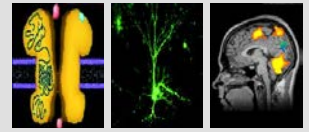


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EXTINCTION LEARNING: THE NEURAL, BEHAVIOURAL, ONTOGENETIC, EDUCATIONAL, AND CLINICAL MECHANISMS

April 24 - 25, 2018 Veranstaltungszentrum, Ruhr University Bochum

Wednesday

April 25, 13:10 – 16:00

Session 4 **Bridging the gap – Implications for psychopathology**

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Amygdala circuits and mechanisms in associative auditory fear and extinction memory

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 in mice as model organism. A key region for the formation and storage of fear and extinction memories is the amygdala. The amygdala directly receives sensory inputs from thalamic and cortical regions and is part of a larger interconnected network with the hippocampus and medial prefrontal cortex. The latter tripartite network has been implicated in state- and context-dependent control of fear. Increasing evidence suggests that parallel processes in these circuits and inhibitory elements play a critical role in the control of fear and extinction memory.

We employ a combination of behavioral, and ex vivo electrophysiological, anatomical and optogenetic approaches to delineate properties of and plasticity in fear and extinction circuits. My talk will touch upon 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 in extinction. From a systems perspective, I will show that sleep supports the consolidation of fear extinction memory and discuss preliminary data on the associated global activity patterns during sleep. Secondly, I will highlight our recent work on the intercalated cell (ITC) network, a specific set of GABAergic neurons surrounding the BLA, which were thought to play a key role in extinction. Our anatomical data delineated their local and long-range connectivity patterns and demonstrate a considerable cellular heterogeneity. Furthermore, functional data suggest that the ITC network may participate in fear learning, as well as in its expression and suppression.

