Taking a productive alliance further

In 2011 the School of Medicine formed a research alliance with the biopharmaceutical company Gilead Sciences, Inc. to accelerate the discovery and development of new drugs to treat cancer. Called “transformative” by then-Yale President Richard C. Levin, the collaboration included an initial commitment of up to $40 million to support research at the medical school over four years.

Now, almost four years into the collaboration, the commitment has been renewed for an additional three years and supplemented with an additional $30 million.

“Gilead is pleased to be continuing this important collaboration with Yale,” said William Lee, Ph.D., senior vice president of research at Gilead. “Significant progress has been made in this first phase of our research partnership, and we will continue to work closely with the team from Yale in an effort to identify novel cancer therapies with the potential to help patients.”

Since the collaboration’s inception, scientists from Gilead and Yale have engaged in a multidisciplinary research program to search for the genetic basis and underlying molecular mechanisms of many forms of cancer. The goal—to identify new molecular targets in order to enable development of novel targeted therapies, including therapies that overcome drug resistance—has fostered substantial and promising research.

In one part of the collaboration, tumor samples are analyzed to identify gene mutations that disrupt normal cellular functions and promote the uncontrolled cell growth and metastasis seen in cancer. Thousands of genes from a diverse set of cancer types have been taken up directly by the team from Yale in an effort to identify novel cancer therapies with the potential to help patients.

Neurosurgeon, a pioneer in genomic studies, is new chair

Murat Günel, M.D., an accomplished neurosurgeon and geneticist, has been named chair of the School of Medicine’s Department of Neurosurgery and chief of neurosurgery at Yale-New Haven Hospital (YNHH).

Günel’s clinical expertise is in treating complex brain aneurysms and vascular malformations, and brain tumors. His landmark genomic research has revealed the genetic risks for brain aneurysms, the mutational landscape of brain tumors, and a multitude of genes fundamental in cortical development. He succeeds Dennis D. Spencer, M.D., the Harvey and Kate Cushing Professor of Neurosurgery, who led the department for 27 years and is a longtime mentor to Günel.

“Murat is an exceptionally creative scientist,” said Dean and Ensign Professor of Medicine Robert J. Alperm, M.D. “I am confident he’ll be a terrific department chair. I am pleased to be continuing this important collaboration with Yale,” said William Lee, Ph.D., senior vice president of research at Gilead. “Significant progress has been made in this first phase of our research partnership, and we will continue to work closely with the team from Yale in an effort to identify novel cancer therapies with the potential to help patients.”

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The mystery of medicine

Pursuing a passion for problem solving, while quietly making history

As a college chemistry student in the 1970s, Michele H. Johnson, M.D., found herself intrigued by the television show “Quincy, M. D.,” about a crime-solving forensic pathologist. In one episode “they found a femur, and in a television hour, they came up with the drawing of the person. This is so hokey,” Johnson says, but the show led her to an idea. “Could I use chemistry to solve medical problems?”

Since then, problem-solving has formed the backbone of Johnson’s own narrative. She has also followed in the footsteps of her mother, a chemist, and her father, a neurochemist and the first African-American to receive a Ph.D. in chemistry from the University of Delaware. After earning her B.A. in chemistry at the same institution, she entered medical school at Temple University, where a medical “mystry” on a rotation struck a familiar chord.

At St. Christopher’s Hospital for Children in Philadelphia, Johnson watched Marie Capitanio, M.D., chief of radiology, use a single chest X-ray to diagnose both cystic fibrosis and sickle-cell disease in a teenager. She immediately saw the value in pairing X-ray clues with clinical knowledge to diagnose patients. “I learned very early that the more clinical information you know and can apply, the stronger diagnostic you are,” she says.

After her internship and residency in diagnostic radiology at Temple University and fellowship in neuroradiology at the University of Pennsylvania, Johnson returned to Temple to join the diagnostic radiology faculty. It was an exciting time to be in radiology, she says. Bolstered by the appearance of non-invasive technologies like computed tomography (CT) and magnetic resonance imaging (MRI), the field blossomed in the late 1970s and 1980s.

