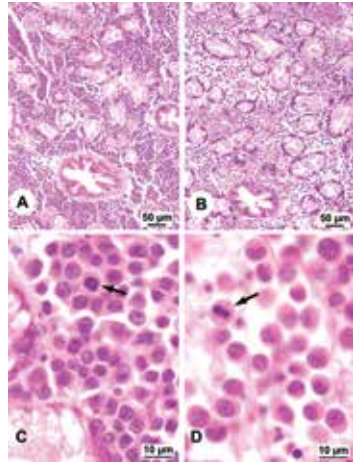
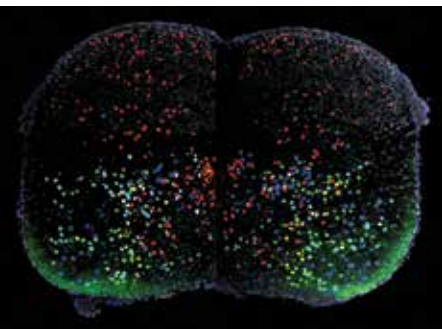


2016 Research Highlights

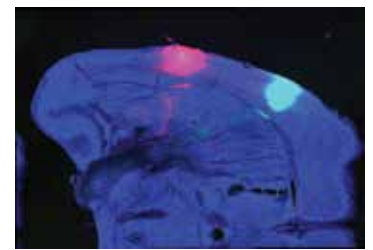
Counting Neurons in the Spinal Cord

Researchers at Columbia's Mortimer B. Zuckerman Mind Brain Behavior Institute have described new approaches to identify individual classes of neurons in the spinal cord. Two papers published in *Cell* highlight how statistical approaches could provide neuroscientists with a critical tool to quantify cellular diversity of any brain region. The research focused on a group of neurons in the spinal cord called V1 interneurons that orchestrate the activity and output of motor neurons, the class of neurons that give muscles the power to move. Researchers looked at these neurons in laboratory mice and were able to distinguish 50 distinct types of V1 interneurons.



Contagious Cancers Seen in Shellfish

Direct transmission of cancer among some marine animals may be more common than once thought, suggests a study published in *Nature*. A study led by Stephen Goff, PhD, the Higgins Professor of Biochemistry & Molecular Biophysics and professor of microbiology & immunology, in collaboration with researchers from Canada and Spain, revealed that in several species of bivalves, including mussels, cockles, and clams, cancer cells spread from animal to animal through sea water. The cancer, known as disseminated neoplasia, is a leukemia-like disease that affects bivalves in many parts of the world. Until recently, direct transmission of cancer cells had been observed in only two species of mammals.



Turning Taste On and Off

In research published in *Nature*, scientists demonstrated in mice the ability to change the way something tastes by manipulating cells in the brain. In one experiment, researchers used optogenetics to activate neurons to trick mice into thinking they were tasting bitter or sweet even when drinking water. "These experiments formally prove that the sense of taste is completely hardwired, independent of learning or experience," says Charles S. Zuker, PhD, professor of biochemistry & molecular biophysics and of neuroscience.

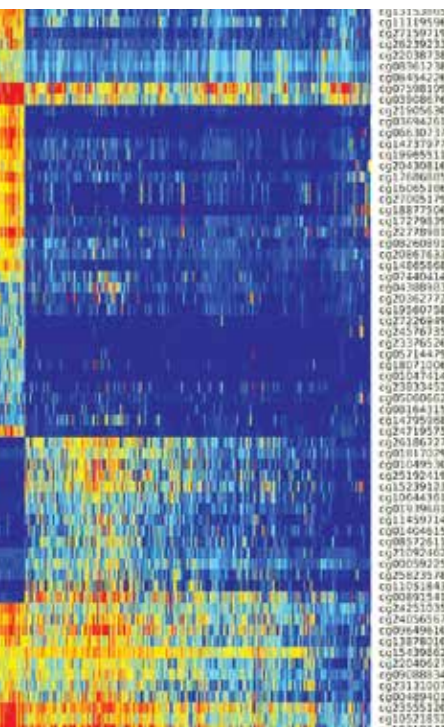
Brain Tumor Differences

Pathologists currently determine if a glioma, the most common malignant brain tumor, is low-grade or high-grade based on the tissue's appearance under the microscope. Research published in *Cell* explains why some patients diagnosed with slow-growing or low-grade tumors succumb to the disease faster than those with more aggressive tumors. Researchers analyzed samples to look for epigenetic changes in the tumors' DNA. They found that DNA methylation levels might influence tumor progression. Co-senior author Antonio Iavarone, MD, professor of neurology and of pathology & cell biology, says the results may help identify patients who require more aggressive treatment.



