

DEAN'S MESSAGE: What's On My Mind

What's on my mind this month is our **fourth annual Festival of Science**.

This event is one of the highlights of the school year, both for the School of Medicine and for me personally. Every year, our institution highlights one area of research, and our community learns about the exciting, cutting-edge work our scientists are doing in that domain. Last year we focused on groundbreaking discoveries in brain science; this year, the theme will be cancer research.

Nearly all of us have known someone who has faced this terrible disease: almost 600,000 Americans die from cancer every year. Researchers at the School of Medicine are using a range of approaches to better understand and treat the diseases, and at the same time are developing treatments that will improve the lives of cancer patients, both today and in the future. In this issue, we focus on some of this innovative research. Some scientists here are doing basic research, while others are doing translation and clinical research, some having direct impact on patients' lives.

Cancer is an extremely complex disease, and researchers here are examining it from a variety of perspectives. Some are focusing on enzymes that have been implicated in the process of disease. **Amy M. Fulton, PhD**, a Professor in the Department of Pathology, focuses on the role of inflammation in cancer progression. She has found that overexpression of the enzyme cyclooxygenase-2 (COX-2) is linked to more aggressive disease, and that COX inhibitors, a class of anti-inflammatory medications already on the market, could limit tumor growth and spread.

Another promising area is the immune system, which may not work properly in many patients with cancer. **Eduardo**

Davila, PhD, an Associate Professor in the Department of Microbiology and Immunology, is working to understand more about the role of T cells in cancer genesis, and to use this knowledge to develop new ways to diagnose, prevent and treat cancer. **Tonya J. Webb, PhD**, an Associate Professor in the Department of Microbiology & Immunology, is focusing on the role of natural killer T (NKT) cells, a class of immune cells that play a key role in regulating response to tumors. In many cancer patients, these cells are fewer and less active.

Others are investigating the role of genes. **Feyruz V. Rassool, PhD**, an Associate Professor in the Department of Radiation

Oncology, is trying to unravel how DNA repair mechanisms go awry in cancer, especially in leukemia. She is now looking at possible ways to use DNA repair as a treatment strategy for leukemia and other cancers. At the other end of the spectrum, lifestyle remains crucially important as well. **Joanne F. Dorgan, PhD, MPH**, a Professor in the Department of Epidemiology & Public Health, is focusing on identifying hormonal determinants of cancer, particularly breast cancer, and the hormonal mechanisms by which environment and lifestyle affect cancer risk. In a study published earlier this year, she reported that adolescent girls whose diet is higher in saturated fats and lower in healthier unsaturated fats have higher breast density in early adulthood, which may increase their subsequent risk for breast cancer.

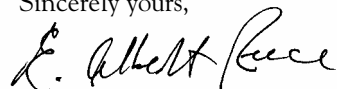
Others are focusing on ensuring that cancer treatment is proportional to the risk. **M. Minhaj Siddiqui, MD**, an Assistant Professor in the Department of Surgery, is studying how to better differentiate aggressive prostate cancer from non-aggressive tumors, using both MRI imaging as well as sophisticated measures of cell metabolism. **Zeljko Vujaskovic, MD, PhD**, a Professor in the Department of Radiation Oncology, is trying to elucidate how radiation injures normal tissue.

This is just a small sample of our exciting research on cancer. I am confident that in the years to come, this work will lead to breakthroughs.

Also in this issue, we are introducing a new feature, "Clinical Care News Update," to highlight the growing range of clinical services in which our faculty is involved, as well as our exciting plans for the future. This month we focus on our rapidly expanding network of outpatient clinical practices in the state. These include our new facility at Waterloo Crossing in Columbia and our new orthopedics practice at Camden Yards. Our goal is to continue growing, and as we do we will be sure to let you know.