In 1999 Johnson came to Yale School of Medicine (YSM), where today she confronts medical mysteries routinely. As professor of diagnostic radiology, neurosurgery, and surgery, like any good detective, she throws herself into every case. “We’re not just sitting in a dark room looking at films,” says Johnson. “We’re part of the patient care team, and I’m very proud that that’s an important part of what I do.”

Johnson shows off photos on her ever-buzzing phone of one of the latest advances in neuroradiology, a clot retrieval tool no wider than a blood vessel that resembles a Chinese finger trap. To restore blood flow in the brain after an acute stroke, she uses the contraption to snake through vessels, latch onto blood clots, and pull them out the same way she went in. One of the field’s biggest challenges, Johnson says, is training new radiologists to apply established fundamentals in using newer, non-invasive technologies. Trainees need to develop the ability to take two-dimensional images and make them three-dimensional in their heads. “Our challenge as faculty is to teach that effectively,” she says.

In 2012 Johnson completed a fellowship in medical education through the medical school’s Teaching and Learning Center, to stay abreast of pedagogical challenges students and residents to think creatively and cooperatively when faced with novel situations. “I try to teach trainees that it’s more effective to be collaborative than confrontational,” says Johnson. “You might even have fun in the process.”

In 2014, Johnson became the first African-American woman named a full professor at YSM, but she doesn’t dwell on the subject. “I can teach technique and anatomy,” she says. “Can I teach students to work together successfully for the patient’s benefit? That would be the real legacy I’d aspire to.”

For Yale’s renowned M.D./Ph.D. Program, a changing of the guard

The School of Medicine’s Medical Scientist Training Program (MSTP), known on campus as the M.D./Ph.D. Program, has undergone a change in leadership for only the fifth time in its 45-year history. James D. Jamieson, M.D., Ph.D., professor of cellular biology and the program’s director for more than 30 years, stepped down this past summer. His successor is Barbara Kuzmierczak, M.D., Ph.D.

Kuzmierczak, associate professor of medicine and microbial pathogenesis, earned her bachelor’s and master’s degrees at the University of Chicago, and her M.D./Ph.D. at the Weill Cornell/Rockefeller/Slan-Kettering Tri-Institutional Program. She completed residency and fellowship training at the University of California—San Francisco. Kuzmierczak has studied the pathogen Pseudomonas aeruginosa extensively, focusing on bacterial factors important for establishment of disease and on host responses to infection. She came to Yale in 2001 and has served as director of graduate admissions for the microbiology track and as associate director for basic science of the M.D./Ph.D. Program. Established in 1969, the M.D./Ph.D. Program graduated its first students in 1971. Jamieson led the program from 1974 to the present, with the exception of the years 1983 to 1992, when he chaired the Department of Cell Biology. The program’s extraordinary success under Jamieson is reflected by its 40 years of continuous support by the National Institutes of Health.

New pilot aims to help bridge gaps for new physicians

The School of Medicine has been named by the Association of American Medical Colleges (AAMC) as one of 10 medical schools that will make up a pilot cohort to test the implementation of the Core Entrutable Professional Activities (EPAs) for Entering Residency. These are new guidelines intended to help bridge the gap between patient care activities that new physicians should be able to perform on day one of residency training and those they feel ready to perform without direct supervision.

The AAMC released the new guidelines in June in response to feedback from residency program directors about the clinical preparedness of entering residents, and from emerging literature documenting a performance gap at the transition point between medical school and residency training.

The School of Medicine was one of more than 70 AAMC member schools to apply for a spot in the pilot. The high number of applications “demonstrates the significant energy and commitment within academic medicine toward closing the gap between expectations and performance for residents on day one,” said Darrell G. Kirch, M.D., AAMC president and CEO.

The AAMC is a not-for-profit association representing all 141 accredited U.S. and 17 accredited Canadian medical schools; nearly 400 major teaching hospitals and health systems, including 51 Department of Veterans Affairs medical centers; and nearly 90 academic and scientific societies. It represents 128,000 faculty members, 8,100 medical students, and 110,000 resident physicians.

