagues have studied rare genetic variations in disorders such as Tourette syndrome, autism and mental retardation. His work on the contribution of the gene *SLITRK1* to Tourette syndrome was cited as one of the top 10 breakthroughs of 2005 by the journal *Science*.

Matthew State

State is co-director of the Yale Program on Neurogenetics. He received the Tourette Syndrome Association Early Career Research Award and now leads the Simons Foundation Genetics Consortium, a multicenter research effort aimed at discovering genes involved in autism. He maintains an active practice in community child psychiatry. State earned his undergraduate and medical degrees from Stanford University and completed his residency at UCLA's Neuropsychatric Institute. He came to the Child Study Center (CSC) in 1997 as a postdoctoral associate, and concurrently earned his PH.D. from the School of Medicine's Department of Genetics in 2001.

Cohen, director of the CSC from 1983 to 2001, is recognized as one of the leading child psychiatrists of his generation. The new professorship in his honor was established with a $3 million fund made up of contributions from friends, colleagues, corporations and foundations that had grown in value over several years.

Medicine@Yale

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Advances

Health and science news from Yale

CORBIS

Lyme disease has European roots

More than 20,000 cases of Lyme disease, a bacterial infection transmitted by deer ticks, are diagnosed each year in the U.S. Researchers have speculated that *Borrelia burgdorferi,* the spirochete that causes the clinical symptoms of Lyme disease seen in this country, originated in North America. But a new study published in the June 24 issue of *Proceedings of the National Academy of Sciences* traces the bacterium's pedigree to Europe.

Durland Fish, PH.D., professor of epidemiology at the Yale School of Public Health, worked with an international team that analyzed 64 different samples of bacterial DNA from ticks and infected human patients in both the U.S. and Europe. By looking at mutations in a group of genes essential to basic metabolism, the scientists determined that European strains are more closely related to a common ancestor than are North American strains, indicating a European origin for the bacterium.

"Understanding the evolution of pathogens is a key epidemiological tool," says Fish. "By understanding the evolutionary history of pathogens, we can better predict their evolutionary future."

Secrets of a stowaway bug

When harmful bacteria enter the body, white blood cells known as macrophages engulf them and sequester them in capsules called phagosomes. These capsules then fuse with lysosomes, spheres packed with enzymes that destroy the bacterium.

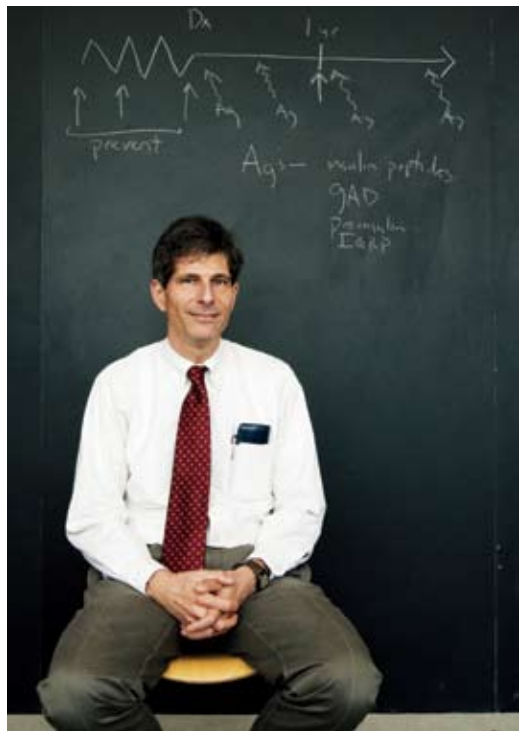
But some bacteria can survive and continue to cause illness by blocking this process. Scientists have long known that pathogens like *Legionella pneumophila,* the cause of Legionnaire's disease, secrete proteins into macrophages, but it has been unclear what those proteins do.

In the June 20 issue of *Science*, a School of Medicine team led by Craig R. Roy, PH.D., associate professor of microbial pathogenesis, reported that *L. pneumophila* proteins known as Anks disrupt the transport of endosomes—vesicles that eventually develop into bacteria-killing lysosomes—along intracellular conduits known as microtubules.

Because *L. pneumophila* and related bacteria behave somewhat like viruses, in that they inject Ank proteins into cells, Roy says they might be vulnerable to a vaccine that targets Anks, allowing macrophages to do their job.

Type 1 diabetes: is prevention finally in sight?

New antibody therapies lessen need for insulin, may one day eliminate it



GALE ZUCKER

With grants from the Juvenile Diabetes Research Fund International and the National Institutes of Health, Kevan Herold has pioneered antibody-based therapies that make type 1 diabetes more manageable—and may someday prevent the disease altogether.

The discovery of insulin by Canadian Nobel laureate Sir Frederick G. Banting, M.D., and his student Charles H. Best, M.D., in the early 1920s transformed childhood diabetes from a death sentence to a serious chronic disease, but the therapy they pioneered—multiple daily insulin injections—is no cure. That goal has remained elusive for nearly a century, but School of Medicine researchers are finding new success by treating the underlying autoimmune reactions that cause diabetes in children and young adults. By protecting and preserving a patients' own insulin production, the new approaches present the exciting prospect of preventing the disease altogether.

Though the symptoms of type 1 diabetes, sometimes called juvenile-onset diabetes, emerge abruptly, researchers now know that the condition develops over a long period. Overactive immune T cells mistakenly attack and destroy the insulin-producing beta cells in the pancreas in a battle that can last for years. That realization opened a window of opportunity for therapy, which Kevan Herold, M.D., professor of immunobiology and medicine, and his colleagues are aiming to exploit.

"We know that when people first present with diabetes, they still make substantial amounts of insulin," Herold explains. "Over a period of years, they gradually lose that ability. Our idea is to stop the ongoing process of immunologic destruction of insulin-producing cells."

To do that, Herold and his collaborator Jeffrey A. Bluestone, PH.D., of the University of California at San Francisco, have developed an antibody that quiets the attacking T cells. In a series of small clinical studies that began in 1999 and 2002, Herold and colleagues demonstrated that patients who received a two-week treatment with the antibody when their diabetes first appeared still had substantial insulin production up to two years later, while untreated control subjects showed the expected continued decline in insulin levels. That antibody is now undergoing testing in larger clinical trials, sponsored by a Maryland biotech company in collaboration with the Juvenile Diabetes Research Foundation International (JDRF), with a target completion date of 2011.