Drug Activates Brain's 'Garbage Disposal'

To remain healthy, brain cells must continually clear out old, worn, or damaged proteins, a task performed by a small molecular cylinder called the proteasome. The proteasome acts as a kind of garbage disposal, but in neurodegenerative diseases such as Alzheimer's, Parkinson's, and Huntington's, proteins tagged for destruction accumulate in the brain's neurons, suggesting that the cell's proteasomes are impaired. Researchers identified a new way to activate the brain's garbage disposal system, successfully using a drug to activate the system and slow down disease in a mouse model. Even though the drug used in the research, rolipram, is not a good drug for humans because it causes nausea, similar drugs without that side effect could be tested, says study leader Karen E. Duff, PhD, professor of pathology & cell biology (in psychiatry and in the Taub Institute for Research on Alzheimer's Disease and the Aging Brain). "This has the potential to open up new avenues of treatment for Alzheimer's and many other neurodegenerative diseases."



Cellular 'Switch' and the Perception of Danger

In a study published in *Science*, Jayeeta Basu, PhD, then a post-doctoral fellow in the laboratory of neuroscience chair Steven Siegelbaum, PhD, examined how a cellular circuit in a mouse helps the brain remember which environments are safe or harmful. The findings suggest that disruptions in neural pathways may contribute to an inappropriate fear response, a key characteristic of conditions such as anxiety or post-traumatic stress disorder.

Protein 'Raptor' Prevents Fatty Liver Disease

Researchers at Columbia's Naomi Berrie Diabetes Center have identified a pathway that prevents insulin or insulin-sensitizing therapy from causing fatty liver without getting rid of the favorable effects of insulin to reduce blood sugar. They found a protein called Raptor that exists within a protein complex known as mTORC1 that is involved in cell growth and cell differentiation. "As it turns out, young healthy mice—and, we assume, young, healthy people—have a lot of this free Raptor," says Utpal Pajvani, MD, PhD, assistant professor of medicine. "As mice age or get fat, free Raptor disappears. When free Raptor disappears, mice get fatty liver. If you give them back free Raptor, fatty liver goes away but leaves insulin's ability to lower blood sugar intact."

New Embryonic Stem Cell

P&S partnered with researchers at the Hebrew University of Jerusalem and the New York Stem Cell

Foundation Research Institute to create a new type of embryonic stem cell that carries a single copy of the human genome. It is the first time human cells have been known to be capable of cell division with just one copy of the parent cell's genome. The researchers were able to show that these haploid cells were pluripotent or able to differentiate into many other cell types, including heart, nerve, and pancreatic cells, while retaining a single set of chromosomes. The findings, published in *Nature*, show the potential for the cells to be used to develop cell-based therapies for diseases in which genetically identical cells offer a therapeutic advantage.

Fighting 'Superbugs'

Bugs like *E. coli*, *Salmonella*, and *Klebsiella pneumoniae*—all gram-negative bacteria—alter their electrostatic charge to evade detection by polymyxin antibiotics, our last line of defense against some "superbug" infections. Researchers using high-resolution imaging techniques to peer inside the bacteria have found places where drugs could disrupt the bugs' defense and restore their susceptibility to powerful antibiotics. Bacteria become resistant to polymyxins by placing a cap, made from a sugar molecule, over the negative charge, altering the electrostatic forces between bacteria and antibiotics. An enzyme called ArnT in the membrane of bacteria is responsible for the capping. The researchers were able to visualize the precise details of the process by using X-ray crystallography to reveal the location of

each individual atom in the ArnT enzyme before and after it grabs the sugar. Because the images reveal places where the enzyme could be disabled, the researchers are using computerized techniques to screen millions of potential drug candidates that might work with polymyxins to eliminate antibiotic-resistant bacteria.