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To end brain tumor growth: a switch?

Glioblastomas are among the most deadly cancers: fewer than 5 percent of those diagnosed with the brain tumors will survive more than five years. Researchers know that multiple different molecular pathways work in concert to help the tumors grow, and they’re struggling to find drugs that block these cancer-enabling factors all at once.

Now, a team of School of Medicine scientists has discovered a single protein that can simultaneously weaken glioblastomas and make the environment around the tumors less welcoming to the cancer.

 SOURAV GHOSH, PH.D., assistant professor of neurology, Carla V. Rothlisberg, assistant professor of immunology, and colleagues showed that blocking the protein—called atypical protein kinase (AKPK)—inactivated growth pathways in glioblastomas and reduced inflammation in the surrounding tissue. In mice with glioblastomas, they discovered, administering a drug targeting AKPK shrunk tumors by more than half in just a week. And in people with glioblastomas, higher levels of AKPK were correlated with poorer prognosis, they reported in the Aug. 12 issue of Science Signaling.

The findings suggest that drugs blocking AKPK in humans could be an effective treatment for glioblastomas.

Predicting whether a patient’s tumor will shrink in response to a treatment has often been a bit of a guessing game. But this may be changing: Yale researchers have identified a way to determine ahead of time whether a wide range of cancers will respond to aMPDL3280A, an experimental drug which blocks the protein PD-L1, a critical “checkpoint” for the body’s immune response to cancer.

In July, Marie-Szol, M.D., professor of medicine, updated colleagues at the annual conference of the American Society of Clinical Oncology (ASCO) on a remarkable Phase I melanoma trial. It combines nivolumab and another antibody, ipilimumab, in advanced melanoma patients. While ipilimumab acts on the CTLA-4 checkpoint, together the drugs affect the immune system synergistically. Nivolumab produces an already impressive 65 to 73 percent one-year survival rate, but when combined with ipilimumab the rates rose to 85 percent at one year and 75 percent at two years. (Comparison, chemotherapy offers this population a one-year survival rate of around 20 percent.)

Early results appeared in 2013 in the New England Journal of Medicine. If confirmed in Phase III trials, Szol, says, “this would be the most active combination that we’ve ever developed for melanoma.”

Another PD-1/PD-L1 inhibitor, MPDL3280A, is in trial as well. Half of a group of patients with advanced bladder cancer—who haven’t responded to standard therapy—have responded to MPDL3280A, says investigator Daniel P. Petrylak, M.D., professor of medicine and urology. That, he says, “has been pretty much unheard of,” since no chemotherapeutic agent currently exceeds a 20 percent response rate. Some patients’ tumors have become radiologically undetectable, and responses have lasted more than 18 months. Similarly, in 2013, Roy S. Herbst, M.D., PH.D., Ensign Professor of Medicine, professor of pharmacology, and co-director of medical oncology at Yale Cancer Center and Yale-Smoly Cancer Hospital at Yale-New Haven, reported at ASCO that MPDL3280A was durably shrinking advanced solid and hematologic tumors in 21 percent of patients.

Such results are prompting oncologists to rethink the role of chemotherapy, which suppresses the immune system as it targets fast-dividing cancer cells. Immunotherapy, by contrast, relies on intact immunity. That difference makes it problematic to design trials that combine immunotherapeutic and chemotherapeutic agents. But it also means researchers like Chen foresee a day when immunotherapy will replace chemo as a first-line treatment for cancer. “The direction is very clear,” says Chen, also professor of immunobiology, dermatology, and medicine.

Studies that place the burden of a cure solely on immunotherapeutic agents are already under way. Scott N. Gersinger, M.D., associate professor of medicine, for example, is studying nivolumab alone or in combination with other agents in advanced lung cancer, with promising early results.

