

## Introductory Remarks to Symposium 33

### Bridging brain function and microglia signaling

Anne Günther and Jastyn Anne Pöpplau, Hamburg

The complex mechanisms underlying neuronal processing were long thought to rely solely on neurons as the central units of brain function. Consequently, glial cells were thought to mainly serve as metabolic and structural support of neuronal processes. However, in more recent years, far more diverse roles have been attributed to glial cells, identifying them as crucial modulators of neuronal communication within local circuits as well as across brain regions.

Microglia, the resident macrophages of the central nervous system, exemplify this functional diversity. They are able to actively monitor their environment and, based on their high sensitivity to signaling molecules, they can rapidly respond to changes in a temporally and spatially restricted manner. Due to their crucial role in fine-tuning synaptic connections, microglia are essential for neuronal circuits, especially during development. Immature microglia populate the brain already at early perinatal stages, where they are primed by their surroundings in a lasting and subpopulation-specific manner. Throughout development and even into late adulthood, microglia maintain their role as surveyors of neuronal health and connectivity.

However, on the downside, insults during development can result in permanently altered priming of microglia, which in turn might promote excessive pruning, apparent in neurodevelopmental disorders or in neurodegenerative diseases. Thus, a detailed understanding of microglia is key for a comprehensive picture of normal as well as pathological brain function.

This symposium will present recent insights into the manifold phenotypes and roles of microglia, addressing their functions in the context of small signaling molecules, all the way to brain-wide network interactions. Moreover, novel techniques for specific manipulation of microglia in the intact brain will be highlighted.

Overall, this symposium will enrich the current understanding of microglia and their diverse roles in shaping brain function, not only across lifespan and species, but also in health and disease.

## Symposium 33

Friday, March 24, 2023  
13:00 - 15:00, Lecture Hall 101

Chairs: Anne Günther and Jastyn Anne Pöpplau,  
Hamburg

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| 13:00 | <b>Opening Remarks</b>   |
| 13:05 | Thomas Oertner, Hamburg<br>PHANTOM INFLAMMATION: A NEW PARADIGM TO INVESTIGATE MICROGLIA-TO-NEURON SIGNALING (S33-1)       |
| 13:30 | Dimitrios Kleidonas, Freiburg<br>MICROGLIA ACTIVATION DETERMINES THE EFFECT OF TNF $\alpha$ ON SYNAPTIC PLASTICITY (S33-2) |
| 13:45 | Marco Prinz, Freiburg<br>THE MYELOID SIDE OF THE BRAIN (S33-3)   |
| 14:10 | Marcus Semtner, Berlin<br>MICROGLIA SENSE NEURONAL ACTIVITY VIA GABA IN THE EARLY POSTNATAL HIPPOCAMPUS (S33-4)            |
| 14:35 | Mikael Simons, Munich<br>ROLE OF MICROGLIA IN WHITE MATTER AGING (S33-5)   |