

# Research Update

Contributed by Dr. Sreejayan Nair

Research at the School of Pharmacy reached new heights in 2017 with several publications in top-tier journals and grant support from both federal (National Institutes of Health, Department of Defence) and nonfederal (pharmaceutical companies) sources. Additionally, the school received a grant from The ALSAM foundation for acquisition of shared research equipment needed to strengthen and enhance our research capability in basic, translational or clinic research areas of biomedical/behavioral research.

Behavioral neuroscience is a key area of basic/translational research in the School of Pharmacy. During this past year, Dr. Travis Brown (Assistant Professor) has been studying how exposure to various rewards (e.g., cocaine and dietary high-fat) rewire the brain to promote pathologies such as drug addiction and obesity. This work has been funded by a R01 grant from the National Institutes of Health in collaboration with Washington State University. He was also one of the pilot-project investigators on the NIH Sensory Biology COBRE grant awarded to the University of Wyoming. Dr. Brown is actively involved in the Graduate Neurosciences Program at the University of Wyoming and has two graduate students, Ms. Paige Dingess and Ms. Emily Jorgensen. Dr. Brown and his students identified changes in neuronal structures that may be responsible for maladaptive behaviors, which has been published as five papers this past year in high-impact journals. It is of note that **their work** was highlighted on the cover of the journal *Neuropsychopharmacology* and recently on display at Washington DC at the meeting of the Annual Society for Neuroscience meeting.



Dr. Brown with Dingess (left) and Jorgensen (right)

Another key investigator in the area of neurosciences is Assistant Professor Dr. Jared Bushman, whose research seeks to determine the influence of astrocyte function in the nervous system. More importantly, he is focused on developing neuroengineering strategies to regenerate damaged neurons. Dr. Bushman's lab was recently renovated through a generous gift by the ALSAM foundation. His state-of-the-art laboratory now houses dedicated rooms for tissue culture, microscopy and a surgical suite. In addition to publishing several papers in reputed journals, Dr. Bushman has filed two provisional patents on spinal cord regeneration. Recently, he also received grant support from the Department of Defense.

Drs. Jun Ren, Guanglong He and Sreejayan Nair work in the field of cardiovascular research, which encompasses the broad areas of heart failure, diabetes, vascular dysfunction and obesity. During the past year Dr. Ren has served on the board of several international conferences and as an editor for several journals. In addition, he serves as an adjunct professor in Fudan University Zhongshan Hospital (Cardiology), which allows him to perform clinical research. In 2017 he has published 20 research articles and edited two books. He has obtained two international grants and also serves as a co-PI on a R01 application (receiving a score of 30th percentile). He has mentored three Ph.D. students (as major advisor) this fiscal year. Dr. Guanglong He's lab focuses on the mechanistic consequences of chronic inflammation on cardiovascular health. This year he received funding from the Diabetes Action Association and has ongoing grant support from the Wyoming IDeA Networks for Biomedical Research Excellence (INBRE) Program. He has published five manuscripts and presented at national meetings such as the American Heart Association Annual conference and American Physiology Society conference. Dr. He was invited

to give a seminar lecture on the health effects of air pollution on obesity and cardiovascular function in a prestigious university in China: the University of Science and Technology of China. In addition, two undergraduate students working on cardiovascular research were awarded INBRE summer research scholarship, and another two undergraduate students were awarded Wyoming Research Scholars Program scholarship. One graduate student was awarded travel support to attend the APS and AHA conferences. Dr. Nair's lab focuses on the complications of diabetes. His research involves both basic and clinical studies. He has published in top-tier journals and has obtained funding from the Mountain West IDeA Clinical and Translational Research –Infrastructure Network. He presented a plenary lecture at the International Meeting of Cardiology (Vancouver) and has received the Fellowship of the American Heart Association.

Dr. Bhaskaran Thyagarajan's research bridges neuroscience research with cardiovascular pharmacology, the second thematic research focus in the School. His lab, 'Baskilab', focuses on analyzing the molecular mechanisms of regulation of transient receptor potential proteins in pain, metabolic and neurodegenerative diseases. He is interested in developing new drug molecules that modulate the function of transient receptor potential proteins and new target site-specific delivery of such molecules to counteract human diseases. Recently, Baskilab received a second US Patent, which describes the invention of a nanoparticle Delivery System for Targeted Anti-Obesity Treatment (US Patent No US 9,782,481 B2, awarded on October 10, 2017). Dr. Thyagarajan collaborates with Dr. Kurt Dolence, Associate Professor of Medicinal Chemistry, in designing fluorescent-labeled capsaicin probes to aid in determination of cellular trafficking.



Members of Baskilab recently gave a lab tour to University of Wyoming president Laurie Nichols and gave her an informative overview of their research.



Finally, Dr. Marnie Peterson, who is a new addition to our team, is the founder of **Extherid Bioscience**, based in Jackson, WY. Dr. Peterson's focus is experimental therapeutics, antibiotic resistance, and microbial pathogenesis. Her multidisciplinary team of scientists come from academic and industry settings, and their long-term goal is to better understand host-pathogen interactions at skin and mucosal surfaces in order to develop novel therapeutics to treat and prevent infections. Dr. Peterson is a recipient of the 3M award and has published extensively in the field of biofilms, infectious disease and wound healing.