Understanding Schizophrenia

P&S and Mortimer B. Zuckerman Mind Brain Behavior Institute investigators made significant findings in schizophrenia this year. Zuckerman Institute researchers Joseph Gogos, MD, PhD, and Joshua Gordon, MD, PhD, successfully disrupted a genetic

chain of events in a mouse model of schizophrenia and reversed memory deficits, one of the disorder's most difficult-to-treat symptoms. In a paper published in *Neuron*, scientists used a chemical compound to regrow connections between neurons, which in turn restored memory. In another study published in *Neuron*, Zuckerman researchers found that deficits in social memory, the inability to recognize familiar faces, may be due to a decrease in the number of inhibitory neurons in a little-explored region within the brain's memory center. "We can now examine the effects of schizophrenia at the cellular level and at the behavioral level," says Steven Siegelbaum, PhD, chair of neuroscience, who led this study along with Dr. Gogos. "This essentially opens up a whole new avenue for research that could lead to earlier diagnosis and more effective treatments for schizophrenia." A study by P&S and New York State Psychiatric Institute researchers, this one published in *Biological Psychiatry*, identified a pattern of brain activity that may be a sign of memory problems in people with schizophrenia. The research for the first time linked a brain signal in the dorsolateral prefrontal cortex directly to working memory performance in patients with schizophrenia.

Turning Back Time

As people reach their 30s and 40s, muscle strength and endurance decline. New research now suggests that changes in a protein from bones may be partly responsible. Researchers in the lab of Gerard Karsenty, MD, PhD, chair and the Paul A. Marks Professor of Genetics & Development and professor of medicine, years ago discovered that osteocalcin, a protein that is produced by bone cells in both mice and humans, is present in the bloodstream and delivered to other organs where it acts

as a hormone. Their newest studies show that osteocalcin has a profound effect on muscle and exercise capacity. When the hormone is injected into old mice, the animals are able to run as far and as fast as young mice. The researchers found that osteocalcin is able to improve exercise capacity by increasing the amount of glucose and fatty acids that skeletal muscle can take in and consume during exercise.

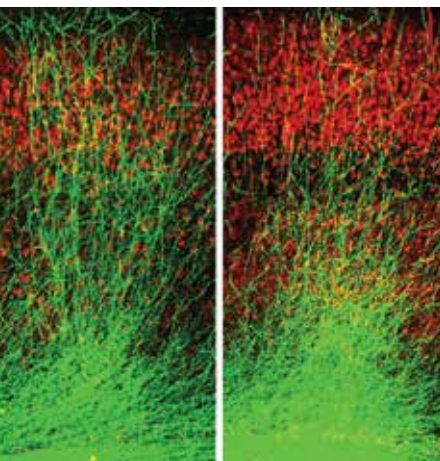
Clinical Practice by the Numbers

An international observational study has uncovered widespread differences in the treatment of patients with common chronic diseases, including type 2 diabetes, hypertension, and depression. Using data from 250 million records of patients from four countries, researchers demonstrated the feasibility of performing large-scale observational research to obtain information about clinical practice among diverse groups of patients. "We found that while the world is moving toward more consistent therapy over time for the three diseases, there remain significant differences in how they are treated," says George Hripcsak, MD, the chair and Vivian Beaumont Allen Professor of Biomedical Informatics. Observational research, in which patterns of care are gleaned from large data sets—such as electronic health records, insurance claims, and pharmacy records—has the potential to offer insight into real-world treatment scenarios that may inform clinical trial design and, ultimately, clinical practice. An international group of scientists

formed the Observational Health Data Sciences and Informatics program, which allows researchers to combine and analyze patient data from widely different sources in the United States and abroad. Columbia University serves as the program's coordinating center.

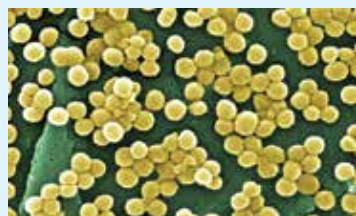
New Mouse Model of Anorexia

Columbia researchers have described a new mouse model that features a combination of genetic and environmental risk factors that can trigger the compulsive restriction of food intake seen in patients with anorexia nervosa. Previous models of anorexia included some of the variables thought to raise the risk of anorexia (genetic, biological, psychological, and sociocultural), but no model captured the elements of social stress and genetic susceptibility to anxiety and anorexia that appear to contribute to the onset of the disorder in humans, particularly in adolescents. "This model not only shows us the most important factors that contribute to the onset of anorexia, it's also helping us to identify signaling pathways in the brain that ultimately drive this potentially fatal eating disorder," says study leader Lori Zeltser, PhD, associate professor of pathology & cell biology. For the new mouse model, the researchers exposed adolescent mice with at least one copy of a variant of the BDNF gene, which has been associated with anorexia and anxiety in mice and humans, and also exposed the mice to social stress and caloric restriction.