PD-1/PD-L1 inhibitors work by disrupting an immune “shutdown” caused by tumors. Typically, when the immune system’s T-cells arrive at cancer sites, they secrete cytokines—which causes tumors and related tissues to make the protein PD-L1. The PD-L1 then binds to PD-1, a receptor on the T-cells, paralyzing the immune response at the tumor site. PD-1/PD-L1 inhibitors come in two types: drugs that consist of antibodies to PD-1, such as nivolumab, and drugs that consist of antibodies to PD-L1, such as MPDL3280A. Both types counteract this immune shutdown, allowing T-cells to proceed with the destruction of cancer cells. (Incidentally, Chen discovered PD-L1 in 1999 at the Mayo Clinic.)

The PD-1/PD-L1 inhibitors offer multiple and distinct advantages. Not only do they halt and shrink so many advanced cancers, their effects also last much longer than those of chemotherapy, since the inhibitors bolster the patient’s immune system against his own cancer. And because the immune boost happens at tumor sites, most side effects are minor or readily manageable, so the drugs are better tolerated than chemotherapy. “Patients don’t even have to be hospitalized,” Chen says. “They walk in, sit for a half-hour or one hour, and then leave.”

Yale researchers hope to develop biomarkers to identify the patients most likely to benefit from immunotherapeutic agents from those less likely, so they’re taking biopsies from responders and non-responders to look for key differences (see related story, “Better predicting a tumor’s treatability,” at left.). Some tumors, for example, express more PD-L1 than others, and so are more apt to respond to an anti-PD-1/PD-L1 agent.

Researchers also plan to develop effective combinations with other immune modulatory agents as yet undeveloped and with other immunotherapy strategies. From here, the possibilities seem nearly limitless.

“We used to have a paradigm in oncology that the amount of excitement is inversely correlated to the amount of clinical data that you have,” Szol, says. “Here, the excitement is actually driven by very good clinical data. We’re just at the beginning of what we can do with these drugs.”
The team is now exploring the use of the technology in humans with GBM. In other projects with medical colleagues, Saltzman is synthesizing and testing nanoparticles to deliver gene-editing agents, novel anti-cancer agents that block microRNAs, microbicides for preventing infectious disease, and targeted approaches for treating vascular disease. “Mark Saltzman embodies the spirit of collaboration and innovation that we prize at the School of Medicine, which is so essential to the development of novel treatments for disease in today’s scientific climate,” says Dean and Ensign Professor of Medicine Robert J. Alpern, M.D. “Mark is not only a dynamic leader, but a resourceful and innovative collaborator. We are very proud of his election to the IOM, an honor he has truly earned.”

Saltzman received his B.S. in chemical engineering from Iowa State University and earned an M.S. in chemical engineering and Ph.D. in medical engineering from MIT. In 2002, after serving on the faculties at The Johns Hopkins University and Cornell University, Saltzman came to Yale, where he was named founding chair of the Department of Biomedical Engineering in 2003. Saltzman’s achievements in the classroom have been recognized throughout his career, with teaching awards from Johns Hopkins, Cornell, and Yale, as well as the Distinguished Lecturer Award from the Biomedical Engineering Society. The IOM is an honorific membership body that also advises lawmakers, health professionals, and the public on health care and health policy. Saltzman is one of 37 School of Medicine scientists who are members. He is among 70 new members and 10 foreign associates elected to the IOM.
A new piece of the diabetes puzzle

Since the 1990s, researchers have struggled to explain how leptin, an enzyme that monitors how much energy our bodies generate, lowers high blood glucose in diabetic mice. Understanding this mechanism, they’ve known, could pave the way for new therapies for patients with type 1 and type 2 diabetes (T1D and T2D).

In the July 2014 issue of *Nature Medicine*, members of the lab of Geri J. Lombroso, M.D., Ph.D., Georgia Tech. Cowliff Professor of Medicine, reported on a mechanism by which leptin mediates its action. The team observed that fasting T1D and T2D mice had low levels of leptin, and increasing leptin levels reversed hyperglycemia. They found that leptin inhibits the hypothalamic-pituitary-adrenal (HPA) axis, a critical neuroendocrine pathway that regulates body processes such as stress response.

The results suggest leptin could be an additional therapy (with insulin) that could vastly improve blood glucose control in diabetes, says lead author Rachel J. Perry, Ph.D., postdoctoral fellow in medicine.