In the meantime, Herold is running his own follow-up experiments with the antibody. His current studies aim to test if booster treatments of the antibody can prolong its effect on insulin production. Also, he wants to know if treatment can still work for people who have had diabetes for a while but continue to make some of their own insulin.

The antibody is not a cure. After treatment, patients still need daily insulin injections, but they need significantly less. Preserving some natural pancreas function helps them to regulate their blood sugar, which is likely to stave off both dangerous swings in blood sugar in the short term, and long-term complications that can include heart disease, high blood pressure, blindness and kidney disease. At the same time, an important plus of the immune treatment is that it does not result in long-term immunosuppression, which carries a risk of infection or cancer. Instead, the antibody appears to produce a state of immune tolerance, where the T cells are retrained and cease to attack vulnerable beta cells. One important question Herold wants to answer is how long that effect can be maintained.

It seems certain that any future cure will feature some form of immune control. Promising approaches include stem cell replacement therapy and beta-cell transplants, but in either case, the new tissues created by these techniques will need protection from the same immune onslaught that destroyed their predecessors. Along those lines, researchers elsewhere are now testing the antibody developed by Herold and Bluestone in conjunction with beta-cell transplants.

But the most exciting prospect for Herold is finding out whether the antibody can actually prevent diabetes in people who are not yet sick, but appear to be headed that way. With support from The National Institutes of Health (NIH), Herold now directs the Trial Net Center at Yale, which promotes studies of the treatment and prevention of type 1 diabetes. A diabetes prevention trial—in which subjects will include relatives of people with type 1 diabetes who still have robust insulin production, but

Diabetes, *page 5*

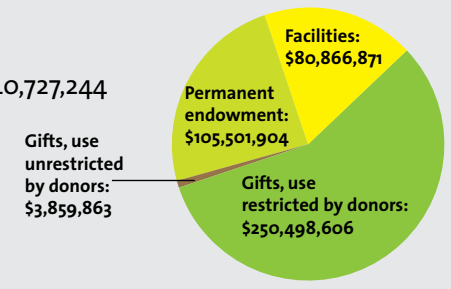
MEDICINE tomorrow

Campaign update

Campaign goal: $750 million

Results through 6/30/08: $440,727,244

Results by gift designation



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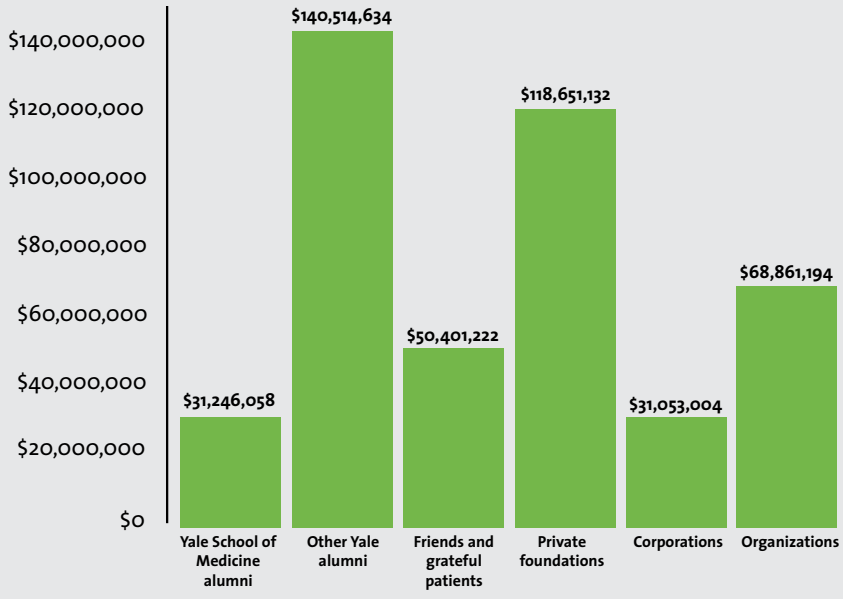

Supporting research on diabetes, obesity and related disorders is a top priority of The Campaign for Yale School of Medicine. For information about gift opportunities, visit yaletomorrow.yale.edu/medicine or contact Jancy Houck, associate vice president for development and director of medical development at (203) 436-8560.

Doctor who stays in touch wins prize for clinical excellence

After so many years of training, one might expect a doctor's head to be full of nothing but high-level information. But as Lynn D. Wilson, M.P.H., M.D., knows, simpler concepts are also key to professional success.

Wilson, professor of therapeutic radiology and dermatology and recipient of the first annual David J. Leffell Prize for Clinical Excellence, is known for returning calls from patients and referring doctors within one hour of receiving them—just one aspect of his practice that has garnered him the admiration of patients, colleagues and administrators. He received the newly inaugurated prize at the first Annual Meeting of the Yale Medical Group (YMG) on June 9. The award was established with a $100,000 endowment donated this spring by David J. Leffell, M.D., deputy dean for clinical affairs and CEO of YMG, and his wife, Cindy.

HAROLD SHAPIRO

Dean Robert Alpern (right) presents therapeutic radiologist Lynn Wilson with the inaugural David J. Leffell Clinical Excellence Award for his dedication to superb patient care.

Presenting the award, Dean Robert J. Alpern, M.D., said that Wilson is "an outstanding educator and clinical researcher" in addition to excelling at patient care.

Wilson directs patient care in the Department of Therapeutic Radiology and provides radiation therapy for cancer patients.

His clinical and research interests include cutaneous and non-cutaneous lymphoma, and cancers of the lung, head and neck. He serves on the editorial boards of a number of oncology journals and is the principal investigator for a phase I clinical trial using a combination of transimmunization (an immunotherapy for cancer devised by Richard L. Edelson, M.D., professor of dermatology and director of Yale Cancer Center) and external-beam radiation therapy for the treatment of late-stage non-small cell lung cancer.

Leffell, who endowed the prize to celebrate the 30th anniversary of his graduation from Yale College in 1977, says, "I'm delighted that the inaugural prize is going to Lynn. I've known him for many years and believe that his focus on clinical excellence is exactly what this award was designed to recognize. Lynn is a very meticulous, thoughtful and compassionate physician. He's thoroughly committed to the values of the medical school and to the principles of the practice, which puts excellence in patient care first."