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2016 Clinical Highlights



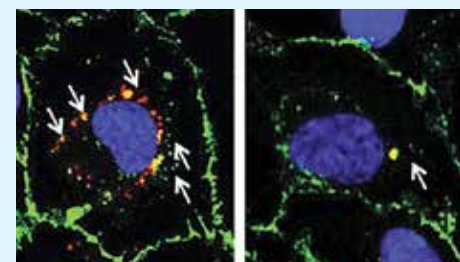
Killing Drug-Resistant Bacteria

Scientists from Columbia's Center for Radiological Research have shown that a narrow wavelength of ultraviolet light killed drug-resistant MRSA bacteria in mice, demonstrating a potentially safe and cost-effective way to reduce surgical site infections. A particular wavelength of UV light known as "far-UVC" is as effective as conventional germicidal UV light in killing MRSA, as shown in a previous study, but the new study shows for the first time that, unlike conventional germicidal UV, far-UVC does not cause biological damage to exposed skin, reports David J. Brenner, PhD, the Higgins Professor of Radiation Biophysics and director of the Center for Radiological Research.



Alternative to Open Heart Surgery

A study conducted by the Columbia Heart Valve Center found that women undergoing transcatheter aortic valve replacement—TAVR—have better survival rates than men one year after the procedure. The results, published in the *Annals of Internal Medicine*, are opposite of results seen in surgical aortic valve replacement, for which women had poorer outcomes. Another Columbia study, published in the *New England Journal of Medicine*, showed that TAVR is a viable alternative to traditional open heart surgery for patients with severe aortic stenosis at intermediate risk for surgery.



Heart Disease Risk and Sleep Apnea

For millions of adults, obstructive sleep apnea results in sleep disruption and then daytime sleepiness and difficulty concentrating. Sleep apnea also triples the risk for developing heart disease, including hypertension and ischemic stroke. A study has revealed some of the underlying mechanisms that may increase the risk and also found that statins may reverse the process. "We were surprised to discover that these commonly prescribed drugs appeared to reverse the process that leads to vascular injury, and ultimately heart disease, in people with sleep apnea," says Sanja Jelic, MD, associate professor of medicine at CUMC.

Steroids Benefit Late Preterm Babies

Babies born to women at risk for late preterm delivery may benefit from corticosteroids, reports new research published in the *New England Journal of Medicine*. Cynthia Gyamfi-Bannerman, MD, the Ellen Jacobson Levine and Eugene Jacobson Associate Professor of Women's Health (in Obstetrics & Gynecology), found that babies whose mothers received the corticosteroid betamethasone had significantly lower rates of severe respiratory complications shortly after birth compared with those whose mothers received a placebo. Babies in the study's treatment group also were significantly less likely to require long-term stays in the hospital's NICU or require respiratory treatment. Since the early 1990s, corticosteroids have been used in mothers at risk of delivering before 34 weeks of gestation to accelerate the development of the baby's lungs, but researchers believed that corticosteroids were unnecessary for later preterm births because 99 percent of babies born after 34 to 35 weeks survive. Research shows that even infants born during the "late" preterm period (between 34 and 36 weeks) have increased neonatal and childhood respiratory complications compared with newborns born at 37 weeks or later.

Precision Medicine Tools Link Congenital Disorders

A study published in *Science* explains why many children with congenital heart disease

also have other health problems, including neurodevelopmental disorders and other congenital problems. Researchers looked at genetic information from 1,213 children with congenital heart disease and their parents to analyze more than 4,000 genes. After comparing the findings with data on families not affected by congenital heart disease, the researchers showed that many children with congenital heart disease had spontaneous mutations in heart development genes. A single genetic mutation was responsible for about 20 percent of cases of severe congenital heart disease accompanied by neurodevelopmental disorders and/or other congenital problems. Mutations in children born with a combination of heart, brain, and other congenital disorders occurred in a subset of genes that act like conductors, orchestrating the formation and function of organs. Knowing these links could help doctors predict risk and may allow interventions to be put in place while the brain is still developing.

