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UCONN School of Medicine Dean's Newsletter, Fall 2010

Cato T. Laurencin

*University of Connecticut School of Medicine and Dentistry*

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Research Focuses on Building New Bone

Cell-based therapy
From the earliest days of my career in orthopaedic surgery and chemical engineering, I have been fascinated with the prospect of regrowing bone and connective tissue to help patients regain mobility. It is now my privilege to be leading teams of scientists not only in my own lab but throughout the UConn Health Center who are pursuing promising research in this area.

This includes Dr. David Rowe who has devoted most of his career to the study of osteogenesis imperfecta and is now pioneering new approaches for bone and tissue regeneration through the use of adult and embryonic stem cells. These efforts have received robust extramural support and have fostered collaborative efforts with scientific colleagues throughout the University of Connecticut – the top public university in New England.

Like you, I am confident that teams on campuses across the country will continue to make breakthroughs to improve care for generations to come. I hope you will enjoy learning more about this and some of the other exciting endeavors at the UConn School of Medicine.

My best wishes to all as we begin a new academic year.

Sincerely,

Cato T. Laurencin, M.D., Ph.D.
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Diversifying the Health Professions Pipeline

The UConn Health Center’s Health Career Opportunity Programs (HCOP) open doors to careers in medicine, dental medicine, biomedical research, and other health professions for students who are disadvantaged or from populations underrepresented in such fields.

With funding from public and private sources including the Aetna Foundation, HCOP director Marja M. Hurley, M.D., oversees a number of programs collectively known as the Aetna Health Professions Partnership Initiative (HPPI) pipeline. This year, 23 of UConn’s 117 medical and dental school graduates were considered underrepresented – including minority students and those who are economically or educationally disadvantaged. Fifteen of those 23, more than 65 percent, participated in at least one pipeline program. “It’s been an increasing trend over really the last 10 years,” Hurley says.

HCOP associate director Granville Wrensford, Ph.D., C.R.A., says he’s found the students in the program to be more motivated, organized and focused. “And I think it broadens their horizons, too. They’re talking about a lot more possibilities in terms of what they would like to do, as opposed to having a narrow focus.”

One pipeline program is the Aetna HPPI Saturday Academy, which follows students throughout their high school careers. They meet at UConn’s Hartford campus on Saturdays during the academic year and full time for six weeks during the summer, with a focus on advancement in math, science, and language arts, and standardized testing preparation.

All participants in the Aetna HPPI are mentored by medical, dental, and graduate students, and faculty at the Health Center. The pipeline also offers a broad range of programs for middle school, high school, and college students – from a high school-level research apprentice program to a clinical summer research fellowship program for undergraduate students.

Information on all HCOP enrichment programs is available at http://hcop.uchc.edu.
Modern genetic testing can predict your risk of contracting particular diseases based on predispositions discovered in your DNA. Jim Rusling, Ph.D., professor of chemistry at UConn and professor of cell biology at the UConn Health Center, is hoping similar biotechnology could detect disease even before any symptoms arise.

Rusling and his colleagues have been developing techniques to detect biomarker proteins – the physiological traits that indicate that a person has a specific disease – for prostate and oral cancer. Because these biomarkers are often present in the blood in a disease’s early stages, they can be used for early detection and prevention.

In the journal *Analytical Chemistry*, Rusling describes a system he and his team developed to detect with record sensitivity the bloodstream levels of a protein associated with several types of oral cancer. The protein, called interleukin-6, is normally present in very low levels in the bloodstream – so low that previous biomarker sensors might not be able to detect it. This and other biomarkers are signaling molecules, which can instruct cancerous cells to grow faster. Their levels can increase even before tumors begin to form, enabling early detection.

Currently, blood samples and antibodies need to be specially prepared and fed manually into the group’s testing setup. Rusling envisions that in clinics, an automated tester about the size of a cell phone could be developed to accept a sample of a person’s blood, analyze the sample, and read out the results. Such testers could make early detection much easier, he says, which could go a long way toward saving lives.

“There’s not going to be one cure for cancer, because cancer is thousands of diseases,” he says. “The best thing for patients is early detection. Biomarker proteins could become the standard of early detection and treatment monitoring in the future.”

Mobility is a critical component of independence and quality of life for older persons. Research by Leslie Wolfson, M.D., and his team has shown for the first time that certain changes in the brain’s white matter are highly predictive of the development of disability in older adults. The results of the study are published in the *Journal of the American Geriatrics Society*.

Changes involving brain white matter are seen in many MRI brain scans of older adults. “They are so common that until recently it was assumed that they don’t matter and may represent normal aging,” explains Wolfson, professor and chair of the Department of Neurology. “But our research found that these brain changes are a good indicator of problems in older adults such as difficulty walking, thinking, and remaining continent.”