Out & about

September 11, 2007: New Haven's Union League Café was the setting for **REMEMBERING AND RECOVERING**, a discussion with **Steven Marans**, PH.D., M.S.W., Harris Professor of Child Psychiatry at the Child Study Center (CSC), Professor of Psychiatry, and Director, National Center for Children Exposed to Violence; and Congresswoman **Rosa L. DeLauro** (D-CT) to raise awareness and recognize children and families affected by violence and trauma. **1.** From left: Marans with **Sandy Goodkind and David Goodkind**, M.D. **2.** From left: DeLauro, **Debra P. Hauser**, PH.D., M.S.W., lecturer in the Child Study Center; **Janet Levy**; and **Ana White**. The event was sponsored by the CSC's Child Development-Community Policing program.

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STEVE PERLMUTTER (2)

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JAMES R. ANDERSON (2)

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JOHN CURTIS

June 6, 7: Medical school alumni and their families converged on New Haven for the festivities at **REUNION WEEKEND**. **1.** Dean **Robert J. Alpern**, M.D., presented **Christine A. Walsh**, M.D.'73, professor of clinical pediatrics at Albert Einstein College of Medicine, director of the Pediatric Dysrhythmia Center at the Children's Hospital of Montefiore and co-director of the Einstein-Montefiore CardioGenetics Center, with the 2008 Distinguished Alumni Award. **2.** From left: **Harold D. Bornstein Jr.**, M.D.'53, and his wife, **Maureen Bornstein**, in a lively discussion with **Donald E. Moore**, M.D.'80, M.P.H.'81. **3. Lisa Gale Suter**, M.D.'98, with her son, Halvor, at the reunion clambake.

June 16: A reception was held to honor **Joan A. Steitz**, PH.D., Sterling Professor of Molecular Biophysics and Biochemistry, winner of the 2008 Albany Medical Center Prize in Medicine and Biomedical Research (see related story, p. 8). **1.** Steitz (left) and husband **Thomas A. Steitz**, PH.D. (right), Sterling Professor of Molecular Biophysics and Biochemistry and professor of chemistry, celebrate with **Andrew D. Hamilton**, PH.D., former provost of Yale University, recently appointed as vice-chancellor of Oxford University. **2.** From left: **Merle Waxman**, M.A., associate dean for academic development, ombudsperson of the School of Medicine and director of the Office of Women in Medicine, with **Lawrence S. Cohen**, M.D., Ebenezer K. Hunt Professor Emeritus of Medicine. **3. Sara C. Rockwell**, PH.D., professor of therapeutic radiology and pharmacology. **4. Haifan Lin**, PH.D., professor of cell biology and director of the Yale Stem Cell Center.

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TERRY DEGRADI (4)

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4

Advances

Health and science news from Yale

Testing neurons' crossover potential

As an embryo develops, wire-like axons sprout from cells, elongating to form networks of neurons in the brain and spinal cord. Some axons cross from one side of the body to the other, while others stay put. But how do axons know whether to cross?

ELKE STEIN

Scientists have shown that axons are prompted to cross the midline by an attractant protein known as netrin-1. Now a team led by Elke Stein, PH.D., assistant professor of molecular, cellular and developmental biology and of cell biology, has shown that DSCAM (Down syndrome cell adhesion molecule), a protein that has been linked to mental retardation, is essential for netrin-1 to exert its effects on spinal axons.

By suppressing the *DSCAM* gene in axons that normally cross at the midline of the mouse (see photo) and rat spinal cord during development, the Stein lab, in collaboration with Marc Tessier-Lavigne, PH.D., of California-based Genentech, found that axons that lack DSCAM lose their "sense of direction"; they fail to grow and reach the midline. The Stein lab is now investigating whether DSCAM plays this essential role in wiring up other parts of the nervous system and the nature of its contribution to Down syndrome.

A decline in falls

When taught how to prevent falls, clinicians and their older patients can significantly reduce the likelihood of one occurring. In an article published in *The New England Journal of Medicine* in July, Yale researchers reported an 11 percent reduction in the rate of older adults visiting an emergency department or being hospitalized because of a fall.

The researchers compared injury rates in a 58-zip code area in and around Hartford—in which clinicians were encouraged to incorporate evidence-based fall risk assessment and management into their practices—to a control region elsewhere in Connecticut. Their analysis also showed 10 percent fewer fall-related hip fractures and head injuries, some 1,800 fewer emergency department visits or hospitalizations and overall health care savings in the study region estimated at $21 million over the two-year study period.

"The research is done," said senior author Mary E. Tinetti, M.D., the Gladys Phillips Crofoot Professor of Medicine and Epidemiology and Public Health. "The next step is to put it into practice, by making physicians, nurses and physical therapists everywhere more conscious of fall risks among their patients and of what can be done to prevent falls."

On-the-spot blood tests make surgery quicker

Patients come to Yale from far and wide for endocrine surgery

Ever take a medical vacation? Stay in a hotel, take in the sights and fit in some surgery? That's a reality for some of the hundreds of patients each year who come to Yale-New Haven Hospital (YNHH) for parathyroid operations by endocrine surgeon Robert Udelsman, M.D., M.B.A., chair and William H. Carmalt Professor of Surgery. Since Udelsman's arrival at Yale in 2001, the number of such operations has risen steadily from 91 to more than 300 annually. Many of his patients are from out of state, and some fly in from Canada and as far away as Italy and Greece.

Most of these patients have primary hyperparathyroidism (PHP), an uncommon disease in which one of the parathyroid glands in the neck begins to enlarge and produce too much hormone. These enlarged glands are called adenomas. Too much parathyroid hormone, or PTH, causes bone loss, kidney stones and other health problems. The adenoma needs to be removed, and in most centers that requires general anesthesia and several nights in the hospital.

Not so at YNHH. Udelsman, who came to Yale from The Johns Hopkins School of Medicine in 2001 to head the surgery department, combines already existing techniques with a radical but simple innovation—placing a laboratory machine to measure hormone levels, along with a technician, inside the operating room—to create the safe, quick approach to adenoma removal that has made Yale a worldwide destination for PHP patients. "They can fly in Sunday, stay at the hotel and see us on Monday morning. Tuesday morning they have surgery," says Patricia Donovan, R.N., M.B.A., director of strategic operations and Udelsman's nurse coordinator. "They return Friday that same week—they might explore New Haven in the meantime—get their stitches removed . . . and fly back."

HAROLD SHAPIRO

Robert Udelsman (left) consults with a patient. Having lab equipment and a technician in the operating room has allowed Udelsman's team to assess parathyroidectomy results in just 12 minutes.

Udelsman's approach, which has been adopted by the other three endocrine surgeons on the team—Sanziana A. Roman, M.D., chief and assistant professor of surgery (endocrine); Julie Ann Sosa, M.D., associate professor of surgery; and Tobias Carling, M.D., PH.D., assistant professor of surgery—involves several coordinated steps.

