Monthly Publication Highlight - Dr. Flaherty

The Purdue College of Pharmacy is pleased to honor and recognize the outstanding research and scholarship generated by our faculty each month. This month we highlight Dr. Daniel Flaherty, Assistant Professor of Medicinal Chemistry and Molecular Pharmacology. Dr. Flaherty’s recent publication, “Optimization of a 1,3,4-oxadiazole series for inhibition of Ca2+/calmodulin-stimulated activity of adenyl cyclases 1 and 8 for the treatment of chronic pain”, can be read in European Journal of Medicinal Chemistry (January, 2019; DOI: 10.1016/j.ejmech.2018.11.036). The study was conducted in the Flaherty Lab: Jatinder Kaur and Daniel P. Flaherty; Watts Lab: Monica Soto-Velasquez and Zhong Ding; van Rijn Lab: Richard M van Rijn; and Lill Lab: Ahmadreza Ghanbarpour and Markus A. Lill.

In this research, we are looking into a new approach to managing chronic pain. The current standard of care is with the use of opioid classes of drugs. While these drugs are effective, they also have unwanted side effects such as constipation, euphoric feelings and are highly addictive if not managed properly by the doctor and patient. These addictive properties have given rise to the “opioid epidemic” and led to changes with respect to how healthcare professionals prescribe these drugs. Opioid drugs act on a pathway that runs through the enzyme adenylyl cyclase type 1 (AC1). Based on previous research by our team and others, it has been theorized that if we target AC1 directly with drug like molecules we can still achieve the desired reduction of chronic pain while effectively bypassing the opioid receptor and the undesired side effects and addictive properties associated with it. Our team identified a hit molecule that targeted AC1 activity in the cell and we optimized the molecules properties to make it more potent and selective. We then showed that when administered to mice in a model for chronic pain. The molecules were able to provide an analgesic effect and reduce the pain sensation the mice felt.

“This project is a perfect example of the type of collaborative research that is achievable in our department. The researchers in the department of Medicinal Chemistry and Molecular Pharmacology are highly diverse in their training,” said Dr. Flaherty. “This project brought together expertise in the fields of medicinal chemistry, computational modeling, molecular pharmacology and pain pathology in one department, to advance our knowledge toward treating chronic pain safely and effectively.”