



## DEAN'S MESSAGE: What's On My Mind

"THIS YEAR WE WILL LAUNCH THE FOUNDATIONS OF RESEARCH AND CRITICAL THINKING COURSE TO HELP STUDENTS UNDERSTAND BASIC RESEARCH PRINCIPLES, EVALUATE THE LITERATURE, AND RECOGNIZE HOW RESEARCH FINDINGS WILL AFFECT THEIR CLINICAL PRACTICE."



What's on my mind this month is all we have to look forward to—from our capital projects, to our research program goals, to our new education initiatives—in the calendar year ahead. As I contemplate my personal goals for 2013, I also reflect on the priorities for the School of Medicine. I see us achieving key milestones in a number of areas:

**Capital projects:** Many of you may have attended the "Topping Out" Ceremony last month for the **Maryland Proton Treatment Center (MPTC)**. This ceremony commemorated a significant milestone in the development of the Center both physically—with the placement of the final beam at the top of the building—and symbolically, as we came a step closer to having a facility dedicated to fighting cancer more aggressively while causing less harm to the patient. Once completed, the MPTC will have the capacity to treat almost 2,000 persons each year and will employ over 170 healthcare professionals. As only the 12th of such centers in the United States, and the only one serving the immediate Baltimore-Washington area, the decision to locate the MPTC in the University of Maryland BioPark demonstrates our leadership in cancer treatment and research into innovative approaches to fight this devastating disease.

**Continued state support for the construction of the Health Sciences Facility III (HSF III) research building remains upmost in my mind:**

Although the Maryland General Assembly generously approved \$4 million and \$4.7 million in matching funds for the proposed building plan in 2011 and 2012, respectively, our project goal remains \$284 million. I am heartened by the tireless work of our government relations and development teams who have reached out to the state legislature prior to the start of the 2013 session, including organizing last November's legislative staff day, "**Transforming Clinical Care Through Research.**" My gratitude also extends to our facilities team, who is working diligently to keep the construction project on track in anticipation that the demolition of Hayden-Harris Hall (the former University of Maryland Dental School building) and the groundbreaking of HSF III might begin in calendar year 2013.

**Research programs:** One of our major priorities for this year is to continue to increase our support for the burgeoning research enterprise in the School of Medicine. Recently, we added a new research institute to the School, the Clinical and Translational Science Institute, and expanded our Department of Radiation Oncology program

to include a new Division of Translational Radiation Sciences, which adds to the high caliber of research already ongoing. In fiscal year 2012, our grants and contracts funding totaled over \$429 million, and I expect this total to increase for 2013 as we anticipate successful funding of several large research project grants, including a Clinical and Translational Science Award from the NIH National Center for Advancing Translational Sciences.

**I also want to emphasize the importance of consortia grants and encourage more staff to consider applying for these funding opportunities:** These include such grants as the NIH National Heart, Lung, and Blood Institute Progenitor Cell Biology Consortium and the Cognitive Neuroscience Test Reliability and Clinical Applications for Schizophrenia Consortium. In an era when resources are at a premium and budgets are limited, building multi-investigator groups that promote collaboration intra- and extramurally can significantly help us achieve our research goals.

**Education initiatives:** This year we will launch the **Foundations of Research and Critical Thinking** course to help students understand basic research principles, evaluate the literature, and recognize how research findings will affect their clinical practice. This new course is designed to stimulate critical thinking, enhance intellectual acuity and inquisitiveness in our medical students, and foster excellence in the development of clinician investigators and physician scientists by adding breadth to the academic



L-R: Jeff Bordok, CEO of Advanced Particle Therapy, who is developing the Proton Center project; Dr. Minesh Mehra; Dean Reece; Dr. William Regine; and Paul Tyler of the Haskell Company, a partner in engineering, architecture and construction.

portfolio of students.

