BBB seminar (BMED380)

Thursday, November 9. 14:30 at the BBB, Auditorium 4

Cell biology of myelin formation, dynamics, and disease

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Myelin is required in the vertebrate nervous system for fast and precise nerve signaling and is increasingly found to play key roles in learning and neurodegenerative diseases. To build myelin in the central nervous system, oligodendrocytes undergo a dramatic morphological transformation to extend dozens of dynamic processes which ensheath and spirally wrap around axons, then squeeze out their cytoplasm to form compacted, electrically-insulating sheaths. Once formed, myelin sheaths remain dynamic in the adult brain and can adjust their morphologies in response to experience and neuronal activity. Research in the Zuchero lab aims to understand the cellular mechanisms driving myelin formation, dynamics, and disease. We address these questions by combining primary culture and mouse in vivo approaches with the creation of new genetic tools. Two key cell biology mechanisms have emerged from our work as essential for myelination: actin cytoskeletal dynamics and vesicular trafficking/exocytosis. Here, I will highlight our recent discoveries that exocytosis is required to provide new membrane and adhesion proteins for myelination, and ongoing work using new genetic tools for perturbing actin filaments that uncovers an unexpected role for the actin cytoskeleton during myelination. Finally, I will propose a unified cell biological model for how oligodendrocytes respond to neuron type and activity to precisely tune myelin during neurodevelopment and learning.

Chairperson: Petri Kursula <petri.kursula@uib.no>, Dept. of Biomedicine