

Introductory Remarks to Symposium 32

Dendritic inhibition – role in network dynamics, memory and behavior

Marlene Bartos and Jörg Geiger, Freiburg and Berlin

The encoding of information in cortical networks markedly depends on the morphological and physiological properties of pyramidal cell dendrites as the cardinal points for the convergence of afferent inputs. They have the ability to integrate and potentially amplify synaptic inputs. Thus, dendrites play a key role in the processing and encoding of afferent information. These properties are controlled by synaptic inhibition, provided by the various GABAergic inhibitory cell types targeting specific compartments of pyramidal cell dendrites. Consequently, dendrite-targeting interneurons will affect various aspects of encoding of information on the level of individual cells and neuronal populations in a target-specific manner. In the here proposed symposium, we aim to highlight recent experimental and computational advances in the role of dendritic inhibition in modulating the representation of environmental and sensory information in neuronal networks of the hippocampus and neocortex, respectively, and its influence on the execution of behavior.

This symposium will bridge between *in vivo*, *in vitro* and computational studies to highlight new insights on the role of the various dendrite-targeting interneurons including somatostatin (SOM)-expressing and neuron-derived neurotrophic factor (NDNF)-positive interneurons on cortical single cell and network dynamics. The proposed speakers utilized a breadth of advanced experimental techniques including whole-cell and single unit recordings as well as 2-Photon population imaging in behaving animals, optogenetics, quantitative behavioral and computational analysis to obtain the here presented results on the role of dendritic inhibition in shaping the spatial and temporal activity of single cells and cell populations during learning for the representation of space, context and thread perception.

Symposium 32

Saturday, March 29, 2025
11:30 - 13:30, Lecture Hall 10

Chairs: Marlene Bartos and Jörg Geiger,
Freiburg and Berlin

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| 11:30 | Opening Remarks |
| 12:05 | Johannes Letzkus, Freiburg
TOP-DOWN CONTROL OF THREAT MEMORY THROUGH NEOCORTICAL LAYER (S32-1) |
| 12:30 | Matthew Larkum, Berlin
THE CONTRIBUTION OF DENDRITIC INHIBITION TO CORTICAL NETWORK DYNAMICS (S32-2) |
| 12:55 | Marlene Bartos, Freiburg
DENDRIT INHIBITION SHAPES ENCODING OF SPACE AND CONTEXT IN THE DENTATE GYRUS OF BEHAVING MICE (S32-3) |
| 13:20 | Panayiota Poirazi, Hellas, Greece
INHIBITORY CONTROL OF CIRCUIT DYNAMICS BY DENDRITE-TARGETING INTERNEURONS - INSIGHTS FROM COMPUTATIONAL MODELS (S32-4) |
| 13:25 | Discussion / Concluding Remarks |