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Editorial

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TRP Channels—Convergent Sites of Action for Phytochemicals and Endogenous Lipid Transmitters That Regulate Human Sensation and Physiology

This special issue of *ACS Chemical Neuroscience*, which was guest-edited by Rao S. Rapaka, Vishnudutt Purohit, and Joni Rutter, focuses on the molecular composition, ligand pharmacology, and physiological functions of the Transient Receptor Potential (TRP) family of ion channels and relates to the NIDA-sponsored workshop in July 2013 entitled "TRPs as Probes and Medications for CNS Disorders: Focus on the Trptome, Trptomics, Addiction and Pain". In 1997, Michael Caterina, David Julius, and colleagues launched the field of mammalian TRP channel biology through their discovery that TRPV1 represents the receptor for capsaicin, the pungent ingredient in chili peppers.[1] Over the ensuing decade-and-a-half, we have learned much about the composition and function of TRP channels. There are more than 25 members of the TRP channel family in humans, and several of these proteins have been found to regulate various forms of thermal and noxious chemical sensation, as well as other (patho)physiological processes. Moreover, TRP channels constitute the sites-of-action for several well-known phytochemicals, including, not only capsaicin, but also menthol[2] and mustard oils.[3] TRP channels are also activated by endogenous ligands, principally bioactive lipids, such as the endocannabinoids.[4]

The articles in this issue provide a lucid and thorough overview of our current understanding of TRP channel function in mammalian biology and disease. Premkumar reviews the prominent role that TRP channels play as sensor of bioactive phytochemicals that regulate a remarkably diverse array of human physiological processes.[5] Janero and Makriyannis expand on this survey of TRP channel pharmacology to include an analysis of both exogenous terpene and endogenous lipid ligands and how these ligands also interface with the endocannabinoid system.[6] Caterina introduces the provocative concept that TRP channels may be viewed as "ionotropic cannabinoid receptors" and highlights the prominent role that endocannabinoid-TRP pathways play in cutaneous sensation and disease.[7] Dussor, Porreca, and colleagues lead us into the nervous system, where they assess the possible roles for TRP channels in the pathophysiology of migraine.[8] Finally, Iannotti, Di Marzo, and colleagues provide evidence that the non-psychoactive cannabinoids cannabidivarin and cannabidiol may exert their anticonvulsant activities through desensitizing TRPV1 channels in the central nervous system.[9]

Together, the papers presented in this special issue of *ACS Chemical Neuroscience* capture the tremendous advances that have been made in our understanding of TRP channel biology in mammalian systems, as well as the many opportunities and challenges that remain to convert this knowledge into new therapeutics to treat a range of human diseases.

Benjamin F. Cravatt

The Scripps Research Institute

AUTHOR INFORMATION

Notes

Views expressed in this editorial are those of the author and not necessarily the views of the ACS.

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