In the relentless pursuit of excellence, I am

Sincerely yours,

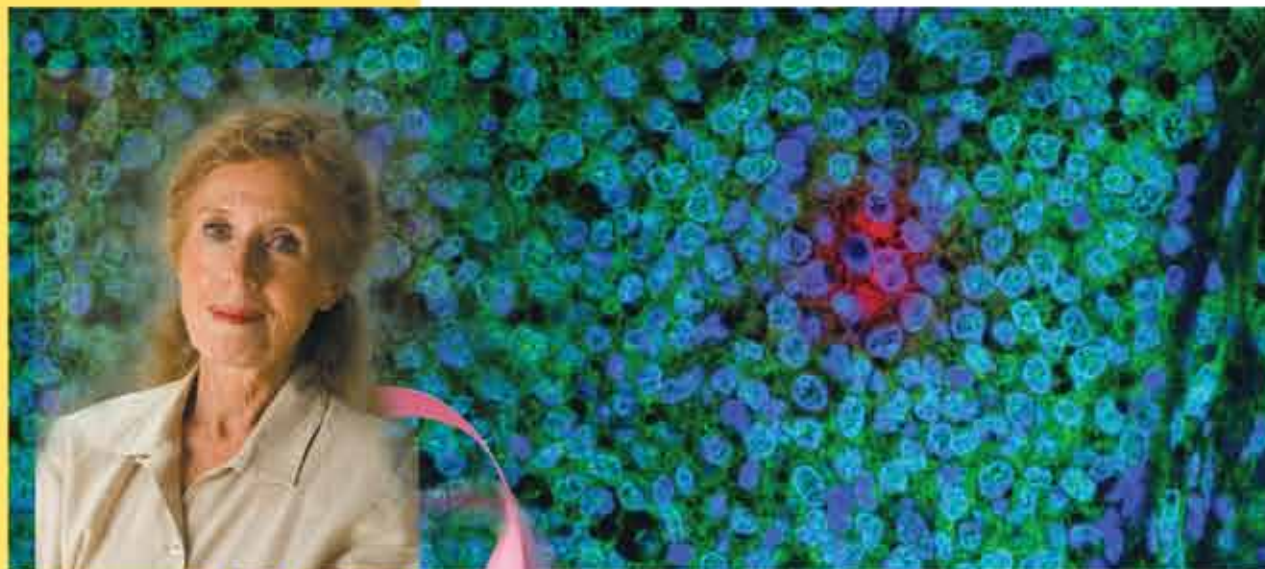


E. Albert Reece, MD, PhD, MBA
Vice President for Medical Affairs, University of Maryland
John Z. and Akiko K. Bowers Distinguished Professor and Dean, University of Maryland School of Medicine



Point of Pride

In 1993, researchers from the School of Medicine, led by Angela Brodie, PhD, developed the first



selective aromatase inhibitor, formestane (Lenatron), to treat estrogen-receptor-positive breast cancer in post-menopausal women.

This makes us proud!

Fourth Annual

FESTIVAL *of* SCIENCE

Preview

CANCER

From Diagnosis to Treatment: UM SOM Researchers Lead the Way

This year, nearly 1.7 million Americans will be diagnosed with cancer, and nearly 600,000 will die from the disease. Despite the monumental gains in knowledge in recent decades, an enormous amount remains to be discovered. At the University of Maryland School of Medicine (UM SOM), researchers from many disciplines are using innovative strategies to unravel crucial problems involving cancer in its many forms. This work, which will be showcased at this year's Festival of Science on November 10, will help create the breakthroughs that will improve the odds for cancer patients both today and in the future.



The keynote speaker for this year's Festival will be Victoria M. Richon, PhD, President and Chief Scientific Officer for Ribon Therapeutics, a start-up biotechnology company focused on developing first-in-class therapeutics for the treatment of cancer. Prior to joining Ribon in November 2015, she was the vice president and global head of oncology discovery and translational medicine at Sanofi, and was responsible for drug discovery and translational sciences through early clinical development in oncology. Prior to that, Dr. Richon was vice president of biological sciences at Epizyme. While there, she was involved in the discovery and development of two key histone methyltransferase inhibitors, specifically the DOT1L inhibitor and EZH2 inhibitor that are currently in clinical development. Prior to Epizyme, Dr. Richon headed the Department of Cancer Biology and Therapeutics at Merck. As a researcher at the Memorial Sloan Kettering Cancer Center in New York City, Dr. Richon was part of a team that discovered the histone deacetylase inhibitor vorinostat. This discovery was the basis of Aton Pharma, a company that she co-founded. Dr. Richon has authored over 120 peer-reviewed publications and book chapters related to cancer research and drug development. She received her PhD degree in biochemistry from the University of Nebraska.