**Before the endeavors of the year intervene I want to check in with you: Do you have needs that we currently are not addressing? Is there enough support in place to help you achieve your goals for the year? What can we do to help? I invite you to share your thoughts and welcome your feedback.**

I look forward to seeing our objectives in the various mission areas come to fruition, even in the midst of these challenging times, and hope you will join with me in nurturing them to completion.

In the relentless pursuit of excellence, I am

Sincerely yours,

E. Albert Reece, MD, PhD, MBA  
Vice President for Medical Affairs, University of Maryland  
John Z. and Akiko K. Bowers Distinguished Professor and  
Dean, University of Maryland School of Medicine



## DR. MOHAN SUNTHA Named President & CEO of New University of Maryland St. Joseph Medical Center

The bridge board for the newly formed University of Maryland St. Joseph Medical Center named Mohan Suntha, MD, MBA, president and chief executive officer of the hospital following the transfer of the St. Joseph Medical Center to the University of Maryland Medical System (UMMS) on Dec. 1, 2012.

Dr. Suntha is the Marlene and Stewart Greenebaum Professor of Radiation Oncology and vice chairman of the Department of Radiation Oncology at the University of Maryland School of Medicine. Dr. Suntha also is director of clinical affairs at the University of Maryland Marlene and Stewart Greenebaum Cancer Center.

► BY KAREN ROBINSON

## Study of Drug-Resistant

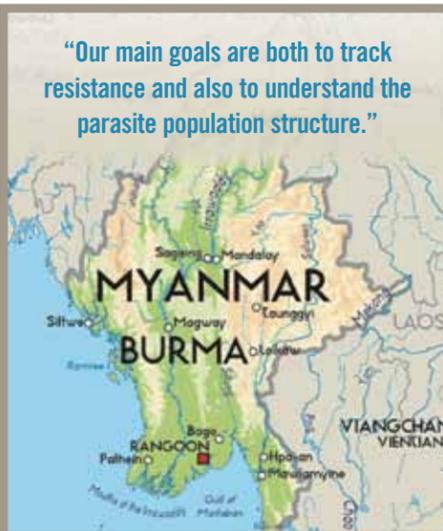
University of Maryland School of Medicine researchers have launched groundbreaking research into the spread of potentially deadly drug-resistant malaria in the developing Southeast Asian nation of Myanmar, also known as Burma. The scientists, working as part of a large international team coordinated by the World Health Organization (WHO), have identified several promising genetic markers that could be used to develop tests to identify and track the spread of the newest type of drug-resistant malaria in Southeast Asia, including Myanmar. The scientists described these new candidate markers in an article published online Dec. 17 in the journal *the Proceedings of the National Academy of Sciences (PNAS)*.

Additionally, two new National Institutes of Health awards to the University of Maryland School of Medicine are some of the first U.S. federal funds to support the study of malaria in Myanmar. Myanmar, long an isolated sovereign state, ended military rule last year and is gradually opening its doors to the rest of the world. In November, President Obama became the first sitting U.S. president to visit the country.

The University of Maryland School of Medicine researchers will use the new funding to track the spread of artemisinin-resistant malaria and train local investigators in cutting-edge molecular and pharmacology lab practices to help their country cope with the problem. Artemisinin-resistant malaria is a new type of resistant malaria that reacts slowly to the first-line treatment against the deadly disease, the artemisinin group of drugs. Malaria is caused by a parasite transmitted in the bite of a mosquito. The disease causes fevers and other symptoms that can lead to coma and even death. There were 216 million cases of malaria in the world in 2010, according to the WHO, and 655,000 deaths.

"Myanmar has about three percent of the Southeast Asian population, but about 20 percent of the region's malaria," says principal investigator Christopher Plowe, MD, professor, Departments of Medicine, Epidemiology & Public Health and Microbiology & Immunology, a Howard Hughes Medical Investigator and leader of the Malaria Group at the University of Maryland School of Medicine's Center for Vaccine Development. Dr. Plowe will work with scientists from the Johns Hopkins Bloomberg School of Public Health on this research. "Artemisinins are our newest group of effective anti-malaria drugs, having replaced older drugs that are no longer useful because the malaria parasite developed resistance to them. Artemisinin is our first line of defense against this parasite. This emerging form of artemisinin-

"Our main goals are both to track resistance and also to understand the parasite population structure."