First comes pre-op preparation. Besides the patient's medical background, the team needs to know where the offending adenoma is located. With most people having four or more parathyroid glands, figuring out which is the overactive one—or whether there is more than one—can be a challenge. Imaging studies such as sestamibi scans or ultrasounds help localize it. Before the patients arrive for surgery, Donovan gathers all relevant records, medical information and scan results, talking by phone with patients and their doctors to make sure that the surgery is appropriate for them.

But it is in the operating room that the uniqueness of Yale's approach is most evident. For one thing, Udelsman and his colleagues do not routinely place patients under general anesthesia. Instead, the patient receives a series of injections of local anesthetics in the neck to block pain. A small incision is made, the offending adenoma is removed and a blood test is done to check levels of PTH. But rather than having to send the blood sample to another part of the hospital, the lab technician in the operating room tests hormone levels immediately, an innovation that greatly speeds up the operation. The surgical team needs to wait only 12 minutes for the blood test results—about a quarter of the time needed at other institutions, where waiting for results can take longer than the operation itself. If PTH levels have dropped sufficiently, the surgeons can be confident that they removed the adenoma completely. Then it's time to sew up.

The entire procedure typically takes half an hour, and the patient goes home—or back to the hotel—a few hours later, returning to the clinic in three days for a final follow-up visit. Complication rates are low, cure rates are about 98 percent and the surgery is cost-effective. But most of all, patients are satisfied. According to Udelsman, "Putting the lab technician in the operating room is what made us, I think, the premier parathyroid center in the world." The patients who keep checking into New Haven's hotels would no doubt agree.

Online: Yale Netcast
"Minimally invasive surgery"

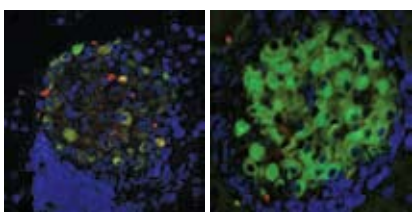
Diabetes *from page 3*

show signs of an ongoing immune reaction to their beta cells and subtle changes in blood sugar regulation—is expected to be launched by the Yale center by year's end. Such people do not meet the diagnostic criteria for diabetes, says Herold, but as teenagers, they have a 90 percent chance of developing diabetes within six years. The trial will test whether antibody treatment can protect the beta cells from destruction, keep insulin levels normal and permanently prevent the onset of diabetes, making daily insulin injections unnecessary.

Since coming to Yale two years ago as the first new faculty to join the Human Translational Immunology program directed by Jordan S. Pober, M.D., PH.D., professor of immunobiology, dermatology and pathology, Herold has joined forces with Richard A. Flavell, PH.D., chair and Sterling Professor of Immunobiology, to develop new mouse models of diabetes.

Flavell pioneered the use of genetically engineered mice to study the fundamental principles of immune systems. Now, using a combination of genetic modifications and human stem cells, he is leading an effort to engineer a new mouse that shares the most important features of the human immune system. (see related story, p. 2)

The project was launched by a $17 million grant to Flavell and colleagues from the Bill and Melinda Gates Foundation to develop the mice for the rapid development and testing of new HIV/AIDS vaccines, but the human immune-system mouse is also eminently qualified for studying diabetes. "There have been a lot of resources that the Gates Foundation has put into this project, and we want to take advantage of that," Herold says. "By making a few tweaks, we can develop new models that can be used to study autoimmune diseases including type 1 diabetes. So we're not reinventing the wheel; we're taking advantage of advances that are moving forward in parallel fields and applying them to diabetes."



KEVAN HEROLD

(Left) A mouse pancreatic islet that has been attacked by the mouse's own immune system, as happens in type 1 diabetes, contains few insulin-producing beta cells (green). (Right) after treatment with a monoclonal antibody being tested in Kevan Herold's laboratory, insulin production has been largely restored.

Once developed, the mice will be invaluable for discovering and testing new drug candidates, and for understanding how treatments work. In support of the effort, the JDRF recently granted Flavell and Herold $7.5 million to establish the JDRF Center for Developing Immunotherapies for Diabetes at Yale, with the express goal of generating models of diabetes in the new human immune-system mice. In return for that investment, Herold says, the new mice should "make it a lot easier, a lot faster and a lot cheaper to develop new therapies."

UTC *from page 1*

new ways and different methodologies to treat the disease. There are some real home runs in the family, which is why there is confidence in the institution to bring it to a new level," he said during an interview in his Hartford, Conn., office. "Now with Smilow Cancer Hospital plus the new research center, the tools are there. You have the people, you have the tools, you can attract the talent."

Construction of Smilow Cancer Hospital began in 2006, and the 497,000-square-foot building is expected to be complete in late 2009. The hospital will house 112 inpatient beds, outpatient treatment rooms, expanded operating rooms, diagnostic imaging services, therapeutic radiology and a specialized Women's Cancer Center with a reception area recognizing UTC's contribution. The hospital is named in recognition of the generous support provided by Joel E. Smilow, a member of the Yale College Class of 1954, and his wife, Joan.

The West Campus research center is one of a number of programs planned or contemplated for 450,000 square feet of research space already occupying the 136-acre complex in West Haven, former home of Bayer Pharmaceuticals' North American research headquarters.

United Technologies is a global corporation with business units that produce Pratt & Whitney aircraft engines, Sikorsky helicopters, Carrier air conditioning and heating systems, Otis elevators and escalators, Hamilton Sundstrand aerospace and industrial systems, UTC Fire and Security protection services, and UTC Power fuel cells. It had revenues of $54.8 billion in 2007 and employed 225,000 worldwide, including 27,000 in Connecticut, making it the state's largest private employer.

"[Supporting cancer research and treatment] is a high priority, because every week some of our employees have to deal with the devastating news of a diagnosis, either for themselves or for someone in their family," Chênevert said. "I lost my Dad to cancer and Debbie lost hers," he added. "Many of the cancers today can be cured because of the great research that has been done, and I think there are a lot of opportunities to find more cures

YALE-NEW HAVEN HOSPITAL

An architect's rendering of the lobby of the Smilow Cancer Hospital, now under construction and slated to open its doors to patients in late 2009.

with this new cancer center. Certainly the integrated facility creates a more patient-friendly environment. It's all about science and research, and it feels very good."

UTC made approximately $20 million in gifts to nonprofit organizations in 2007, including $5 million in Connecticut. It has raised more than $90 million over the last 15 years for the United Way, and its U.S.-based employees volunteer more than 65,000 hours of their time each year.