house'. This has expanded UMGCCC investigator's access to state-of-the-art technologies and shared use of UMGCCC's technologies with other NCI-designated Cancer Centers.

Toni M. Antalis, PhD

Professor, Departments of Physiology and Surgery

Dr. Antalis is the associate director of the Center for Vascular and Inflammatory Diseases, director of the Molecular Medicine Program in the UM SOM Graduate Program in Life Sciences (GPILS), and associate director for Training and Education for the UMGCC. She is also a member of the Hormone Responsive Cancers Program at UMGCC and co-director of the NIH T32 Training Program in Cancer Biology and the STAR- Postbaccalaureate Research Education Program supported by the National Institutes of Health. She will be discussing UMGCC's multidisciplinary cancer training and education network, which supports a continuum of cancer researchers through encouraging programs beginning in middle school and proceeding through undergraduate, graduate, and post-graduate training; the mentoring of junior faculty; and sponsoring of cancer-related community activities in order to foster individuals with a long-term commitment to the fight against cancer.



THIS YEAR'S PRESENTERS ARE:

Nicholas Ambulos, PhD

Associate Professor, Department of Microbiology and Immunology

In 1993, Dr. Ambulos became director of the Biopolymer Core Facility, which has evolved under his leadership into what is now the Genomics Core Facility. In 2011, he established the Translational Genomics Laboratory, which provides clinical investigators and physicians a source for clinically validated genomics assays for the diagnosis, care, and treatment of disease. He is also founding director of the UM SOM Center for Innovative Biomedical Resources (CIBR), the organizational structure for the school's biomedical



research core facilities and shared services. CIBR now provides the infrastructure that supports all of the UM SOM core facilities, and also provides the infrastructure to support new NIH Shared Instrumentation grants, such as a \$1.6 million grant for an automated biobank freezer system. As associate director of The Marlene and Stewart Greenebaum Comprehensive Cancer Center's (UMGCCC) Shared Services, Dr. Ambulos will be discussing how the UMGCCC, in collaboration with colleagues from the NCI-designated Cancer Centers at Georgetown University, Johns Hopkins University, and the University of Virginia, developed a Shared Resource Consortium that provides investigators access to technologies not available to them at their home institutions through simplified access and a fee structure the same as 'in-



Maria R. Baer, MD

Professor, Department of Medicine

Dr. Baer joined UMGCCC as director of Hematologic Malignancies in 2007, and became co-leader of the Experimental Therapeutics Program in 2014. She has a

BREAKTHROUGHS

long track record of individual and collaborative clinical and translational research in leukemias, as well as myelodysplastic and myeloproliferative neoplasms. She also conducts laboratory research on mechanisms of drug resistance in leukemia. She has published extensively. The UMGCCC Experimental Therapeutics Program, co-led by Dr. Baer, focuses on developing and testing new therapies for solid tumors and hematologic malignancies based on innovative preclinical research. The emphasis is on bringing basic and preclinical discoveries to early-stage clinical testing and also on providing platforms for investigators in other programs to study their findings in the clinical setting. The Program focuses on developing and testing new therapies based on novel molecular targets, new delivery strategies for cancer treatments, and new strategies for increasing the efficacy of radiation therapy.

