Biography

Dr. Dana Selley received a B.S. in Biology from the University of Massachusetts, North Dartmouth and a Ph.D. in Neuroscience from the University of Rochester. He completed his post-doctoral training in the laboratory of Dr. Steven Childers at Wake Forest University School of Medicine, and then obtained a faculty position at the same institution. He established his laboratory in the Department of Pharmacology and Toxicology at Virginia Commonwealth University (VCU) School of Medicine in 1998, and has been continuously funded by NIH, including the National Institute on Drug Abuse and National Institute on Neurological Disorders and Stroke, since 1996.

His research program is focused on understanding the signaling and regulatory mechanisms of G-protein-coupled receptors (GPCRs) that are targets of neuroactive drugs, including opioid, cannabinoid, dopamine receptors, mainly in the context of pain treatment, drug abuse and drug discovery. A major concentration of this work is on the roles of lipid neuromodulators that act through GPCRs to regulate pain, such as the endocannabinoid and sphingolipid systems, in the search for novel targets for treatment of chronic pain.

Abstract

“Targeting sphingosine-1-phosphate receptors for chronic pain treatment: a promising approach with complex pharmacology”

Chronic pain is difficult to treat and long-term opioid use has contributed to widespread abuse and overdose. Therefore, new and safer chronic pain treatments are needed. The sphingosine-1-phosphate (S1P) system is a promising target for this purpose because it regulates both immune-driven inflammation and neuronal pain signals. Drugs that bind to S1P receptors have been shown to attenuate pain responses in both acute and chronic pain models in rodents. However, S1P binds to multiple receptors, and plays both pro- and antinociceptive roles, depending on the specific receptor and cell type in which it is acting. The immunomodulatory pro-drug FTY720 acts as both an agonist and a “functional antagonist” of S1P receptors (by desensitizing and downregulating these receptors) and produces antinociception in multiple pain models. The challenges for pharmacology are to determine: 1) the primary S1P receptor target(s) of FTY720 that contribute to pain control, and 2) whether agonism, functional antagonism or both actions of FTY720 are required at each receptor type to alleviate pain.