Dr. Christopher Plowe

## Malaria in Myanmar

resistant malaria, while it's still relatively rare, is already causing treatment failures where it first appeared, in Cambodia. The concern is that we'll lose this drug, at an immense cost of human life."

The paper published in *PNAS*—with Dr. Plowe as senior author, and lead author Shannon Takala Harrison, PhD, assistant professor, Departments of Medicine and Epidemiology & Public Health at the University of Maryland School of Medicine—is a collaboration with University of Maryland College Park scientist Michael Cummings, PhD, associate professor, Center for Bioinformatics & Computational Biology, and other scientists from the United Kingdom and Southeast Asia. The work was funded by the Bill and Melinda Gates Foundation through a grant to the WHO.

In the paper, researchers working in Bangladesh, Western Cambodia and areas of northern Thailand near the border with Myanmar conducted clinical trials of artemisinin efficacy, providing samples and data

to Dr. Plowe's team. The samples allowed the team to identify four promising molecular markers in hopes of one day developing a test to quickly and accurately identify artemisinin-resistant malaria. The markers were found by testing mutations throughout the malaria genome to see if they were associated with clinical resistance.

"Standard drug susceptibility tests used in the laboratory are not predictive of the slow parasite clearance observed in patients who are infected with drug resistant parasites in Southeast Asia," says Dr. Takala Harrison, who led the genomic analyses for the *PNAS* study. "In this study, we were able to correlate the parasite markers with clinical resistance, measured as the amount of time it took patients to clear their infections following treatment with artemisinins."

Researchers in Myanmar, led by Dr. Plowe, already are further exploring the two most promising markers identified in the paper, one on chromosome 10 and one on chromosome 13. These scientists are examining samples from previous efficacy studies of artemisinin drugs, testing them for the two markers to see if the results correlate with drug resistance. In another project, researchers have undertaken an international study to see if it is possible to replicate the *PNAS*-published results on a far larger scale.

"This research is providing us with candidate molecular markers for drug resistance," Dr. Plowe says of the *PNAS* study. "We are now trying to validate these markers in our research in Myanmar, in part using our R03 funding from NIAID. If these markers turn out to be predictive, we can use them to

[please turn to back page]

## In Memoriam



### Dr. William J. Weiner

William J. Weiner, MD, professor and chairman of the Department of Neurology, who was nationally known for his work with Parkinson's disease and other movement disorders, died December 29, 2012 of multiple myeloma. He was 67.

"Bill was a true scholar, leader and visionary. He was academically and clinically very strong," said E. Albert Reece, MD, PhD, MBA, Vice President for Medical

Affairs, University of Maryland, and the John Z. and Akiko K. Bowers Distinguished Professor and Dean, University of Maryland School of Medicine, in Dr. Weiner's obituary in *The Baltimore Sun*. "Many national leaders in the fields of Parkinson's disease, sclerosis and other movement disorders have come from here because of Bill's vision," added Dr. Reece. "He built these divisions that are now world-class."

Dr. Weiner was born and raised in Chicago and earned his medical degree from the University of Illinois College of Medicine. He did his intern year at Rush-Presbyterian-St. Luke's Medical Center in Chicago, spent a year as a neurology resident at the University of Minnesota, and then completed his second and third years of residency back at Rush-Presbyterian. After a stint in the Navy, where he served as chief of the neurology service at the Memphis Naval Hospital in Millington, TN, Dr. Weiner held various positions in neurology at Rush Medical College. He was also an assistant (and later associate) professor in neurology at the University of Chicago Pritzker School of Medicine. In 1983, he joined the faculty of the University of Miami School of Medicine, where he was a professor in the university's department of neurology until coming to the University of Maryland School of Medicine in 1990. He became chair of the Department of Neurology here in 2001.

