**Neural responses evoked by auditory stimulation during the sleep-wakefulness cycle in the cat**  
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Changes of auditory cortical evoked potentials depending on vigilance state are well known. However, underlying cellular and circuit level mechanisms are still unclear. In the present study, we have implanted chronically metal linear array multielectrodes into the medial geniculate body (MGB) and auditory cortex (AC) of cats. We recorded spontaneous local field potential (LFP), multiunit (MUA) and single unit activity (SUA) and the same signals evoked by single or pairs of clicks from the MGB and AC of freely moving and behaving animals. We analyzed and compared the properties of spontaneous activity and evoked responses during the different phases of the sleep-wakefulness cycle. In previous studies, we have found that auditory stimulation during slow-wave sleep (SWS) evokes a down-state in the AC that is very similar to spontaneous down states. To characterize the effects of the evoked down states on the AC neurons, we presented single clicks as well as pairs of clicks with different delays within pairs. We have found in the LFP that response to the second stimulus of the pair is modulated by the phase of evoked potential elicited by the first stimulus. During SWS, late positive phase of the first evoked potential effectively attenuates the amplitude of evoked potential elicited by the second stimulus. The amount of attenuation depends on the phase of potential oscillation evoked by the first stimulus. However, on the cellular level, effects of single and paired stimulation vary among single neurons.

Supported by: Hungarian Brain Research Program - Grant No. KTIA\_13\_NAP-A-IV/1,2,3,4,6, EU FP7 Grant No. 600925 NeuroSeeker