Kevin J. Cullen, MD

Professor, Department of Medicine

Dr. Cullen is the director of the UMGCCC, as well as the Program in Oncology at UM SOM. He specializes in head and neck cancer. Dr. Cullen will be discussing UMGCCC's role in developing and applying innovative therapeutic and preventive strategies to cancer patients. The Center has a total cancer funding of \$64 million, with \$23 million from NCI. In 2015, UMGCCC served 2,622 new cancer patients, and 632 patients participated in 190 clinical trials. Under Dr. Cullen's leadership, UMGCCC has focused on increasing diversity in its cancer trials: now, a third of participants in the center's clinical trials are African-American. A 2016 nationwide ranking of cancer treatment programs placed UMGCCC 21 of more than 900 U.S. cancer programs. It has been ranked in the top 50 for nine years in a row.



Eduardo Davila, PhD

*Associate Professor,
Department of Microbiology
and Immunology*

Dr. Davila is the program leader for the Tumor Immunology and Immunotherapy Research Program at the UMGCCC and director of



the Scientific Training for Advancing Biomedical Research Postbaccalaureate Research and Education Program (STAR-PREP). He recently received the BioMaryland LIFE (Leading Innovative Faculty Entrepreneurs) award for groundbreaking discoveries that could someday affect human health, as well as the UM SOM Dean's Faculty Award for Diversity and Inclusion. Dr. Davila collaborates with both basic and clinical researchers to understand the immune regulation of malignant disease and translate this knowledge into the development of novel diagnostic, preventative and treatment regimens. Dr. Davila's research focuses on T cell-based therapies for cancer and the pathogenesis of T cell acute lymphoblastic leukemia.

Joanne Dorgan, PhD, MPH

Professor, Department of Epidemiology and Public Health

Dr. Dorgan is currently the director of the Division of Cancer Epidemiology in the UM SOM Department of Epidemiology and Public Health, and co-leader of the UMGCCC Population Science Program. Dr. Dorgan studies African-American cancer patients to better understand how the disease differs among that population. She looks at patients' survival rates, as well as their quality of life outcomes. She also focuses on identifying hormonal determinants of cancer, particularly breast cancer, and the hormonal mechanisms by which environmental and behavioral exposures affect cancer risk.



Susan Dorsey, PhD, RN, FAAN

*Professor, UM School of Nursing, UM SOM
Department of Anesthesiology, and UM School of
Dentistry Department of Neural and Pain Sciences*

Dr. Dorsey is chair of the School of Nursing's Department of Pain and Translational Symptom Science, and also co-directs the University of Maryland Center to Advance Chronic Pain Research. She is now overseeing several large, multi-school NIH-funded studies on the genomics of pain and self-management of pain, and last year was appointed as a translational research expert on the NCI Symptoms and Quality of Life Steering Committee. Her translational program of research incorporates molecular, cellular and genetic/genomic methods to study chronic pain and cancer treatment-related symptoms.

Amy Fulton, PhD

Professor, Department of Pathology

Dr. Fulton is the leader of the Hormone Responsive Cancers Program at the UMGCCC. She collaborates with both clinical and basic research investigators to develop innovative approaches to diagnose, treat and prevent breast and prostate cancer. Her research focuses on the role of inflammatory pathways in cancer progression. Dr. Fulton's laboratory is working on identifying the mechanisms by which breast cancers grow and metastasize and in developing therapeutic strategies against breast cancer with the goal of understanding the role of inflammation in promoting tumor progression. Her research has shown that overexpression of cyclooxygenase-2 (COX-2) is an indicator of aggressive disease, and that COX inhibitors could limit tumor growth and spread. Recent research has shown that breast cancer with stem-like cells with heightened tumorigenic potential and a treatment-resistant phenotype have elevated levels of the prostaglandin E receptor EP4, and are more sensitive to inhibition by EP4 antagonists than the non-stem cell population. Working with colleagues, Dr. Fulton's lab has also identified a novel and potent inhibitor of metastasis isolated from the Taro plant. She and colleagues are now trying to understand how these inhibitors have this effect.