Infants, Immune System, and Vaccines

A study published in *Nature Medicine* provides new insights into how the infant immune system functions and suggests strategies for enhancing vaccination programs. Researchers took tissue from 64 organ donors to measure T cells and found that children under age 2 had more regulatory T cells in their tissues and lower levels of infection-fighting cyto-

kines than adults. The results suggest that health officials may be able to enhance the effectiveness of vaccines given in early infancy, says author Donna Farber, PhD, professor of surgical sciences (in surgery and microbiology & immunology).

Model Cancer Care

The Centers for Medicare & Medicaid Services selected Columbia, New York-Presbyterian Hospital, and Weill Cornell Medical College to participate in a care delivery model that supports and encourages higher quality, more coordinated cancer care. Nearly 200 physician group practices and 17 health insurance companies are participating in the Medicare arm of the Oncology Care Model, which includes more than 3,200 oncologists and will cover approximately 155,000 Medicare beneficiaries nationwide. Participants in the five-year Oncology Care Model will provide treatment following nationally recognized clinical guidelines for beneficiaries undergoing chemotherapy, with an emphasis on person-centered care.

Safety of Anesthesia for the Young

Columbia participated in a multicenter study that found that a single exposure to general anesthesia poses no cognitive risk to healthy children under age 3. Findings from the Pediatric Anesthesia Neurodevelopment Assessment study were published in the *Journal of the American Medical Association*. "A number

of animal studies have suggested that exposure to commonly used anesthetic agents in early development could lead to deficits in learning, memory, attention, and other cognitive functions," says Lena S. Sun, MD, the Emanuel M. Papper Professor of Pediatric Anesthesiology and professor of pediatrics at CUMC. "However, few clinical studies have adequately addressed whether this is also true in humans. Based on our findings, we can reassure parents that one exposure to anesthesia is safe for healthy young children."

Pioneering Public-Private Cancer Initiative

Columbia's Herbert Irving Comprehensive Cancer Center is one of four cancer centers that have formed a research consortium to accelerate the discovery and development of novel cancer therapeutics and diagnostics. The four cancer centers also entered into public-private collaboration agreements with Celgene Corporation in which Celgene will pay each institution \$12.5 million for the option to enter into future agreements to develop and commercialize novel cancer therapeutics arising from the consortium's efforts. Over the next 10 years the institutions plan to present research programs to Celgene with the goal of developing new life-saving therapeutics.

Surgical Treatment for Spasticity

Spasticity, an involuntary stretching reflex that stiffens



467-Gene Cancer Panel

The New York State Department of Health approved the Columbia Combined Cancer Panel, which queries 467 cancer-related genes. The panel was designed by the Laboratory of Personalized Genomic Medicine at CUMC in collaboration with Columbia oncologists.

muscles, is a common problem for people with cerebral palsy. One way to reduce spasticity is with a procedure called selective dorsal rhizotomy, in which a surgeon disconnects overactive sensory nerves that tell muscles to contract. CUMC is one of only a few medical centers in the United States to offer a less-invasive procedure that reaches the crucial sensory nerve roots by removing a much smaller piece of bone from the spine than is standard. Once the nerve roots are accessible, the surgeon uses electrical signals to differentiate motor nerve roots from sensory nerve roots and determine which sensory nerves are causing the most spasticity. Physical and occupational therapists in the OR confirm the results before the surgeon disconnects any nerve roots.

Combining Genomic Information and Electronic Records

A group of researchers will incorporate genomic information into electronic health records for thousands of Columbia patients

as part of the Electronic Medical Records and Genomics Network administered by the National Human Genome Research Institute. The goal is to combine genetic data with electronic medical record systems to improve diagnosis, disease risk assessment, prevention strategies, and treatment options. Researchers will look for new disease-causing variations in about 100 genes that have been linked to cancer, cardiovascular disease, stroke, kidney disease, and other health problems. The research is led by principal investigators Chunhua Weng, PhD, associate professor of biomedical informatics; George Hripcsak, MD, the Vivian Beaumont Allen Professor of Biomedical Informatics and chair of biomedical informatics; and Ali Gharavi, MD, professor of medicine and chief of nephrology.