Dr. Weiner's major interests were in the experimental therapeutics and clinical phenomenology of Parkinson's disease. He wrote or edited 25 books in Neurology, most of which related to movement disorders. His most recent books included *Parkinson's Disease: A Complete Guide for Patients and Families*, which was widely acclaimed by the patient community, and the scholarly text *Parkinson's Disease: Diagnosis and Management*, which is now in its second edition. He helped lead the American Academy of Neurology author group that wrote the new Practice Parameters for Parkinson's disease. Dr. Weiner also published over 300 peer-reviewed articles. His clinical ex-

pertise included Parkinson's disease, Huntington's disease, dystonia, tremor, Tourette's syndrome, tardive dyskinesia, myoclonus and atypical parkinsonism.

"This puts him into the upper echelon in the field of movement disorders," Dean Reece told *The Sun*. "His death is a huge loss not only for the University of Maryland but also for the national discipline as a whole."

Just a week before his death, Dr. Weiner learned that the in-patient neurological service at the School of Medicine would be named in his honor.

Services for Dr. Weiner were held Dec. 31 at Sol Levinson & Bros. He is survived by his wife, Lisa Shulman, MD, the Eugenia Brin Professor in Parkinson's Disease and Movement Disorders in the Department of Neurology; two daughters, Monica and Miriam; stepson Joshua; stepdaughter Corey; siblings Barry and Merle; and five grandchildren. The School of Medicine is currently planning a memorial service on campus in his honor; details will be shared when they become available.



### Andrew Dunsmore

Andrew "Andy" Dunsmore, PhD, assistant dean for Development at the University of Maryland School of Medicine, died on December 24, 2012 of gastric cancer at his parents' home in Maryville, TN. He was 46.

Andy joined the Office of Development in October 2009, and was responsible for leading the major gifts program at the School of Medicine, securing several gifts in excess of \$1 million. He also played a key leadership role in the planning phases of the School's *Transforming Medicine Beyond Imagination* \$500 million comprehensive campaign.

He came to the School of Medicine from Johns Hopkins University, where he held the position of director of Development in the Department of Neurosurgery. In 2007, he obtained a Doctor of Philosophy from the University of Tennessee, where he had previously earned bachelors and masters degrees. In addition to his time at Johns Hopkins, Andy gained valuable higher education experience at the University of Tennessee School of Social Work, Hiwassee College, and the Washington University School of Medicine.

Andy is survived by his parents, the Reverend Beecher and Sarah Dunsmore, and his sisters, Sarah and Julie.

► BY KAREN ROBINSON

# Learning and Decision Making: The Role of the Orbitofrontal Cortex

AN AREA OF THE BRAIN called the orbitofrontal cortex is responsible for decisions made on the spur of the moment, but not those made based on prior experience or habit, according to a new basic science study from substance abuse researchers at the University of Maryland School of Medicine and the National Institute on Drug Abuse (NIDA). Scientists had previously believed that the area of the brain was responsible for both types of behavior and decision-making. The distinction is critical to understanding the neurobiology of decision-making, particularly with regard to substance abuse. The study was published online in the journal *Science*.

Scientists have assumed that the orbitofrontal cortex plays a role in “value-based” decision-making, where a person compares options and weighs consequences and rewards to choose a best alternative. The *Science* study shows that this area of the brain is involved in decision-making only when the value must be inferred or computed rapidly or hastily. If the value has been “cached” or pre-computed, like a habit, then the orbitofrontal cortex is not necessary.

The same is true for learning—if a person infers an outcome but it does not happen, the resulting error can drive learning. The study shows that the orbitofrontal cortex is necessary for the inferred value that is used for this type of learning.

