

On the 9th of February 2006, 10 am. in the meeting room
Ulbert István will give a talk about

Disfacilitation in evoked potentials

It is usually assumed, that evoked potential (EP) components are originated from active, synaptically driven excitatory and inhibitory currents. Different EP components for example mismatch negativity (MMN), N100, P300 are also often assigned to different stages of active, synaptically driven intracortical information processing such as automatic change detection, semantic processing etc.

During slow wave sleep, the cortex oscillates between depolarized 'up states' and hyperpolarized 'down states'. In the 'down state', the synaptic bombardment of cortical neurons is virtually absent; the cortex is disfacilitated as opposed to the 'up state' where the neurons are facilitated by the abundance of background synaptic inputs from surrounding and distal cells. Disfacilitation is fundamentally different from active synaptic inhibition, since it arises in larger scale networks, and it does not explicitly require the action of any neurotransmitter.

Here we show, that periods of brief disfacilitatory responses are present following the initial short latency acoustic EPs in the auditory cortex of sleeping cats. During the disfacilitation, the cortex is silent and hyperpolarized; it does not generate oscillations or action potentials. We hypothesize, that besides thalamic gating, this type of cortical gating process serves as an important sleep protecting mechanism via pushing the membrane potential away from the firing threshold.