Smilow Cancer Hospital will house inpatient and outpatient services for Yale faculty physicians and community practitioners at Yale-New Haven Hospital and Yale Cancer Center, one of 41 comprehensive cancer centers recognized by the National Cancer Institute for exceptional clinical care and scientific research.

According to YCC Director Edelson, Chênevert is on to the next challenge and has focused their discussions on matters well beyond the brick-and-mortar issues surrounding the hospital's construction. This is good news, Edelson said, and it makes Chênevert a formidable ally in the battle against cancer.

"This is a man who identifies what's important to him and makes it happen," he said. "Louis is looking for the ultimate victory, and he understands the steps that need to be taken to get there. He has the big picture, and the big picture is defeating this disease and bringing the very best care to the patients who are served by Yale Cancer Center."

Simons *from page 1*

sor of Medicine. "His passion for the combination of state of the art clinical medicine and cutting edge molecular medicine will ensure that cardiovascular medicine at Yale and Yale-New Haven Hospital will provide the latest in outstanding personalized care. We are thrilled we were able to recruit him to Yale."

Angiogenesis is often associated with cancer, and with efforts to develop drugs that block the process to deprive tumors of their blood supply. Simons has been an advocate of therapeutic angiogenesis—using growth factors to stimulate new vessel growth to improve circulation in damaged regions of the heart or in blood-deprived limbs. At Dartmouth, Simons played a key role in FIRST (FGF *I*nitiating *R*eva*S*cularization *T*rial), a multicenter Phase II clinical trial of fibroblast growth factor for the treatment of patients with advanced coronary artery disease, as well as a number of other protein and gene-therapy trials.

Recently, Simons' research group has been especially interested in synectin, a scaffold protein that regulates multiple signaling cascades in the endothelial cells that line blood vessels. Synectin appears to be a key regulator of arterial fate determination and branching.

"Dr. Simons is a wonderful recruit with an exceptionally distinguished background in the laboratory investigation of angiogenesis and in the translation of that research into clinical applications," says John A. Elefteriades, M.D., the William W.L. Glenn Professor of Surgery and chief of the Section of Cardiac Surgery. According to Elefteriades, in addition to boosting the section's translational research capabilities, Simons plans to introduce new technologies to the cardiac catheterization laboratory operated by the Yale Heart Center at Yale-New Haven Hospital.

Simons received his medical degree from Yale School of Medicine in 1984. After an internship and residency at New England Medical Center in Boston, Mass., he completed postdoctoral fellowships at the Laboratory of Molecular Cardiology of the National Institutes of Health (NIH) and in the laboratory of Robert D. Rosenberg, M.D., PH.D., Whitehead Professor of Biology Emeritus at MIT.

Simons is principal investigator on research grants from the NIH totaling more than $4.5 million in direct costs, and he is board-certified in internal medicine, cardiovascular disease and nuclear cardiology. He is author or co-author of more than 200 peer-reviewed research articles, review articles and book chapters.

Simons suceeds Barry L. Zaret, M.D., the Robert Berliner Professor of Medicine and professor of cardiology. Robert Soufer, M.D., professor of medicine, and Forrester A. Lee, M.D., associate dean for multicultural affairs and professor of medicine, have served as interim chiefs of the section since Zaret stepped down in 2004.

Uganda *from page 1*

new mammography van initiative, which will introduce the first such equipment to the African continent.

The effort got off the ground when oncologist Kenneth D. Miller, M.D., assistant professor of medicine, learned that Yale-New Haven Hospital was selling one of its old mammography vans. The buyer, who was offering $1,000, planned to strip it and use it as an RV.

"A little light bulb lit up," Miller says. "[I thought,] 'Wait a minute, don't do that—that's a perfectly good mammography van.'" He upped the bid and won the van, with the Uganda Cancer Institute at Mulago Hospital in mind. Under the auspices of the School of Medicine's Health Overseas Partnerships in Health and Education (HOPE) program, which is supported by Johnson & Johnson, the School of Medicine has long had a close relationship with Mulago, and Miller had recently returned from a scholarly exchange trip there. Okuku, whom Miller met while in Uganda, had already arranged to come to Yale, with the help of Professor of Medicine Michele Barry, M.D., and Associate Professor of Medicine Majid Sadigh, M.D., co-directors of the HOPE program.

Before it could go to Uganda, though, the van needed some renovations—like relocating the mammography machine's generator from the undercarriage, where it would have been unlikely to survive Uganda's bad roads. Bruce L. McClennan, M.D., professor of diagnostic radiology, helped procure an ultrasound machine for the van to supplement the X-ray equipment. Then the van was repainted with vivid graphics. The Yale/Johnson & Johnson program reimbursed Miller for his purchase of the van and funded the renovations, and Barry says that plans are afoot for expanded interactions between the medical school and Mulago to promote cancer screening and education.

Okuku spent six months at the School of Medicine. Instead of just observing the work of attending physicians during clinical rotations, he learned take-home skills. A former X-ray technician, he was already at ease performing mammograms, but Liane E. Philpotts, M.D., associate professor of diagnostic radiology, taught him to interpret mammograms as well as ultrasound images.

Fred Okuku

After embarking on a seven-week transatlantic journey from a dock in Lake Charles, La., the van will anchor a pilot program in the suburbs of Kampala. Public service announcements will urge women to come to the van for a free screening. Brochures distributed from the van will educate the population about early signs of cancer, emphasizing that many cancers can be treated. "We'll use this to sensitize people about cancer," says Okuku, who plans to become an oncologist and practice in Uganda, becoming only the third such specialist in the landlocked nation of 31 million.

Mammography films from the van will be interpreted at Mulago Hospital. Women with suspicious lesions will be urged to come to Mulago at their own expense for further testing and treatment.

Prevention and early detection is crucial in countries like Uganda, where there are few health care resources or physicians, says Okuku. It is much less expensive to remove a breast lump than to do a mastectomy with chemotherapy. According to Okuku, Mulago Hospital's statistics show that 95 percent of Ugandan women with breast cancer have Stage IV disease when they're diagnosed, because they tend to wait an average of two years after noticing a lump before they seek treatment.

With the help of the van, Okuku hopes those statistics will change. "If we can prevent the cancer," he says, "that is the way to go."

