



Spring 2009 Seminar Series

Department of Biomedical Engineering

Wednesday, March 11th @ 3PM in Steinman T-402



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Sleep slow oscillations, associated spindle and ripple activity and their modification under the influence of learning

The slow oscillation (<1Hz) is the dominant collective pattern of neocortical activity during non-REM sleep, representing an oscillation between global neocortical states of increased (up-state) and decreased neuronal firing (down-state). The slow oscillation groups thalamo-cortical sleep spindles, and this grouping influence extends to hippocampal sharp wave-ripple activity. It has been proposed that sleep spindles superimposed on slow waves, in concert with high-frequency hippocampal sharp waves-ripples, promote neural plasticity underlying remote memory formation. Indications for the relevance of the sleep slow oscillation for memory consolidation come from studies applying weak slow oscillation stimulation to the human scalp: Slow oscillatory and sleep spindle activity as well as hippocampus-dependent memory consolidation were enhanced. This seminar will focus on learning-associated increases in these oscillations and their temporal coupling. Similarities and differences of temporal interactions between the cortical slow oscillation, thalamo-cortical spindle activity and hippocampal ripple activity of the human and rat during basal sleep and sleep subsequent to comparable learning tasks will be reported.