

Introductory Remarks to Symposium 2

Novel functions and regulatory mechanisms of the neuronal actin cytoskeleton

Marco Rust, Marburg

The actin cytoskeleton is a major determinant of neuron morphology and function. Actin filaments (F-actin) are enriched in subcellular structures such as growth cones and dendritic spines that are relevant for the formation and function of neuronal networks. Consequently, F-actin dysregulation contributes to the pathogenesis of human brain disorders including neuropsychiatric and neurodegenerative diseases. While numerous signaling cascades and actin-binding proteins have been implicated in the organization and dynamics of the neuronal actin cytoskeleton, our knowledge of actin regulatory mechanisms in neurons is still fragmented. Moreover, neuronal structures such as dendritic F-actin patches, longitudinal actin fibers or periodic actin rings have been discovered more recently, and their regulation and function largely remained unknown.

Our symposium 'Novel functions and regulatory mechanisms of the neuronal actin cytoskeleton' will highlight some important progress made over the past years in the field. Marina Mikhaylova (Berlin, Germany) will present her work on dendritic F-actin patches that control transport and localization of secretory trafficking organelles. She will introduce molecules that link these organelles to F-actin, which ultimately control the formation of dendritic shaft excitatory synapses. The talks of Elena Marcello (Milan, Italy) and Marco Rust (Marburg, Germany) will focus on cyclase-associated proteins (CAP) - proteins with hitherto unknown neuronal functions that have been implicated in actin dynamics only recently. Elena Marcello will present a synaptic mechanism governed by CAP2 that is disrupted in Alzheimer's disease and significantly contributes to the disease pathogenesis. Marco Rust will introduce CAP1 as a crucial actin regulator relevant for both neuron differentiation and synapse morphology, and he will provide insights into CAP1-dependent molecular mechanisms. Complementary to these talks, the young investigator Kristina Ponimaskine (Hamburg, Germany) will introduce a novel approach that allows to analyze interactions of neighboring dendritic spines with high temporal and spatial resolution.

Symposium 2

Wednesday, March 22, 2023
15:15 - 17:15, Lecture Hall 105

Chair: Marco Rust, Marburg

- 15:15 **Opening Remarks**
- 15:20 Marina Mikhaylova, Berlin
CYTOSKELETAL MAKEUP OF THE SYNAPSE:
SHAFT VERSUS SPINE (S2-1)
- 15:50 Elena Marcello, Milan, Italy
CAP2 AT THE CROSSROADS OF ALZHEIMER'S
DISEASE PATHOGENESIS PATHWAYS (S2-2)
- 16:20 Marco Rust, Marburg
CAP1 AND COFILIN1: AN INTIMATE DUET
THAT GOVERNS NEURONAL ACTIN DYNAMICS
(S2-3)
- 16:50 Kristina Ponimaskine, Hamburg
NOVEL APPROACH TO ANALYZE INTERAC-
TIONS OF NEIGHBOURING SPINES (S2-4)
- 17:10 **Concluding Remarks**