manitoba neuroscience network

Understanding the role of pannexin 1 in dendritic spine stability

SEMINAR & VISITING SPEAKER SERIES

DATE
Monday, October 24, 2022
11:30 AM

LOCATION
Apotex Centre 164

SPEAKER
Leigh Anne Swayne, PhD

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BIO

Dr. Swayne is a cell biologist and neuroscientist who completed her BSc in Biological Science at the University of Guelph and her PhD in Neuroscience at the University of Calgary. After training as a Marie Skłodowska-Curie Postdoctoral Fellow at the Centre national de la recherche scientifique in Montpellier (France), and as a Vision 2010 Postdoctoral Fellow at the University of Ottawa (Canada), she joined the Division of Medical Sciences at the University of Victoria in Victoria, British Columbia, Canada in 2011. More details available at: https://onlineacademiccommunity.uvic.ca/swaynelab/people/leigh-anne-swayne/.

ABSTRACT

Dendritic spines are microscopic structures that receive excitatory input from the nerve terminals of nearby axons. These structures are rich in cytoskeletal elements and their morphology can be highly plastic during development, learning, and disease.

Increased spine loss is present in several neurological diseases, and is often preceded by heightened spine instability. Despite clear translational importance, our understanding of the the molecular determinants of spine stability is incomplete. We recently discovered that PANX1 inhibits spine stability and it is also linked to some of these disease states, making it an attractive target for strategies aimed at tuning spine stability. To this end, deeper mechanistic understanding of the role and regulation of PANX1 in spine stabilization is required. To shed light on the mechanisms involved in PANX1 regulation of spines, we have used a combination of advanced microscopy and biochemical tools to define PANX1 neurodevelopmental expression patterns, protein-protein interactions, and trafficking mechanisms. Our findings have helped us to establish our current working model, which is that PANX1 inhibits spine stability by sequestering key spine cytoskeletal regulating proteins, and that PANX1 developmental downregulation contributes to spine stabilization. We hope to leverage the outcomes of this work to develop strategies to tune dendritic spine stability with translational relevance for a number of neurological diseases.

OBJECTIVES

1. Provide an overview on pannexin 1's overall association with several aspects of neuronal development
2. Outline pannexin 1 interaction with spine cytoskeletal regulators and pannexin 1 ATP-dependent internalization and the role these might play in neuronal development and spine stabilization
3. Discuss the translational relevance of leveraging this knowledge for the treatment of neurological disorders

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