A step forward in treating Alzheimer’s

Researchers have known that STRIAtal-Enriched protein Tyrosine Phosphatase (STEP), an enzyme key to regulating learning and memory in the brain, also plays a role in diseases marked by cognitive defects, in people with Alzheimer’s, Parkinson’s, schizophrenia, and other diseases, high levels of STEP disrupt the normal development and strengthening of the brain’s neurons.

Now, a team led by Paul J. Lombroso, M.D., Ph.D., Elizabeth Mears and House Jameson Professor in the Child Study Center, has developed a drug that inhibits STEP’s negative effects.

For five years, Lombroso’s team screened more than 150,000 compounds in search of one that blocks STEP activity. Eventually they landed on a drug called TC-2515. In the Aug. 5 issue of *Plast Biology*, Lombroso’s team reported that TC-2515 reversed memory deficits in mice with an animal version of Alzheimer’s disease. By entering the brain and effectively binding to and inhibiting STEP, the drug prevented the protein from disrupting synaptic activity in neurons.

The researchers are now testing the compound in other animals with cognitive defects. “Successful results will bring us a step closer to testing a drug that improves cognition in humans,” says Lombroso, also professor of neuropsychology and psychiatry.

With seven grants, Connecticut’s commitment to innovative research strengthens Yale stem cell biology

Although a young and sometimes controversial field, stem cell research has been hailed for its medical importance: increasingly, medicine has turned to stem cell biology in treatments for a variety of human diseases—ranging from the treatment of neuromuscular and liver diseases to the generation of skin grafts for burn victims.

Weimin Zhong, Ph.D., associate professor of molecular, cellular, and developmental biology, is getting at the root of what makes stem cells so medically valuable, studying how they balance their abilities to self-renew and differentiate. On one hand, and to develop into any kind of bodily cell or tissue, on the other. To better understand stem cell regulation, the team is inducing mouse nerve stem cells to differentiate from their normal patterns of replication.

Zhong’s research is being supported by a new grant from the state of Connecticut, which this past June awarded $5.6 million to Yale stem cell researchers. While the federal government has not always been fully supportive of stem cell research (between 2001 and 2009, federal funding for human embryonic stem cell research was restricted to a group of four cell lines), the state—partly in reaction to the federal restrictions—has staunchly supported stem cell research for nearly a decade.

The grants are part of a 10-year $300 million commitment to stem cell research begun in 2006. Connecticut’s program aims “to foster an environment in our state where scientists can pursue innovative research—work that is already promising new therapies for debilitating diseases,” said Gov. Dannel P. Malloy.

The grants will fund seven projects at the Yale Stem Cell Center (YSiCC). Among these, the YSsCC received one of only two “core” grants of approximately $500,000 each, for continued support and technological development of the YSsCC’s shared facilities, including its five core labs. Some of the grants are funding research into understanding fundamental stem cell biology, such as Zhong’s project. Others are funding work targeted at specific disease states.
Grants and contracts awarded to the School of Medicine July 2013—February 2014

Federal

Chadi Abdellah, nih, Examining the effect of Carbonic Anhydrase(Inhibitor) on the activation of T-Cells, 5 years, $970,570.

Clara Abraham, nih, Functional Outcomes of Inflammatory Bowel Disease Treatment: A Randomized Controlled Trial, 5 years, $1,810,690.

Serap Aksoy, nih, Exploring the role of microRNA 122 in hepatitis C, 2 years, $247,752.

Tift Abraham, nih, The Use of Antiplatelet Drugs and Regulation of the Cerebral Cavernous Malformation, 5 years, $1,215,204.

Bonita Berto跗 De Aguiar, nih, Effect of Circulating Cytokine on Eating Behavior and Brain Activation in Diabetes, 5 years, $510,271.

Brian Bogue, nih, Calcium Mediation in Development and Regulation of the Cerebral Cavernous Malformation, 5 years, $1,215,204.

Amelia Bond, nih, Characterization and safety Profiling for WAPin2, 2 years, $49,354.

Angeline Bondy, nih, Tic-transient neonatal depression, 5 years, $1,871,806.