Yale lab hones virus that selectively kills brain tumor cells

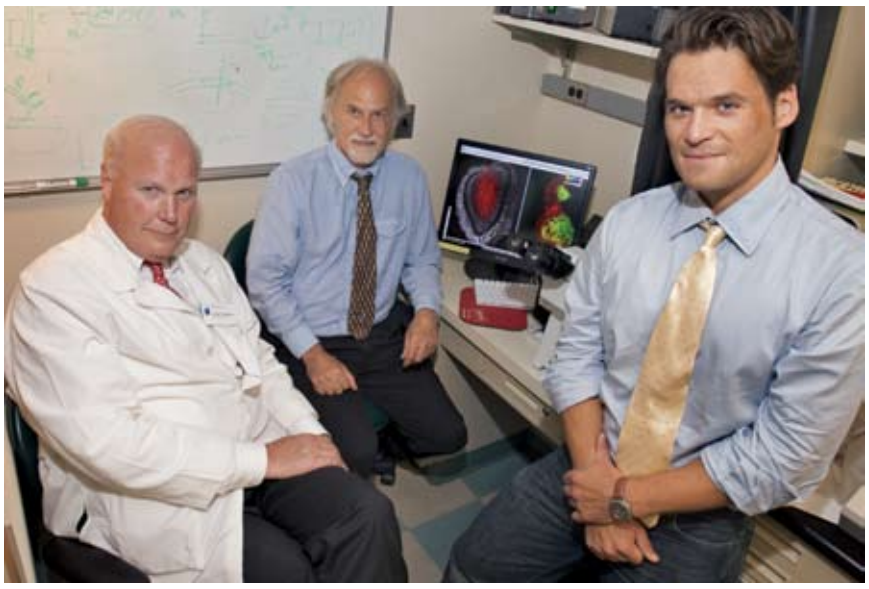
Specially "trained" virus is a search-and-destroy weapon against cancers

When Senator Edward M. Kennedy of Massachusetts was diagnosed with a malignant brain tumor in May, Americans were reminded of the gloomy prognosis faced by many brain tumor patients. According to the National Cancer Institute, of the 20,000 people diagnosed with malignant brain tumors in the United States every year, two-thirds will die in five years or less, only a modest improvement in survival rates from those seen 30 years ago.

Glioblastoma multiforme, the most malignant type of brain tumor, is especially hard to treat because it spreads quickly throughout the brain. Isolated tumor cells invade the surrounding area, migrating deep into normal tissue and making complete tumor removal almost impossible with conventional methods such as chemotherapy, radiation and surgery. In addition, there is a risk of the brain being damaged in the treatment process, causing some functional loss.

To avoid these problems, for over a decade scientists have been exploring whether viruses could be made to infect and destroy tumor cells, leaving normal cells intact. While some viruses have a natural affinity for cancer cells, others have to be genetically engineered to increase their tumor-destroying potential. But despite some promising leads, no virus has yet been found that can be used to successfully treat brain tumors in people. Recent work by School of Medicine researchers, however, has unveiled a new virus candidate that might have the potential to completely destroy brain tumors.

The engineered virus, called VSVrp30, was first described in 2005 by a team of researchers led by Anthony N. van den Pol, PH.D., professor of neurosurgery, in the *Journal of Virology*. The group tested nine viruses against brain tumor cells and found that a virus called vesicular stomatitis virus, or VSV (which causes a mild disease in cattle), worked best. The virus was grown for many generations, alternating between cultures of human glioblastoma cells and normal human cells. Viruses that grew on normal cells were discarded until the researchers arrived at a virus population that could completely destroy a tumor with minimal infection of normal cells. "We made the virus do what we wanted it to do by putting evolutionary pressure on it," says Guido Wollmann, M.D., associate research scientist in the Department of Neurosurgery and lead author of the 2005 study. The resultant virus, with its high selectivity for tumor cells, was named VSVrp30.



TERRY DAGRADI

Joseph Piepmeier, Anthony van den Pol and Guido Wollmann have worked to engineer a virus that targets brain tumor cells.

Wollman, postdoctoral fellow Koray Özduman, M.D., van den Pol and Joseph M. Piepmeier, M.D., the Nixdorff-German Professor of Neurosurgery, recently tested VSVrp30's efficacy against brain tumors in live animals and published their results in the February issue of the *Journal of Neuroscience.*

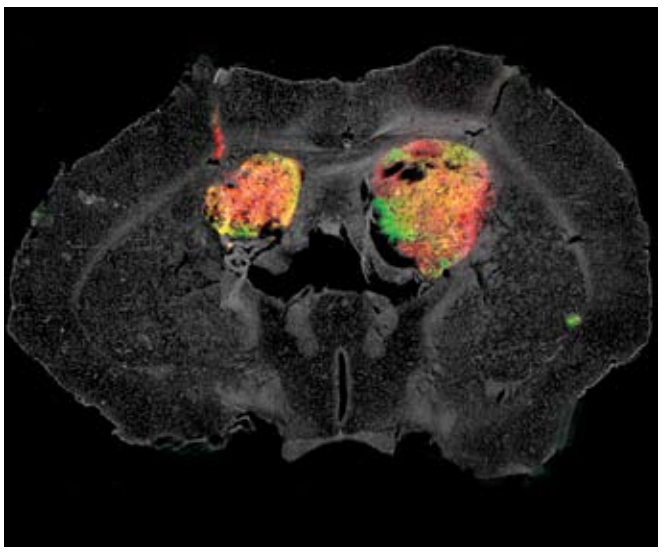
The group injected human brain tumor cells, with an inserted gene from coral that would cause them to glow red under the microscope, into the brains of mice. Solid brain tumors, similar to those seen in humans, soon formed in the mice's brains. VSVrp30, modified with an inserted jellyfish gene that causes green fluorescence, was then injected into the mice's tail veins. Within 72 hours, the researchers saw that the virus, glowing green, had selectively infected and destroyed the red brain tumor cells while sparing normal cells, even when two or three tumors were present in different parts of the brain.

With VSVrp30's high selectivity for tumor cells the researchers hope they can use the virus to locate and infect cancer cells not only in the main body of the tumor but also cells that have dispersed to other parts of the body.

As a control, normal brain cells were injected into mice and, as predicted, VSVrp30 did not infect these cells. One of the greatest difficulties in getting drugs to reach the brain is a protective blood-brain barrier. "We found that the virus managed to cross the blood-brain barrier and infect tumors," says van den Pol, "but it did not cross the blood-brain barrier when there was no tumor" because the presence of a tumor impairs the barrier, allowing the virus to pass through.

