

Nanomedicine and Drug Delivery

In a joint venture with Tulane University and LSU Health Sciences Centers, and augmented by funding from the Louisiana Board of Regents, the College of Pharmacy launched the Center for Nanomedicine and Drug Delivery. Many new technologies are spinning off from the center's work to understand and overcome barriers to efficient oral, colonic, parenteral, pulmonary and vaginal delivery of drugs in the hopes of developing new treatments for chronic diseases.

Dr. Tarun K. Mandal is an Endowed Professor and Director of the Center for Nanomedicine and Drug Delivery, and Co-Director of the Louisiana Vaccine Center. He is a Fellow of the American Association of Pharmaceutical Scientists. He has been recognized for his outstanding contributions in the area of novel and innovative drug delivery. His research focuses on the design and development of commercially viable formulations to improve the safety, efficacy, and patient compliance. Cutting-edge research in his laboratory has resulted in patented controlled release formulations of many therapeutic agents. He has published close to 200 original research paper, review, abstracts, and monographs.

Dr. Levon Bostanian, Professor of Pharmaceutics, conducts research in the areas of preformulation and formulation of drug delivery systems. He is one of the inventors of a U.S. patent on small particle formation. His research has resulted in several peer-reviewed publications as well as numerous presentations at national and international pharmaceutical conferences. His current research is funded by the NIH and focuses on enhancing the bioavailability of drugs with low water solubility.

Dr. Vimal Kishore, Bynum & Sons Inc., Professor and Chairman, Division of Basic Pharmaceutical Sciences has published extensively in areas of inflammation, radioprotection, and novel drug formulations, and he holds two U. S. patents on novel anti-inflammatory agents. Dr. Kishore's most recent research efforts have been directed towards development of multifunctional nano-particles for targeted drug delivery of a variety of therapeutic agents including amifostine and doxorubicin. Additionally, because of his commitment to promote the role of the community pharmacist in public health, Dr. Kishore has also conducted clinical studies on the effectiveness of community pharmacist-delivered brief interventions in reducing hazardous alcohol abuse and risky sexual behavior in patients.

Cancer Research

Nationally, and particularly in Louisiana, there are significant disparities between Caucasians and African Americans with regard to cancer incidence and mortality. African Americans have the highest mortality rate of any racial and ethnic group for most major cancers, making it a serious health and human concern. Xavier University has joined with LSU Health Sciences Center, Tulane University, and Ochsner Health System as members of the Louisiana Cancer Research Consortium (LCRC) in an effort to address this issue. Located in the footprint of an

extensive medical care and research community in downtown New Orleans, the LCRC has constructed a 150,000 square-foot facility that houses leading research scientists, practitioners, teachers, and students. Funded by the State of Louisiana, the LCRS universities are working collectively to achieve designation as an NIH, National Cancer Institute center of excellence.

In 2014, Xavier received a five-year, 10 million Research Centers in Minority Institutions (RCMI) grant advancing the University's national and international prominence in cancer research. College of Pharmacy faculty are actively engaged in research efforts aimed at understanding the pathogenesis of cancer at its molecular level, and in studying strategies for its successful treatment.

Dr. Tien L. Huang, Professor of Medicinal Chemistry. Dr. Huang's research interests are in the design, synthesis and biological evaluation of novel small organic molecules as potential antimicrobial or antineoplastic agents. His laboratory has discovered lead compounds against the opportunistic fungus *Pneumocystis jirovecii* and several protozoan parasites such as *Plasmodium falciparum*, *Trypanosoma brucei* and *Leishmania donovani*. His research projects have been funded by NIH, CDC and DOE.

Dr. Thomas E. Wiese, Professor, Division of Basic Pharmaceutical Sciences, focuses primarily on the molecular mechanisms involved in nuclear receptor mediated endocrine disruption. Projects underway include characterizations of gene, receptor and tissue specific effects of hormone active environmental chemicals, dietary supplements and pharmaceuticals. The goal of these studies is to define the endocrine disruption of these substances as primary molecular cellular level events. This information is then used to examine mechanisms of cancer promotion and progression as well as to characterize a variety of hormone active contaminants with potential for novel endocrine activity. This work involves cellular, molecular, biochemical and molecular modeling approaches applied to studies of estrogen, androgen and progestin activity. Dr. Wiese has authored papers involving endocrine disruption, structure-activity relationships of hormone active chemicals and estrogen mediated effects on gene induction and proliferation in breast cancer cells.

