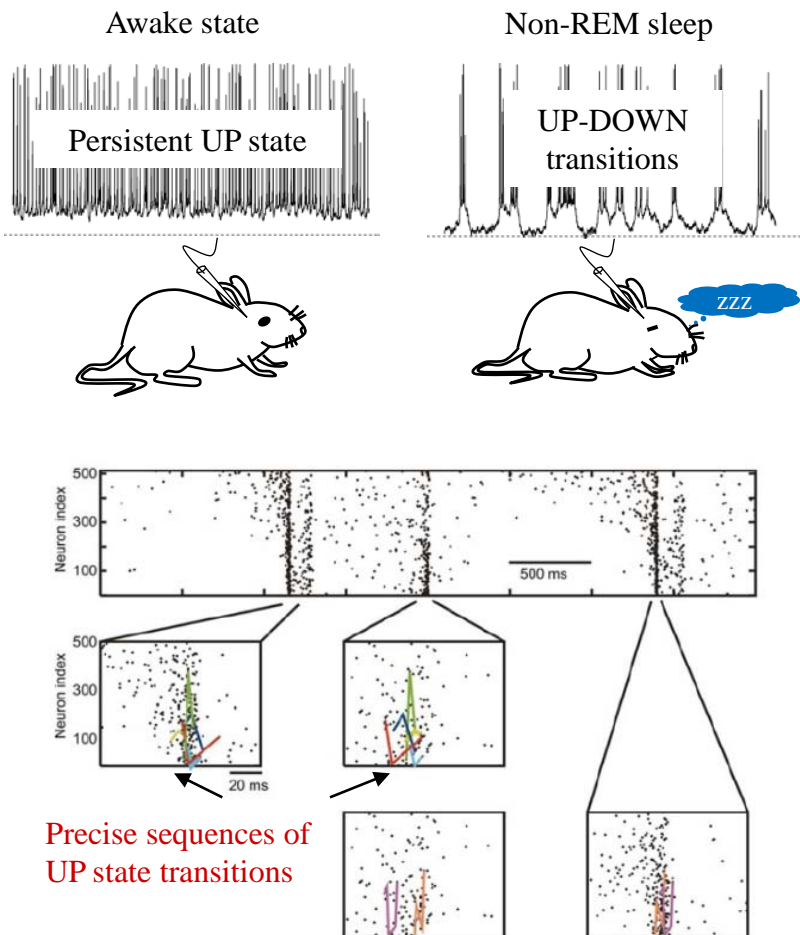


Integrated Approach to the Neural Circuit in Brain

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Illustration



Kang et al., 2008, *PLoS Compt Biol*

Content:

The goal of our laboratory is to understand mysterious brain, especially dynamics of neural circuit through the theoretical approaches such as mathematics, numerical simulation and neural data analysis based on the collaborations with neurophysiologists.

Recent topics are:

- [1] Spontaneous UP-DOWN transition in cortical network
 - We revealed mechanisms of the generation of two-state transitions, related to the memory consolidation during the non-REM sleep, and precise sequences of them. (Kang et al., 2008, *PLoS Compt Biol*)
- [2] Ocular dominance plasticity of visual cortex during development
 - We showed how the sensory experience in critical period significantly affects the structural and functional organization of visual cortex at a level of local circuit including inhibitory neurons (Yazaki-Sugiyama et al., 2009, *Nature*)
- [3] Network computation of hippocampus for memory formation
 - We demonstrated the population dynamics of hippocampal network to the combinational external stimuli and reorganization through the multiple plasticity rules (Kimura et al., 2011, *J Neurosci*)

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