“Our research showed that damage to the orbitofrontal cortex may decrease a person’s ability to use prior experience to make good decisions on the fly,” says lead author Joshua Jones, PhD, a postdoctoral researcher at the University of Maryland School of Medicine and a research scientist at NIDA, part of the National Institutes of Health. “The person isn’t able to consider the whole continuum of the decision, the mind’s map of how choices play out further down the road. Instead, the person is going to regress to habitual behavior, gravitating toward the choice that provides the most value in its immediate reward.”

The study enhances scientists’ understanding of how the brain works in healthy and unhealthy individuals, according to the researchers. “This discovery has general

implications in understanding how the brain processes information to help us make good decisions and to learn from our mistakes,” says senior author Geoffrey Schoenbaum, MD, PhD, adjunct professor at the University of Maryland School of Medicine and senior investigator and chief of the Cellular Neurobiology Research Branch at NIDA. “Understanding more about the orbitofrontal cortex also is important for understanding disorders such as addiction that seem to involve maladaptive decision-making and learning. Cocaine in particular seems to have long-lasting effects on the orbitofrontal cortex. One aspect of this work, which we are pursuing, is that perhaps some of the problems that characterize addiction are the result of drug-induced changes in this area of the brain.”

The scientists are continuing their research, examining the specific coding of the neurons in the orbitofrontal cortex during this process, as well as the effects that drugs have upon this area of the brain. “Drug addiction is marked by severe deficits in judgment and bad decision-making on the part of the addict,” says Dr. Jones. “We believe that drugs, particularly cocaine, affect the orbitofrontal cortex. They coerce the system and hijack decision-making.”

The scientists used a rat model for their research, disabling the orbitofrontal cortex and measuring the difference in behavior that resulted. Further study using the same rat model—work not reported in this paper—has shown that cocaine use mimics this damage to the orbitofrontal cortex.

Further study of this neurobiological mechanism is needed, and the results have not been replicated in humans, but certainly the research is promising, says E. Albert Reece, MD, PhD, MBA, Vice President for Medical Affairs, University of Maryland, and the John Z. and Akiko K. Bowers Distinguished Professor and Dean, University of Maryland School of Medicine. “Our goal here at the School of Medicine is to make groundbreaking discoveries in the laboratory that can be translated into new treatments and new hope for patients and their families,” says Dean Reece. “We are hopeful that research that tells us more about the basic mechanisms in the brain will translate to new techniques in neurobiology and in treating devastating conditions such as drug addiction.”

“Drug addiction is marked by severe deficits in judgment and bad decision-making on the part of the addict. We believe that drugs, particularly cocaine, affect the orbitofrontal cortex. They coerce the system and hijack decision-making.” —Joshua Jones, PhD

## DR. TERRY WATNICK Joins the Division of Nephrology



The Department of Medicine is pleased to welcome Terry Watnick, MD, to their Division of Nephrology. Dr. Watnick is an associate professor with an interest in genetic renal disease and autosomal dominant polycystic kidney disease (ADPKD). ADPKD is one of the most common inherited diseases world-wide and is the fourth most common cause of kidney failure. Dr. Watnick is the Director of the Baltimore Polycystic Kidney Disease (PKD) Research and Translational Core Center, which is moving to the University of Maryland School of Medicine from Johns Hopkins University. The National Institutes of Health funds only

four such P30 Core centers in the United States.

Dr. Watnick did her undergraduate training at Brown University and received her MD degree from the Yale School of Medicine. She remained at Yale-New Haven Hospital for residency training in Internal Medicine and then moved to Johns Hopkins Hospital, where she completed a fellowship in Nephrology. She was on the faculty at the Johns Hopkins School of Medicine

for more than ten years before moving to the University of Maryland School of Medicine.

Dr. Watnick’s clinical interests are in inherited kidney disease and ADPKD. She will be establishing an inherited renal disease clinic at the University of Maryland with the goal of serving as a tertiary referral center for the Mid-Atlantic Region. Dr. Watnick’s laboratory has used a variety of model systems, including engineered models and *Drosophila melanogaster*, to study the biology of the genes that cause ADPKD. In addition, Dr. Watnick has been an investigator in recent clinical trials that have been aimed at testing whether vasopressin-2 receptor inhibitors are effective in halting the progression of polycystic kidney disease.