Wolfson believes that interventions such as aggressive treatment of elevated blood pressure may help prevent or slow these declines, allowing older adults to remain independent, vigorous, and healthy longer.
David Rowe, M.D., is confident that medical science will one day enable patients to regrow bone and other tissues lost to disease, trauma, or aging. Rowe, director of the UConn School of Dental Medicine’s Center for Regenerative Medicine and Skeletal Development, is quick to note that this breakthrough, like others over the centuries, will be achieved only through rigorous, persistent research.

“It’s a very difficult challenge,” Rowe says. “A lot of work needs to be done before this becomes a reality. But we have the people, the tools, the resources, and the commitment to move the research forward.”

The research Rowe and his colleagues are engaged in focuses on how to use embryonic and adult stem cells to regenerate bone and other tissues in the body. The team has received funding for its work from the Connecticut Stem Cell Research Program, the National Institutes of Health, and the Department of Defense.

Rowe himself was recently honored as the recipient of the 2010 UConn Health Center Board of Directors Faculty Recognition Award. The award recognizes Rowe’s outstanding contributions to research, teaching, and mentoring.
Treating Disease and Injury

Osteogenesis imperfecta is Rowe’s main research interest. Commonly known as brittle bone disease, OI is a genetic disease that causes bones to be extremely fragile and to fracture easily. He and his colleagues are working to discover how to treat the disease by correcting the genetic defect in the patient’s own cells.

“We’re looking for ways to identify the progenitor stem cells that exist in the body, remove them, engineer them, and put them back in so they’ll function normally,” says Rowe.

An offshoot of this research deals with treating traumatic injuries, especially those sustained by members of the armed forces serving in war zones. The team has funding from the Department of Defense to develop strategies for salvaging limbs that would otherwise have to be amputated. The DOD is a major supporter of such research nationwide.

“Treating Disease and Injury”

Rowe sees his research on stem cells and regeneration as the next major step in the centuries-old evolution of medicine. Milestones in that evolution have included Hippocrates’ discovery of anatomy; understanding of infectious disease and immunization; innovations in anesthesia and sterile technique, which gave rise to modern surgery; development of antibiotics and the pharmaceutical industry; and breakthroughs in molecular biology and genetics, which brought about new diagnostic tools and drugs.

The next major breakthrough, Rowe predicts, will be cell-based therapy, not only for use in bone regeneration, but also in neuroscience, endocrinology, and other fields.

“The breakthrough would be to take a patient’s own cells, put them through a process to engineer them to be any cell in the body you want them to be, and put them back into the body and have them be a match,” Rowe says. “It’s the ultimate in personalized, cell-based therapy. This is where medicine has to go, and we’re at the dawn of that revolution.”

A Multidisciplinary Approach

Rowe points out that the Health Center has been a leader in connective tissue research for nearly 40 years, having recruited people with expertise in this field when the Schools of Medicine and Dental Medicine were founded.

“The Health Center – and UConn in general – has been a powerhouse nationally and internationally in this area,” he says.

With such a high concentration of expertise available within the institution, Rowe and his colleagues in the Center for Regenerative Medicine and Skeletal Development have made it a point to cultivate a multidisciplinary approach. They work with tissue engineering specialists led by Cato T. Laurencin, M.D., Ph.D., dean of the School of Medicine, and collaborate with the New England Musculoskeletal Institute’s Department of Orthopaedic Surgery, directed by Jay R. Lieberman, M.D. They also work with experts at the University’s Storrs campus, including tissue engineers and specialists in materials science and computer science. “We see ourselves as having a central, coordinating role,” Rowe says. “We’ve built the infrastructure and can do the testing and evaluation of various ideas.”

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The Next Breakthrough

“Treating Disease and Injury”

Rowe reviews research data with Xiaonan Xin. Li Chen works in the background.

“This is a huge area,” says Rowe. “Because of the war and the horrific injuries that in the past would have killed soldiers, there is enormous interest in coming up with strategies to try to salvage bone that has sustained such devastating injuries.”

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A Scholarship Student Becomes a Scholar, Then a Scholarship Donor

Jack Rowe, M.D., has had many titles in his life: professor at Harvard and Columbia, CEO and chairman of Aetna, CEO of Mount Sinai Medical Center and School of Medicine in New York City, chair of the board of the University of Connecticut, and one last title that actually came first: scholarship student.

“I only had the benefit of higher education because I had full academic scholarships to college,” he says. “My family otherwise would not have been able to send me to school.” College, then, made just about everything else in his life possible. From Canisius College in Buffalo, N.Y., to the University of Rochester School of Medicine and Dentistry, to Harvard Medical School and numerous high-profile positions, Rowe has had a lifelong involvement with education.