Slowing Cognitive Decline with Hearing Aids

Though more than half of adults over the age of 75 have hearing loss, less than 15 percent of this population uses a hearing aid. A

Columbia study published in the *American Journal of Geriatric Psychiatry* found that adults who used a hearing aid performed significantly better on cognitive tests. The study showed that adults with hearing loss who used a hearing aid performed significantly better on the Mini-Mental State Examination, in which participants give vocal responses to verbal commands. The research suggests that using a hearing aid could prevent or slow the development of dementia, says Anil K. Lalwani, MD, professor of otolaryngology/head & neck surgery.

Treating Opioid Addiction

Opioid addiction is a growing problem in the general population, but it is disproportionately high in prison populations. A study published in the *New England Journal of Medicine* found that ex-prisoners who received six monthly injections of naltrexone, a long-acting medication that blocks opioid receptors in the brain, were significantly less likely to resume opioid use than

those who received counseling and referrals to community treatment centers without the injections. “Medications like methadone and buprenorphine have proved essential to the treatment of opioid dependence,” notes study co-author Edward V. Nunes, MD, professor of psychiatry at CUMC. “But people with opioid dependence are better served by having a range of options to prevent relapse and reduce the risk of death from overdose. Naltrexone injections offer another effective therapeutic option for people struggling with opioid addiction in a variety of settings.”

New Option for Some Forms of Lung Cancer

The FDA approval of pembrolizumab (brand name Keytruda) provides a new immunotherapy option to treat some patients with metastatic non-small cell lung cancer. “The durability of response with immune checkpoint inhibitors is exciting and has given new options for our patients,” says Naiyer Rizvi, MD,

professor of medicine at CUMC and director of thoracic oncology, who was a principal investigator for Keytruda clinical research.

Fecal Transplants Treat Severe *C. Diff*

Cases of *Clostridium difficile* infections are hard to treat, but several children with recurrent *C. diff* have been treated at Columbia with transplants involving an infusion of a fecal preparation from a healthy donor into the patient's gastrointestinal tract. The goal is to replace harmful microbiota with bacteria that support a healthy gastrointestinal milieu. "The families we have worked with describe the therapy as life-changing," says Norelle Reilly, MD, director of the pediatric celiac disease program and assistant professor of pediatrics. "Many of the children we have treated have experienced years of refractory *C. diff* infection. It is gratifying to be able to intervene in such a novel and meaningful way."

Leukemia Drug with Fewer Side Effects

While the cancer drug ibrutinib has significantly improved treatment for patients with chronic lymphocytic leukemia, it may increase the risk of bleeding, particularly in older patients who are taking blood thinners for heart disease. A study published in the *New England Journal of Medicine* suggests that a similar class of drug, acalabrutinib, has the same cancer-fighting ability as ibrutinib but reduces the risk of bleeding. Thomas Diacovo, MD, associate professor of pedi-

atrics and of pathology & cell biology, found that acalabrutinib has less effect on platelet function than ibrutinib because the drug hits its target with greater precision. Both drugs are designed to inhibit the cancer-promoting molecule Bruton's tyrosine kinase, but ibrutinib also blocks molecules essential to platelet function, which can cause hemorrhaging.

Autism and GI Problems

Children with autism spectrum disorder are four times more likely to suffer from gastrointestinal problems than other children. A study published in the *Journal of Clinical Investigation* found evidence in mice that in some types of autism, gastrointestinal difficulties may originate from the same genetic changes attributed to behavioral and social characteristics of the disorder. "Because serotonin plays an important role in the gastrointestinal system as well as the brain, we wanted to see if there was a direct relationship between these genes and GI development and function," says Kara Margolis, MD, associate professor of pediatrics, who conducted the study with Michael Gershon, MD, professor of pathology & cell biology. The researchers investigated gastrointestinal development in a mouse model that carries a mutation found in some patients with autism. The mutation decreases serotonin activity by increasing the activity of the serotonin reuptake transporter, which pulls serotonin back into the neuron after it is released for

neurotransmission. Drs. Margolis and Gershon discovered that these mice have fewer neurons than normally found in the gut, a poorly maintained gut lining, and slower movement of gut contents. Dr. Margolis says families and physicians should recognize that gastrointestinal problems are common in children with autism, who may present in a different way. "Often, they're not verbal or they have sensory issues so they can't pinpoint where the pain is coming from. It's important that when these patients present with distress or behavioral problems, a gastrointestinal source is considered."