Elizabeth Bradford, nih, Yale Training Program in Health Services Research, 5 years, $2,170,303.

Edward Brewer, nih, Augmenting Mindfulness-Based Training Experience-Driven Neurofeedback During Long-Term Rehabilitation and Bacula, nih, Mechanisms of Rhythmic Synaptic Glutamatergly Activity, 4 years, $919,087.

Jonathan Demb, nih, 5 years, $1,810,690.

Michael Caplan, nih, Subtyping of Toddlers with Autism Spectrum Disorder, 5 years, $2,730,603.

James Demb, nih, Emulsions for Nuclear Material Detection, 3.9 years, $1,661,695.

Jonathan Demb, nih, The Toolbox for Tsetse Reproductive Biology, 3.9 years, $1,661,695.

Jasmine D’Souza, nih, Mechanisms of Aca- toxis to Neural Circuit Deficits in Schizophrenia, 5 years, $1,810,690.

Amy Arnsten, nih, Mechanisms of Age-Related Cognitive Decline, 4 years, $1,838,210.

Kathleen Martin, nih, Enhancing Perioperative Care into Treatment of Hypoglycemia in Older Adults, 2 years, $166,500.

Andrew Miranker, nih, Pathological Angiogenesis, 3 years, $1,810,690.

David Hafler, nih, Medical Therapy for Atrial Fibrillation, 5 years, $2,081,250.

James Duncan, nih, Nuclear and Genomic Mechanisms of Myocardial Calcium Dynamics, 4 years, $1,265,400.

Richard Sutton, nih, Genotype-Environment Interaction With Psychosis, 4.7 years, $1,810,690.

William Sessa, nih, Gene Expression Panels for Forensic Identification of Ancestry, 4.7 years, $786,920.

Lynch, nih, Bioinformatics Of Gender and Hypoglycemia, 4 years, $1,810,690.

Michael Jurczak, nih, Use of Fragile X Premuta- tion as a Functional Relevance of mGLuR Treatment in Untreated Psychosis and its Impact in the U.S., 4.7 years, $1,810,690.

Susan Cotmore, nih, The Toolbox for Tsetse Reproductive Biology, 4 years, $1,265,400.

William Sessa, nih, Gene Expression Panels for Forensic Identification of Ancestry, 4.7 years, $786,920.

Rajit Sinha, nih, 5 years, $1,215,204.

Elizabeth Jonas, nih, Nanoparticles for the Treatment of Chronic Obstructive Pulmonary Disease, 3.9 years, $1,661,695.

Pat Seyfried, nih, Functional Relevance of mGLuR Treatment in Untreated Psychosis and its Impact in the U.S., 4.7 years, $1,810,690.

Elizabeth Jonas, nih, Nanoparticles for the Treatment of Chronic Obstructive Pulmonary Disease, 3.9 years, $1,661,695.

Pat Seyfried, nih, Functional Relevance of mGLuR Treatment in Untreated Psychosis and its Impact in the U.S., 4.7 years, $1,810,690.
Foundation recognizes geneticist’s promise

Panteleimon Rompolas, Ph.D., MBA, professor and molecular fellow in women’s health, is the recipient of a 2014 Blavatnik Regional Award for Young Scientists in the category of life sciences.

The award, which carries an unrestricted cash prize of $20,000, honors Rompolas’ contributions to the understanding of tissue development and regeneration. His research, conducted in the laboratory of Jennifer P. D. M., associate professor of genetics and dermatology, includes examining hair follicle stem cell behavior.

To directly address how stem cells maintain their identity during adult tissues, he developed a system that established for the first time the ability to visualize stem cells in their native environment in real-time in mammalian tissue. His research, published in 2012 and 2013 in the journal Nature, has enhanced our understanding of stem cell function in live mammalian tissue, and of potential roles in cell behavior and fate.

Rompolas is a current Druckenmiller Fellow with the New York Stem Cell Foundation and in 2013 received a $50,000 unrestricted cash prize of $30,000, an unrestricted cash prize of $20,000, and the Merton Bernfield Memorial Award from the American Society for Cell Biology. He earned his B.S. at the National and Kapodistrian University of Athens, and his Ph.D. and MBA at the University of Connecticut.

