

Speaker:

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Time/Location:

22.01.2018 at 4 pm

New Biology Building / DE._2.133

invited by:

Prof. Dr. Inga Neumann

Title:

**Amygdala circuits and mechanisms that control
acquired fear and its extinction**

Abstract:

My lab uses Pavlovian cued fear conditioning and its extinction to investigate the substrates and mechanisms underlying the expression of learned fear and its extinction. A key region for emotional stimulus-associations and storage of fear and extinction memories is the amygdala. The amygdala directly receives sensory inputs and is part of a larger interconnected network with hippocampus and medial prefrontal cortex, which has been implicated in state- and context-dependent control of fear. Increasing evidence suggests that parallel processes in these circuits and inhibitory elements control fear and extinction memory. We employ a combination of behavioral, and ex vivo electrophysiological, anatomical and optogenetic approaches in mice to delineate properties of and plasticity in fear and extinction circuits. My talk will highlight several aspects of our recent work. On the network side, I will discuss data on the functional architecture of prefrontal- and hippocampal-basolateral amygdala circuits, and the role of a specific set of local inhibitory synapses in the basolateral amygdala that participate in extinction. From a systems perspective, I will show that sleep supports the consolidation of extinction memory and discuss preliminary data on the associated sleep stages. Lastly, I will describe novel connectivity of intercalated cells in the amygdala, a specific set of GABAergic neurons surrounding the BLA. These provide learning-modulated sensory feed-forward and feedback inhibition to basolateral amygdala and display a rather unexpected diversity of connectivity patterns. This puts them in a unique position to gate fear expression, and our functional data suggest that they cells participate in fear learning as well as extinction.