The biggest concern about using viral therapies is the possibility that the viruses might infect normal cells. So far, however, the virus seems to have a preference for tumor cells. Normal cells, when they sense a virus, release interferon that serves as a signal for other cells to up-regulate their antiviral defense. But tumor cells have poor antiviral defense and don't release interferon when they sense a virus. This, combined with the high sensitivity of VSVrp30 to interferon, reduces the affinity of the virus for normal cells, the scientists say.

The group also found that the virus could travel along a nerve fiber and enter the brain. When they injected VSVrp30 near the olfactory nerve, the virus entered the brain through the olfactory bulb, a technique that allowed the scientists to avoid placing the virus into the bloodstream. "This is another route we can explore to enhance targeting the problematic part of the brain," says van den Pol.



ANTHONY VAN DEN POL

In this cross-section of a mouse brain, three tumors (including a small tumor at lower right) have been selectively infected by an engineered virus. No infection of surrounding normal brain tissue is apparent in this image.

Grants and contracts awarded to Yale School of Medicine

November/December 2007

Federal

Karen Anderson, NIH, *Molecular Mechansims in EGF Signaling and Iressa/Tarceva Inhibition in NSCLC*, 5 years, $1,440,519 • **Maile Brown**, NIH, *Genetic Regulation of K(Na) Channels in Neuronal Excitability,* 3 years, $154,422 **Dario Englot**, NIH, *Neuroimaging, Energetics and Neuronal Activity in Spike-Wave Seizures,* 3 years, $40,972 • **Gerald Shadel**, NIH, *Epigenetic Regulation of Mitochondrial Complex II*, 2 years, $574,992 • **Gordon Shepherd**, NIH, *Integrative Mechanisms of Cortical Circuits,* 3 years, $868,365 • **Mark Shlomchik**, NIH, *Activation and Regulation of Autoreactive B Cells in Health and Disease*, 5 years, $2,677,905 • **Mary Torregrossa**, NIH, *Peptide Regulation of the Neurocircuitry Underlying Drug Relapse*, 3 years, $49,646 • **Benjamin Turk**, NIH, *Application of Peptide Arrays and Mass Spectrometry to Proteases*, 3 years, $620,260 • **Dianqing Wu**, NIH, *Therapeutic Targeting of Wnt Signaling*, 5 years, $1,584,059

Non-Federal

Clara Abraham, *Crohn's & Colitis Foundation of America Inc., lfa-1 and Regulatory T Cells*, 1 year, $23,647 • **Maysa Abu-Khalaf**, Susan G. Komen Breast Cancer Foundation, *An Integrated Approach to Biomarker Validation in Patients with HER-2 Positive Metastatic Breast Cancer Treated with Rapamycin (Rapamune) to Overcome Resistance to the HER-3 Targeted Therapy, Trastuzumab*, 2 years, $300,000 • **Dorothy Baker**, State of Connecticut, *Connecticut Fall Prevention Program*, 18 months, $1,500,000 **Kathleen Connell**, American Urogynecologic Society, *Effect of HOXA11 Silencing in* In Vitro *and* In Vivo *Extracellular Matrix Remodeling*, 2 years, $30,000 • **Nihal deLanerolle**, ORA Inc., *DARPA Blast Injury (PRVENT)*, 1 year, $262,492 **Robert Dubrow**, Pfizer Inc, *Milestones in Public Health Grand Rounds Series: Health Disparities and the Challenge of the New Millennium*, 1 year, $15,000 • **David Geller**, The Research Institute at Nationwide Children's Hospital, *Mechanisms of Glucocorticoid Action in Podocytes*, 1 year, $9,446 • **Michelle Harris**, Arthritis Foundation, *Interrogating Distal Checkpoints in Autoreactive Germinal Center Regulation*, 3 years, $150,000 • **Hajime Kanda**, The Human Frontier Science Program Organization, *Analysis of the Mechanism of Leptin Sensitivity in Immune Cells to Control Energy Balance* In Vivo, 3 years, $145,900 • **Patricia Keenan**, The Pennsylvania State University, *The Regional Quality Strategy Planning Grant*, 6 months, $12,603 • **Anthony Koleske**, Elsa U. Pardee Foundation, *Control of Breast Cancer Invasiveness by Adhesive Cues in the Tumor Microenvironment*, 1 year, $122,233 **Dania Magri**, American Vascular Association, *The Role of EphB4 in Mediating VEGF-A Induced Vein Graft Adaptation*, 1 year, $3,000 **Yuxin Mao**, Lowe Syndrome Association, *Structure Studies of the Lowe Syndrome Protein OCRL*, 1 year, $20,000 • **Michael Nathanson**, American Gastroenterological Association, *Development and Validation of a Multiphoton Endoscope for Surveillance Studies of Patients with Barrett's Esophagus*, 1 year, $10,000 **Kevin Nickerson**, The S.L.E. Lupus Foundation, Inc., *Opposing Roles of TLR7 and TLR9 Signaling in Systemic Lupus Erythematosus*, 3 years, $135,000 • **Edward Novotny**, Children's Hospital (Cincinnati), *Childhood Absence Epilepsy (CAE): Evaluation and Predictors of Long-Term Outcome*, 1 year, $54,573 • **Rita Rienzo**, Physician Assistant Education Association, *Factors Influencing Graduate Physician Assistants in their Decision to Pursue Postgraduate Residencies*, 1 year, $5,000 • **Joanne Weidhaas**, Radiation Therapy Oncology Group, *Uterine Cancer and MicroRNAs*, 1 year, $50,000 • **Li Wen**, Juvenile Diabetes Research Foundation International, *Prevention and Treatment of T1D in Human CD20 Transgenic NOD Mice*, 3 years, $495,000 • **James Yue**, Covidien, *A Study to Evaluate the Performance of DuraSeal Xact Adhesion Barrier and Sealant System for the Prevention of Perivascular Adhesions in the Rabbit Artificial Disc Model*, 1 year, $59,958

Expert on RNA splicing wins Albany Medical Center Prize

In May, Joan A. Steitz, PH.D., Sterling Professor of Molecular Biophysics and Biochemistry and a pioneer in the study of RNA, was named a winner of the Albany Medical Center Prize in Medicine and Biomedical Research, America's largest prize in medicine. Steitz shares the $500,000 award with Elizabeth H. Blackburn, PH.D., the Morris Herzstein Professor of Biology and Physiology at the University of California, San Francisco. Steitz and Blackburn are the first two women scientists to win the prize.