The exciting Polycystic Kidney Disease Program that Dr. Watnick leads creates an environment that is aimed at fostering interactions between clinical and basic research. The Center includes biomedical research cores that provide reagents aimed at accelerating the pace of research in the field and also to advance translational PKD science nationally and internationally.

## Dr. Mohan Suntha [continued from front page]

“I have had the privilege of working closely with Dr. Suntha for the past five years and have worked very closely with him over the last year while negotiating the purchase of St. Joseph Medical Center,” says Francis X. Kelly, Chairman of the University of Maryland St. Joseph Medical Center Board of Directors.

In his capacity as vice president for system program development for UMMS, Dr. Suntha has been part of the UMMS transition team working on the acquisition of St. Joseph Medical Center from Catholic Health Initiatives.

“Dr. Suntha is an outstanding member of the University of Maryland School of Medicine faculty, and we are delighted that he will continue in his role as professor here,” says E. Albert Reece, MD, PhD, MBA, Vice President for Medical Affairs, University of Maryland, and the John Z. and Akiko K. Bowers Distinguished Professor and Dean, University of Maryland School of Medicine. “He has shown himself to be an exceptional leader and I am confident that he is the best candidate to lead the new University of Maryland St. Joseph Medical Center.”

Kelly adds, “In addition to being an outstanding radiation oncologist, as a graduate of the Wharton School of Business, Dr. Suntha is ideally qualified to be CEO of St. Joseph. He is a strong, personable and decisive leader.”

University of Maryland Medical System, Catholic Health Initiatives (CHI) of Denver, and St. Joseph Medical Center (SJMC) in Towson, Maryland announced November 14 that they were moving forward with a variety of activities needed to transfer the assets of SJMC to UMMS on Dec. 1, 2012.

As part of the transaction, UMMS formed a new organization—the University of Maryland St. Joseph Medical Center, LLC—which took over all hospital operations once the assets were transferred and the transaction was closed.



L-R: Robert Chrencik, CEO University of Maryland Medical System; Edward Gilliss, Vice Chairman of the University of Maryland St. Joseph Medical Center Board; Dr. Mohan Suntha, CEO of University of Maryland St. Joseph Medical Center; Archbishop William Lori; Sister Evelyn Grudza, O.S.F.; Francis X. Kelly, Chairman of the University of Maryland St. Joseph Medical Center Board.

BY CAELIE HAINES

## Students to Service Loan Repayment Program



**Christin Donnelly**, Class of 2012, has always had an interest in primary care. So when she learned of the National Health Service Corps (NHSC) and their Students to Service Loan Repayment Program, she quickly applied. NHSC offers loan repayment to students in their last year of medical school, in return for a commitment to serve in an underserved area upon completion of his/her residency program.

"I have always wanted to go into primary care, because I so strongly believe in the importance of keeping people healthy and promoting overall wellness," Christin says. "Working with the West Baltimore population during medical school gave me a passion for working with the underserved. As soon as I heard about the opportunity to join the NHSC as a fourth-year medical student, I did not have to think twice it. I was thrilled when I was accepted and am honored to be a part of the program."

Christin is now doing her residency in York, PA. "York Hospital is a large community hospital with seven residency programs and a huge focus on primary care and teaching," she explains. "My faculty members are both brilliant and approachable, and I aspire to be more like them in time. It is such a positive environment, and for me, it is the absolute best place to complete my training. Our patients come from a variety of backgrounds, and many are from low-income house-

holds and have complex needs. Taking care of our patients is both challenging and rewarding, and I know it is preparing me very well for the future."

