THE UNIVERSITY OF TOLEDO 1872

CHEMISTRY AND BIOCHEMISTRY COLLOQUIUM

Physiology and Pathophysiology of Neuronal Primary Cilia

Abstract: Primary cilia are specialized sensory organelles that project from nearly all mammalian cell types and incorporate a myriad of extracellular stimuli into signal transduction pathways to modulate cell physiology. Defects in the function of primary cilia lead to a class of human diseases called ciliopathies, which impact many organ systems. Most, if not all, adult neurons throughout the mammalian brain possess primary cilia. The importance of these organelles is highlighted by the fact that ciliopathies are associated with neuropathologies, including obesity, hypogonadism, and learning and memory deficits. Yet, the roles of primary cilia in neuronal function remain unclear. Primary cilia are restricted compartments and specialized mechanisms exist to coordinate the selective targeting, exclusion and retention of certain proteins. This enrichment of select proteins is what defines the functions of cilia and determines the signaling pathways they mediate. This talk will focus on our efforts to identify novel ciliary signaling proteins and define the intra- and intermolecular determinants of protein localization to neuronal cilia. Our recent results defining novel ciliary signaling pathways and their impact on neuronal function will also be discussed.

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