Dr. Christopher Williams, Associate Professor of Pharmacology. Dr. Williams' research primarily focuses on experimental therapeutic modes of cancer therapy, with a specific emphasis on breast carcinoma. His lab is studying the anti-inflammatory pathways effects of metformin in the breast cancer microenvironment, as well as nuclear receptor modulating drugs as potential therapies in breast cancer. Dr. Williams has been supported through NIH (K01), the Office of Naval Research, LCRC, and RCMI. Additionally, he has served as mentor for students in the COE, RISE, MARC, UNCF STEM Scholars, McNair Scholars, and LS-LAMP programs for undergraduate research.

Dr. KiTani Parker Lemieux, Associate Professor of Basic Pharmaceutical Sciences, is conducting a project, aimed at understanding the molecular determinants that are critical in the progression, migration, and invasion of triple negative breast cancer (TNBC). The approach is to identify these factors from the noncancerous microenvironment and to determine their role in

proliferation, migration and invasion of TNBC. The rationale is that a better understanding of the microenvironment of the TNBC cells will aid in the identification of novel targets for pharmacological intervention. The subtype of breast disease disproportionately affects African American women and a better understanding of this phenomenon would aid in relieving the burden of disease in this population. Five undergraduate students from several programs across campus and one from Tulane have participated in this work. These students have been supported by the COE Scholars Program in the COP, the MBRS/RISE Program, the Ronald McNair Program, and the UNCF/STEM Scholars Program.

Materials Research

As a result of a partnership between Xavier University and New York University's Materials Research, Science and Engineering Center, which was already funded by a prestigious NSF grant, College of Pharmacy faculty and staff are focused on nanoscale imaging systems and receptor-ligand binding interactions. The group is also engaged in building a pipeline of under-represented undergraduates who are well-trained and qualified to pursue graduate studies in materials research.

Dr. Robert Blake II, Professor, Division of Basic Pharmaceutical Sciences. Dr. Blake's laboratory is extraordinarily well-equipped to study the kinetics and thermodynamics of receptor-ligand binding interactions. In particular, they have an integrating cavity absorption meter that offers the unique capability to monitor absorbance or fluorescence changes in turbid suspensions that scatter light. These functional studies are complemented with other instrumentation that focuses on the structural characterization of nanoparticles. Current studies funded by the US Departments of Defense and Energy focus on the respiratory electron transport chains of bacteria that oxidize and degrade selected solid particles.

Health Disparities

The Center for Minority Health and Health Disparities Research and Education (CMHDRE) was established in 2002 with grant funds from the National Center for Minority Health and Health Disparities at the National Institutes for Health. The primary areas of interest are: diabetes research and education; cancer research and prevention/early detection education; asthma education and prevention; and cultural competence.

Dr. Margarita Echeverri, Assistant Professor, Educational Coordinator Health Disparities, Diversity & Cultural Competence Center for Minority Health and Health Disparities Research and Education. Dr. Echeverri conducts research in curricular and educational initiatives related to cultural competence; health literacy; language; and health disparities in health-related professions. This includes development and validation of assessment tools; development and assessment of inter-professional, international, and practical experiences; implementation and assessment of active learning and interactive strategies. Research is also focused on identification of cultural-diversity factors influencing patients' health behaviors and decisions

related to prevention and treatment of chronic diseases, as well as development of strategies to address main factors affecting patients' use of and access to healthcare services. Dr. Echeverri is a founder of the AACP Special Interest Group on Health Disparities and Cultural Competence. Her research has been supported by NIH/NCMHD - Xavier Pharmacy Endowment for Minority Health, NIH - Louisiana Clinical and Translational Science Center (LACaTS), and HRSA - Centers of Excellence.

Dr. Kristi Isaac Rapp, is a Clinical Associate Professor and her research interests include asthma and health disparities research. She served as Director of the HEAL, Phase II Project, supported by the Merck Childhood Asthma Network, Inc. This project aimed to improve pediatric asthma management in the New Orleans area. Dr. Rapp also serves as a research mentor within the College of Pharmacy's Center of Excellence Program.