Feyruz Rassool, PhD

Associate Professor, Department of Radiation Oncology

Dr. Rassool is an expert in repair of potentially lethal forms of DNA damage and DNA double-strand breaks, which play a critical role in generating genomic instability. Her work has focused on the aberrant expression and activity of these repair pathways in cancer and leukemia cells, which not only play a role in genomic instability, but also appear critical for these cells' survival. Dr. Rassool does research on the added effect of combining two kinds of drugs in certain cancers: DNA methyltransferase inhibitors (DNMTi's), such as 5-Azacytidine (5-AZA), and PARP inhibitors (PARPi's). She has found that combining these drugs can improve outcomes in both acute myelogenous leukemia (AML) and certain breast cancers. She recently received the Ziskin Award to study the intersection between DNA damage and repair and epigenetic pathways in cancer, and she is part of the Stand Up to Cancer Epigenetics Dream Team. She has focused recently on targeting acute myeloid



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malignancies and triple negative breast cancers with a combination of DNA repair and epigenetic inhibitors; this work has led to an upcoming clinical trial for patients with acute myeloid leukemia, in partnership with clinicians and researchers at the UMGCCC.

M. Minhaj Siddiqui, MD

Assistant Professor, Department of Surgery

Dr. Siddiqui, who is Board-certified in urology, focuses much of his research on how to better differentiate aggressive prostate cancer from non-aggressive tumors, using cell metabolism and MRI imaging. Eventually, he hopes to help clinicians and patients more precisely distinguish

between high-risk tumors and those that don't need immediate treatment. In recent years, use of imaging characteristics has significantly improved our ability to diagnose men with high-risk disease, while also decreasing the rates at which men with low risk disease are even diagnosed anymore. He is also examining cancer metabolism. Tumor metabolism may be an effective way to differentiate risk levels of tumors.

Zeljko Vujaskovic, MD, PhD

Professor, Department of Radiation Oncology

Dr. Vujaskovic, is director of the Division of Translational Radiation Sciences in the UM SOM Department of Radiation Oncology (which he

established), and director of the Maryland Proton Alliance. His clinical and research work has focused on elucidating the mechanisms associated with radiation normal tissue injury, identifying potential biomarkers predicting individual patient risk for injury, and developing novel therapeutic interventions/strategies to prevent, mitigate, or treat radiation injury. He is a leader in combining hyperthermia treatment with radiation and chemotherapy for a range of cancer patients.

Tonya Webb, PhD

Associate Professor, Department of Microbiology & Immunology

Dr. Webb's current research focuses on Natural killer T (NKT) cells in cancer immunotherapy. She is working to develop NKT cell-based cancer immunotherapy using natural and artificial platforms. NKT cells constitute an important subset of T cells that play a key role in regulating the host's anti-tumor immune response. However, many cancer patients have a reduction in both NKT cell number and function, and these deficits currently limit the potential clinical application of NKT cells for cancer therapy. She is trying to understand why cancer patients have fewer NKT cells, and design new strategies to restore NKT cell number and function in these patients.

David Weber, PhD

Professor, Department of Biochemistry and Molecular Biology

Dr. Weber is the director of The Center for Biomolecular Therapeutics (CBT), the associate director of the Institute for Bioscience & Biotechnology Research, and the co-director of the Molecular & Structural Biology program at the UMGCCC. In 2010, Dr. Weber was co-director of a \$7.9 million federal grant to acquire a superconducting 950 MHz Nuclear Magnetic Resonance magnet that is helping CBT researchers better understand such molecules and develop new agents to treat cancer, diabetes, and other diseases. UM SOM is the only academic institution in the country to have such a device, and one of only two sites in the country. Using this device and other technologies, he and his colleagues are gaining a clearer picture of the structural and dynamic properties of biological molecules involved in a variety of diseases. Dr. Weber focuses on understanding the molecular mechanisms and cellular processes that are altered in cancer and to encourage translation of these basic scientific findings toward the development of novel strategies for treating cancer. His lab focuses on DNA damage, repair, and genomic instability, dysregulation of transcriptional and posttranscriptional control, and cancer cell signaling.

The Festival of Science will be held on November 10, 2016 from 8:00am–3:30pm in the ballroom on the second floor of the Southern Management Company Campus Center (621 W. Lombard Street). Please register at <http://medschool.umaryland.edu/festival/>

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