Steitz, a Howard Hughes Medical Institute investigator, is best known for her discovery and characterization of small nuclear ribonucleoproteins (snRNPs; prounouced "snurps"), intracellular complexes that play a key role in the splicing of pre-messenger RNA, the earliest product of DNA transcription. By excising non-coding regions from RNA and splicing together the resulting segments, snRNPs help to create the messenger RNA (mRNA) templates for making proteins.

Besides illuminating this splicing process, Steitz's research has served to clarify how splicing expands the coding potential of human chromosomes and has provided tools to advance the diagnosis and prognosis of rheumatic diseases.

GLENN DAVENPORT/ALBANY MEDICAL COLLEGE

Joan Steitz and Elizabeth Blackburn shared the 2008 Albany Medical Center's Prize in Medicine and Biomedical Research. From left: Albany Medical Center President and CEO James Barba, Blackburn, Steitz and Vincent Verdile, dean of Albany Medical College.

Blackburn, who was a postdoctoral associate at Yale in the mid-1970s, discovered telomerase, an enzyme that repairs and stabilizes chromosomes. Telomerase has since been shown to play a crucial role in aging, the development of cancer and the biological effects of chronic stress.

"Many scientists believe that Dr. Steitz's research may ultimately lead to breakthroughs in treating a variety of autoimmune diseases including lupus," said James J. Barba, president and CEO of Albany Medical Center, who served as chair of the selection committee for the prize. "Dr. Steitz and Dr. Blackburn are among the greatest scientists of our generation. The potential impact of their research is extraordinary and we all owe them a great debt of gratitude."

Now in its eighth year, the Albany Medical Center Prize is the second largest medical prize in the world outside of the Nobel Prize. The prize, which was endowed by a gift of $50 million from the Marty and Dorothy Silverman Foundation, is awarded to a "physician or scientist, or group, whose work has led to significant advances in the fields of health care and scientific research with demonstrated translational benefits applied to improved patient care."

Steitz entered the PH.D. program at Harvard University in 1963 in biochemistry and molecular biology, and she was the first female graduate student to work under James D. Watson, PH.D., who had shared the Nobel Prize the previous year for his co-discovery of the structure of DNA. After completing postdoctoral work at the Medical Research Council Lab of Molecular Biology in Cambridge, England, she joined the Department of Molecular Biophysics and Biochemistry at Yale in 1970.

Steitz is a fellow of the American Academy of Microbiology and a member of the National Academy of Sciences, the Institute of Medicine, the American Academy of Arts and Sciences and the American Philosophical Society. She is also a fellow of the American Association for the Advancement of Science.

Genome authority is awarded Connecticut Medal of Science

In May, Michael B. Snyder, PH.D., the Lewis B. Cullman Professor of Molecular, Cellular and Developmental Biology, was awarded the 2007 Connecticut Medal of Science, the state's highest honor for achievement in science.

The award, given by the Board of Governors for Higher Education of Connecticut, was presented at the annual dinner of the Connecticut Academy of Science and Engineering.

"While working at the frontiers of science, Dr. Snyder is an integral part of several educational initiatives to attract more young people into science, particularly those from underrepresented groups," said Frank W. Ridley, chair of the Board of Governors, when presenting the award. "From his cutting-edge lab research to his popular university courses to teaching kindergarten, Dr. Snyder is dedicated to advancing a broader understanding of science and the joy of pursuing curiosity."

Snyder, also professor of molecular biophysics and biochemistry and director of the Yale Center for Genomics and Proteomics, is best known for his efforts to characterize the genomes of humans and model organisms. He laid the groundwork for the large-scale characterization of genes and gene interactions, and for his ongoing research in functional genomics and systems biology, in which he and colleagues analyze thousands of genes or proteins at once to discover their interrelationships.

Michael Snyder

Snyder's early research focused on the mechanisms employed by cells to select directions in which to grow and divide, work that provided insight into how specialized cell types and tissues develop their distinctive shapes and characteristics.

More recently, Snyder's laboratory was the first in Connecticut to focus on human embryonic stem cells. His team discovered a novel signaling pathway that is essential for embryonic stem cell self-renewal. They then used this information to formulate one of the first media for cell growth that is free of any animal components, a step that is important for the future use of human embryonic stem cells for therapy.

The Connecticut Medal of Science and the Connecticut Medal of Technology were conceived in 1991, when then-Senate majority leader John Larson introduced a bill to initiate an annual state award "for scholarship achievement in science and technology." The awards process began in 1993.

Professor emeritus of public health is winner of Ivy Award

During his 36-year tenure as professor of epidemiology and microbial diseases at the School of Public Health, Curtis L. Patton, PH.D., led many research-based efforts aimed at improving public health and served in a number of administrative capacities, including head of the Division of Epidemiology of Microbial Diseases and acting head of the Division of Global Health.

Now an emeritus professor still prominent both on campus and in the broader community, Patton has received one of this year's Ivy Awards, annual prizes given to Yale faculty, staff and students whose work enhances understanding and cooperation between the city and university.

The awards were given on April 30 by Yale University President Richard C. Levin and City Chief Administrator Robert Smuts, representing New Haven Mayor John DeStefano Jr.

MICHAEL MARSLAND

New Haven's City Chief Administrator, Robert Smuts (right), presents Curtis Patton (center) with a 2008 Ivy Award, joined by Yale President Richard Levin (left).

In the summer of 2004, Patton was asked by Levin to help re-establish and chair the Minority Affairs Committee, which gives advice on the appropriateness of university policies related to minority groups. Patton also serves as chair of the Committee on International Health, which awards Downs Fellowships to Yale students who undertake biomedical, medical, nursing or public health research in developing countries.

Yale's recognition of Edward A. Bouchet, PH.D., Yale College's first African-American graduate and the first African-American to earn a PH.D. from an American University, is due in part to Patton. Bouchet became a hero of Patton's while he was an undergraduate student at Fisk University. Since his arrival at Yale, he has worked to ensure that Bouchet is known throughout the campus and community.

Patton has also worked to celebrate the legacy of Cortlandt Van Rensselaer Creed, M.D., the School of Medicine's first African-American graduate.

In 2007, on the occasion of the 150th anniversary of Creed's graduation from the School of Medicine, Patton and his colleagues organized a series of events culminating in the dedication of a new permanent memorial to Creed at the Grove Street Cemetery.

Six Elm Awards, which are bestowed on members of the New Haven community (the "Elm City") were also given at the April event. The Elm and Ivy Fund, which endows the awards, was established at Yale in 1979 by Fenmore Seton, a 1938 Yale College graduate, and his wife, Phyllis.