Treatment-Resistant Schizophrenia

A study published in the *American Journal of Psychiatry* looked at the use of clozapine for patients with treatment-resistant schizophrenia, which accounts for 30 percent of schizophrenia cases. Even though clozapine is the only medication approved by the FDA for treatment-resistant schizophrenia, the drug is seen as a last resort and its use in clinical practice has not been studied in depth. The results of a study led by T. Scott Stroup, MD, professor of psychiatry, found that patients with schizophrenia who do not respond to standard antipsychotic medications have better outcomes if they switch to clozapine instead of another standard antipsychotic. They have fewer hospitalizations, stay on the new medication longer, and are less likely to need additional antipsychotics.

A New Medical School in Lesotho

P&S student Dylan O'Connor'17 contributed to the development of a new medical school in the southern African nation of Lesotho with a hands-on international project that satisfied his passion for global health and



development. “When I came to Columbia, I knew that global health was going to be part of my package,” says Mr. O'Connor. “My experience in Lesotho was truly transformative. It showed me why it’s important for institutions like Columbia to guide the development of new schools.” Mr. O'Connor worked with the dean of the new Lesotho School of Medicine to develop a curriculum that would help address the shortage of doctors in sub-Saharan Africa.

The Newest MD/PhDs

The first two enrollees in a PhD-to-MD program graduated in May 2016. The three-year program was launched to give PhD-trained research scientists an opportunity to move through an accelerated medical school curriculum that would prepare them for careers as physician-scientists.

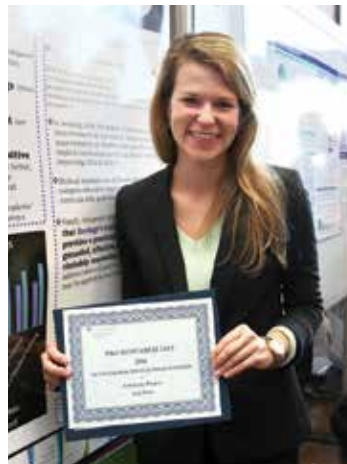
The first graduates are Siyan “Stewart” Cao, who matched to an internal medicine residency at UCSF, and Matthew Fleming, who matched to an internal medicine residency at Vanderbilt.

Student-Led Events Highlight Health Care Issues

Medical students hosted and participated in several national health care events this year. The events they organized helped broaden their understanding of topics such as health care reform, human rights, and new technologies, including mobile diagnostic technologies. Universal health care was a focus for students across the nation at the #TenOne National Medicare-for-All Student Day of Action on Oct. 1. Human rights work was the focus at the 2015 Physicians for Human Rights National Student Conference, hosted by P&S, where students discussed medicine, economics, law, sociology, and



humanitarianism. The P&S Innovative Medicine Interest Group hosted the second annual InnovateMED conference with student leaders in health and medicine presenting a TED-style event.



Scholarly Project Impacts Clerkship

Emily Woodbury'16 not only satisfied her scholarly project requirement, she also made an impact on the obstetrics & gynecology clerkship. The scholarly project requirement gives students a chance to delve into topics that most interest them. For Dr. Woodbury it was a chance to engage and mentor medical students in ob/gyn. She worked with the clerkship’s director to pilot a new ob/gyn rotation, which included a new set of interactive lectures. To maximize opportunities for students to observe how ob/gyn care is practiced, the new clerkship consolidates the number of days a student performs each activity and increases the amount of time spent with each clinical team.

Teaching Next-Generation Tools to the Next Generation

A new multidisciplinary, graduate-level course organized by the Department of Systems Biology is helping young investigators incorporate new genomics tools into their research. The course covers both the experimental principles of next-generation sequencing and key statistical methods for analyzing the enormous datasets that such technologies produce. The stu-

dents also gain valuable practice applying deep sequencing technologies. “We ask students to find a question that has never been systematically investigated before,” says one of the course designers, assistant professor Yufeng Shen, PhD. “We believe the best training is to solve a real world problem using the arsenal of experimental and computational knowledge that they take away from the lectures.”

Asylum Clinic

The Asylum Clinic, part of the P&S Human Rights Initiative, is one of several learning and community service opportunities for medical students. The clinic is among a group of student-



run clinics that offer students the opportunity to work with underserved populations to help alleviate health care disparities afflicting minority, immigrant, and low-income populations. The Asylum Clinic helps asylum seekers in the New York City metropolitan area gain access to pro bono medical evaluations; medical affidavits are thought to considerably increase the chance of receiving asylum.