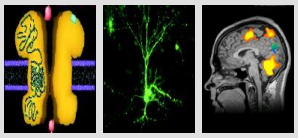

Molecular and Neural Correlates of Memory and Cognition

April 9 - 10, 2019 Veranstaltungszentrum, Ruhr University Bochum

Wednesday April 10, 14:00 – 16:00

Session 4 **Cortical plasticity and information processing as an orchestrator of cognitive flexibility, memory and cognition**

SUSANNE DIEKELMANN

Institute of Medical Psychology and Behavioral Neurobiology, Tübingen University, Tübingen Germany

Cueing reactivation during sleep to facilitate memory consolidation

Sleep is known to strengthen new memories in an active process of system consolidation, involving a fine-tuned hippocampal-neocortical dialogue. This process is assumed to rely on the reactivation of memories both in hippocampal and neocortical networks, which can also be triggered externally by learning-associated reminder cues. We have shown that the application of odor cues during slow wave sleep (SWS) stabilizes new memories and activates hippocampal and parietal cortical brain areas. The same odor cues during wakefulness labilize memories and activate prefrontal cortical regions. Different types of reminder cues (complete/incomplete) thereby differentially affect memories during sleep and wakefulness. While only the incomplete but not the complete cues labilize memories in the wake state, both types of cues stabilize memories during SWS, going along with power increases in the theta and spindle band. Moreover, it has been suggested that low levels of acetylcholine during SWS enable the hippocampal-neocortical dialogue underlying memory reactivation and consolidation during sleep. However, pharmacologically increasing the levels of acetylcholine during cueing in SWS does not abolish the beneficial effect on memory, suggesting that a hippocampal-neocortical dialogue may not be necessary for cued reactivation to strengthen memories. This evidence collectively suggests that cueing reactivation during sleep may directly stabilize neocortical memory traces for long-term storage.