The Blavatnik Regional Awards for Young Scientists were established in 2007 to honor outstanding postdoctoral scientists in Connecticut, New York, and New Jersey. They are administered by the Blavatnik Family Foundation, which is led by industrialist and philanthropist Len Blavatnik and the New York Academy of Sciences, an independent non-profit group committed to advancing science, technology, and society worldwide.

Two faculty assume new leadership roles

The new academic year has seen a shifting of roles within Yale in its preeminent graduate program with the appointment of its director, Lynn Cooley, Ph.D., as dean of Yale’s Graduate School of Arts & Sciences (GSAS).

Cooley, the C.N.H. Long Professor of Genetics, stepped down as leader of the Combined Program in Biological and Biomedical Sciences (Biocomb) in July to assume the presidency of GSAS. She is succeeded as bbs director by Anthony J. Koleske, Ph.D., professor of molecular biology and biochemistry and of neurobiology. Koleske, also professor, has been a faculty member of the genetics and of molecular, cellular, and developmental biology, had served as bbs director since 2001. She received her B.A. from Connecticut College, and earned her Ph.D. at the University of Texas for research carried out with Dieter Söll, Ph.D., Sterling Professor of Molecular Biology and Biochemistry of chemistry. She was a postdoctoral fellow at the Carnegie Institution for Science, where she established new methods using transposable elements for genetic and molecular analysis of genes in the fruit fly Drosophila.

Koleske has served as director of graduate admissions for the BBS Program’s Medical School and Biotechnology track and its successor, the Biochemistry, Biophysics, and Structural Biology track. He is a member of the executive committees of the Interdepartmental Neurosciences Program and the Cellular and Molecular Biology Training Program.

Koleske earned his Ph.D. and completed a postdoctoral fellowship at MIT. His research is focused on the mechanisms underlying cell adhesion and how these processes break down in cancer and neurodegenerative diseases.

Three Yale scientists are among 50 recipients of the 2014 National Institutes of Health Director’s New Innovator Awards. The $1.5 million awards support innovative approaches to major challenges in biomedical research today. With the award’s support, Murat Avcı, Ph.D. (top), assistant professor of molecular, cellular, and developmental biology, and of physics, will work to uncover novel connections between single cell aging and cellular metabolism, chromosome instability, and protein quality control. Chengchao Lin, Ph.D. (middle), assistant professor of cell biology, will aim to generate artificial membranes for better study membrane trafficking in cells. Matthew Simon, Ph.D. (bottom), assistant professor of molecular biophysics and biochemistry, and of physics and of chemistry, and enzyme engineering to research RNA dynamics in the cell.

Nuclear Lamina-Associated Chromatin in Human ES Cells, Ph.D. (bottom), Murat Avcı, Ph.D. (top), and Chengchao Lin, Ph.D. (middle), were awarded $1.5 million each by the National Institute of Health (NIH) to study novel problems in cell biology and molecular medicine. Koleske’s grant supported in colony formation Kinase Fd6, and other cell biology and molecular medicine problems. Avcı’s grant supported the investigation of cell aging in human embryonic stem cells, and Lin’s grant supported the investigation of RNA dynamics in the cell. Three Yale scientists are among 50 recipients of the 2014 National Institutes of Health Director’s New Innovator Awards. The $1.5 million awards support innovative approaches to major challenges in biomedical research today. With the award’s support, Murat Avcı, Ph.D. (top), assistant professor of molecular, cellular, and developmental biology, and of physics, will work to uncover novel connections between single cell aging and cellular metabolism, chromosome instability, and protein quality control. Chengchao Lin, Ph.D. (middle), assistant professor of cell biology, will aim to generate artificial membranes for better study membrane trafficking in cells. Matthew Simon, Ph.D. (bottom), assistant professor of molecular biophysics and biochemistry, and of physics and of chemistry, and enzyme engineering to research RNA dynamics in the cell.