As much as she is enjoying her time in York, however, Christin plans to serve out her NHSC obligation in one of Baltimore's underserved areas. "After living in Baltimore for seven years, I feel very connected to the community and feel a pull to return," Christin admits. "It feels like home to me, and I want to continue working with the families I worked with during medical school."

Although only required by NHSC to serve for three years, "I do plan on continuing to work in my underserved community afterwards," Christin says. "I am so grateful for the wonderful education I was given, and I have a strong desire to make the most of this opportunity. To me, this is what it means to be a Family Medicine physician. It allows me to address a wide variety of conditions in men, women, and children, in communities that need it the most."

"I had wonderful mentors in the Department of Family Medicine at the University of Maryland, whom I respected and admired for their dedication to patients and to teaching," she adds. "It's an easy decision at the end of the day. I know I'm meant to be a Family [Medicine] doctor."

To find out more about the National Health Service Corps, visit <http://nhsc.hrsa.gov>

**GCRC Adds Van Service** The University of Maryland General Clinical Research Center (GCRC) now has a five-passenger minivan that is available to support the community-based research needs of our investigators. The van will be equipped with a refrigerator/freezer, a phlebotomy chair and the necessary supplies required to enable clinical and translational research needs. It can be used to transport a research team to an off-site location or to send GCRC nursing staff to a location on your behalf. It is available to travel throughout the state.

If you currently have an approved GCRC protocol, you may request use of the van by contacting the GCRC via the scheduling email ([gcr@medicine.umaryland.edu](mailto:gcr@medicine.umaryland.edu)). If you do not have an approved protocol, the van has been added to the list of GCRC resources you may request when you complete the GCRC protocol request via Cicero.

Should you have any questions about the van, or ways in which the GCRC can assist you or further support your research needs, please feel free to contact us at 410-328-7648. Additional information about the GCRC can be found on our website: <http://medschool.umaryland.edu/GCRC/>

## Study of Drug-Resistant Malaria in Myanmar [continued from page 2]

track the spread of drug resistance and to help guide the malaria control program in affected countries. We want to focus limited resources on artemisinin resistance to try to stop it in its tracks before it spreads."

"The University of Maryland School of Medicine and its Center for Vaccine Development have a strong global research presence, with scientists in dozens of countries," says E. Albert Reece, MD, PhD, MBA, Vice President for Medical Affairs, University of Maryland, and the John Z. and Akiko K. Bowers Distinguished Professor and Dean, University of Maryland School of Medicine. "Dr. Plowe's exceptional studies in tracking resistant malaria and developing vaccine candidates to prevent it are representative of the mission of the Center for Vaccine Development and the entire School of Medicine—to bring groundbreaking scientific discoveries from the laboratory to the clinic, impacting human health in Baltimore and worldwide."

Myanmar is particularly significant in the study of drug-resistant malaria because malaria cases are found throughout the country, unlike in Thailand, where the center of the nation is malaria-free, forming a potential barrier against the disease's spread. Myanmar's high rate of infection paves a path for resistance to spread to and from neighboring nations, Dr. Plowe explains.

"Our main goals are both to track resistance and also to understand the parasite population structure," says Dr. Plowe. The researchers will examine whether there are populations of the malaria parasite that interbreed or reproduce only with themselves in a given region, but do not spread to other regions. Studying the genetic make-up of those parasites can help scientists understand how resistance spreads to new regions and maybe even how to stop it. The race against the spread of resistance is crucial, he says.

"The artemisinin resistance that we're seeing now is slowing how long it takes to clear the parasite—the infection eventually clears in most cases, it just takes longer," explains Dr. Plowe. "But if artemisinin resistance reaches the stage that resistance to other drugs has—which is to say, total resistance, rendering the older drugs useless—we would expect the same to happen to artemisinins. In addition to a loss of human life, if we lost this most important tool against malaria, the recent momentum for global malaria eradication could quickly evaporate. It takes a long time to develop a drug, and we have nothing on the shelf to replace this class of drugs."

# somnews

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