He and his wife, Valerie Rowe, Ph.D., a former professor at Fordham University, recently took their commitment one step further with a $2 million pledge through the UConn Foundation to the UConn Honors Program. The gift will provide much-needed support to the existing John and Valerie Rowe Health Professions Scholars Program, which encourages academically gifted students from underrepresented groups and low-income families to enter the health professions. The program is administered by the University’s Honors Program in partnership with the UConn Health Center.

“For me and my wife, our particular interest was in trying to give disadvantaged students who are academically talented the opportunity to reach their full potential,” he says. “The health professions are desperately in need of more talented minority physicians and nurses and dentists and lab technicians, and that’s been a consistent observation throughout my career. That’s why we did this.”

“Rowe Scholars have been admitted to medical, dental, and nursing schools, worked on honors theses, and served as campus leaders,” says Lynne Goodstein, director of the Honors Program. “The Rowes’ gift is a statement of their confidence in the Honors Program to provide life-changing opportunities to deserving students.”

White Coat Gala Benefits Clinician-Scientists

Clinician-scientists at the Health Center are at the forefront of medicine, integrating clinical care, research, and basic science to bring discoveries from the bench to the bedside. This past spring, nearly 500 people attended the inaugural White Coat Gala, raising more than $450,000 to benefit clinician-scientists across the Health Center.

The honoree of the evening was Board of Trustees Distinguished Professor of Medicine Lawrence G. Raisz, M.D. Raisz has earned international prominence and numerous prestigious awards for his groundbreaking work in the management of osteoporosis and metabolic bone disease. At the Health Center, he headed the Division of Endocrinology and Metabolism until 1997 and served as the first program director of the Lowell P. Weicker, Jr. General Clinical Research Center. He has been the director of the UConn Center for Osteoporosis since its inception in 1990 and is associate director of the New England Musculoskeletal Institute.

Title sponsorship for the gala was generously provided by Aetna and Carole and Ray Neag, longtime supporters of the Health Center and the University.
Christopher Hughes, M.D., second-year UConn general surgery resident, has been named the Paul Farmer Global Surgery Research Fellow at the Children’s Hospital in Boston.

Hughes, who has participated in several international surgical and medical trips to Belize, Bolivia, Honduras, India, and Ecuador, will spend the next two years researching and performing surgical care in Haiti and Africa.

“We’re kind of at the convergence of a lot of different forces involving international surgery at this point,” explains Hughes. “The documented need for surgery in resource-poor settings around the world is escalating, and people are actually looking into ways of capturing what those needs are for poor people and poor countries around the world.”

In the future, Hughes believes more surgical epidemiologists will look for surgery to fit in a broader context of the overall health care system. “The success of medical missions is often judged by how many surgeries the doctors performed,” explains Hughes. “But when we leave and dump the patients’ complications and follow-up care on the community doctor who is already overwhelmed, does that benefit the community as a whole?”

Christopher Hughes Awarded Prestigious Paul Farmer Global Surgery Research Fellowship

Drs. Anne Kenny and Anna Dongari-Bagtzoglou Accepted to Prestigious Leadership Program

The Hedwig van Ameringen Executive Leadership in Academic Medicine® (ELAM) Program for Women at Drexel University College of Medicine has been an important and prestigious source of leadership training for women nationally and at the Health Center.

Recently accepted into the next class of this highly competitive program are Anne Kenny, M.D., associate professor in the Department of Medicine and the Center on Aging, and Anna Dongari-Bagtzoglou, D.D.S., M.S., Ph.D., associate professor in the Department of Oral Health Sciences and chair of the School of Dental Medicine’s Division of Periodontology.

Kenny is widely published; her clinical interests include interventions that decrease risk for falls, fractures, and frailty in older men and women, such as testosterone and vitamin D supplementation. In recent years, she has played a pivotal role in the development of the master’s degree in clinical and translational research. Dongari-Bagtzoglou was recently appointed to the National Advisory Dental and Craniofacial Research Council. Her research interests include the pathogenesis of oral opportunistic infections in the immunocompromised host and oral infection-induced inflammation.

Fast Fact

$101,908,000 received for biomedical research at the UConn Health Center last fiscal year.
Within days of the earthquake that devastated Haiti, Robert Fuller, M.D., head of emergency medicine, was among the first physicians to arrive with the International Medical Corps to treat nearly 1,500 people for wounds, crush injuries, trauma, and shock. Fuller’s work in Port-au-Prince was recognized with a 2010 Health Care Hero Award from the Connecticut Hospital Association.