Centers of Excellence

Dr. Joseph M. LaRochelle, Clinical Associate Professor, is evaluating clinical interventions in a pediatric intensive care unit, a two year retrospective comparative study of the impact of a clinical pediatric specialist on critical care patients. This is the largest comparative study to date. It is sponsored in part by the Centers of Excellence, with student involvement. He is also the lead author on a large opinion paper with the goal of formulating a multi organizational national position statement on clinical pharmacist involvement in the care of children. As part of the Docere Fellowship in Health Professions Educations through the Center for the Advancement of Educational Scholarship at LSU, Dr. LaRochelle is involved in a multi-school project measuring confidence, social phobia, and inter-professional relationships in P1-P4 pharmacy students. Dr. LaRochelle is also the chair elect of the Pediatric Practice and Research Network of the American College of Clinical Pharmacy and is on the Editorial Board of Currents in Pharmacy Teaching and Learning.

Dr. Sara Al-Dahir, BCPS, Fulbright Scholar, Clinical Associate Professor has published and conducted research in innovative pharmacy teaching methods, cultural competence, health disparities among immigrant populations, infectious disease, critical care and pain management. She has sponsored student research for Centers of Excellence student scholars since 2011 and the Center for Undergraduate Research in 2013. She has also received an Andrew Mellon Foundation grant to complete research related to utilizing on-line platforms for pharmacy courses. In her year as a Fulbright Scholar in Qatar, Dr. Al-Dahir developed international opportunities for collaboration related to diabetes and obesity. As of 2014, Dr. Al-Dahir has served as the research mentor for 12 student research posters and 7 pharmacy resident research posters and projects.

Clinical Research

Dr. Jessica Johnson, Clinical Assistant Professor, is involved in several research activities at the Interim LSU Hospital, where she collaborates with physicians, medical residents and fellows, and pharmacy students. She serves as co-primary investigator on prospective observational and interventional trials related to sedative use and alcohol withdrawal in the Medical Intensive Care Unit, as well as serving as the un-blinded research pharmacist responsible for preparing study drugs for several prospective, randomized trials for COPD. She frequently involves pharmacy students in prospective and retrospective clinical research studies at the hospital and in Service-Learning rotation sites. In addition, Dr. Johnson is investigating the impact of reflective writing on pharmacy students' development of self-authorship and professional identity.

Dr. Ifeanyi Onor, Clinical Assistant Professor of Pharmacy, seamlessly integrates his clinical practice and research interests. His research projects encompass pharmacotherapy-based outcomes research, clinical pharmacokinetics and pharmacodynamics, epidemiology, and pharmacy education. Student collaborators on Dr. Onor's projects are provided opportunities to develop Institutional Review Board (IRB) proposals, collect and statistically analyze data, present at local, regional, and national conferences, and serve as coauthors on publications.

Dr. Yingnan Zhao, Assistant Professor of Pharmacy Administration. Dr. Zhao's current research interests include health economic evaluation, outcomes research and health care equity in access, quality, and outcome. She is also pursuing studies in pharmacoepidemiology, with a focus on safety issues in medication treatment and medical informatics to improve quality of patient care. The majority of her research has been conducted in the area of chronic disease (e.g., diabetes and hypertension) and quality of care for health systems. She has participated in a variety of funded research projects and published research findings in high-impact peer-reviewed journals with media coverage.

Dr. Christopher J. Gillard, Clinical Assistant Professor, Division of Clinical & Administrative Sciences has published infectious disease research, specifically an observational study, retrospectively reviewing minimum inhibitory concentration (MIC) trends of clinically significant bacterial organisms in an intensive care unit setting. He has participated and co-authored a manuscript describing antimicrobial susceptibilities in a surgical/trauma intensive care unit compared to hospital susceptibilities that was recently accepted for publication. Additional research interests include reviewing incidence and risk factors of serious toxicities associated with commonly prescribed antimicrobials in an inpatient setting, identifying and eliminating disparities in cardiovascular health, and factors influencing successful placement of pharmacy students in postgraduate education positions.

