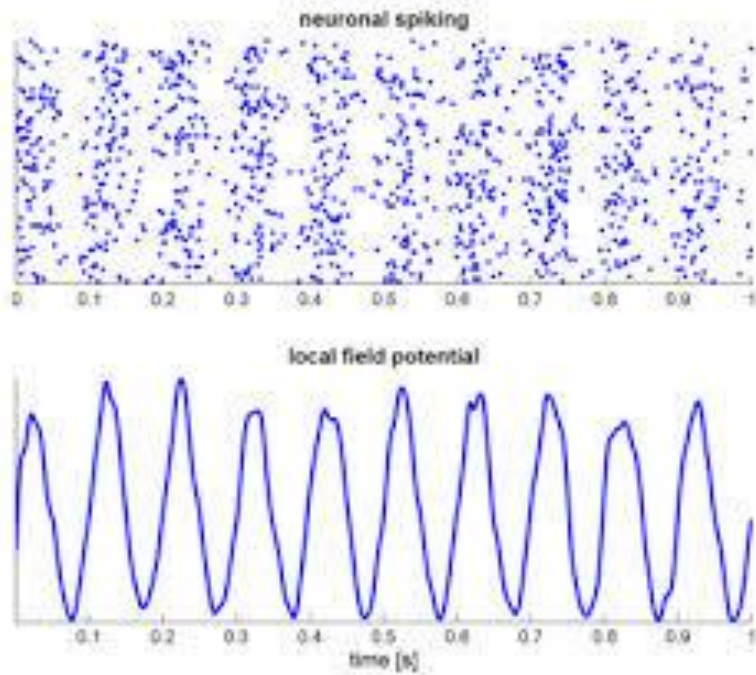


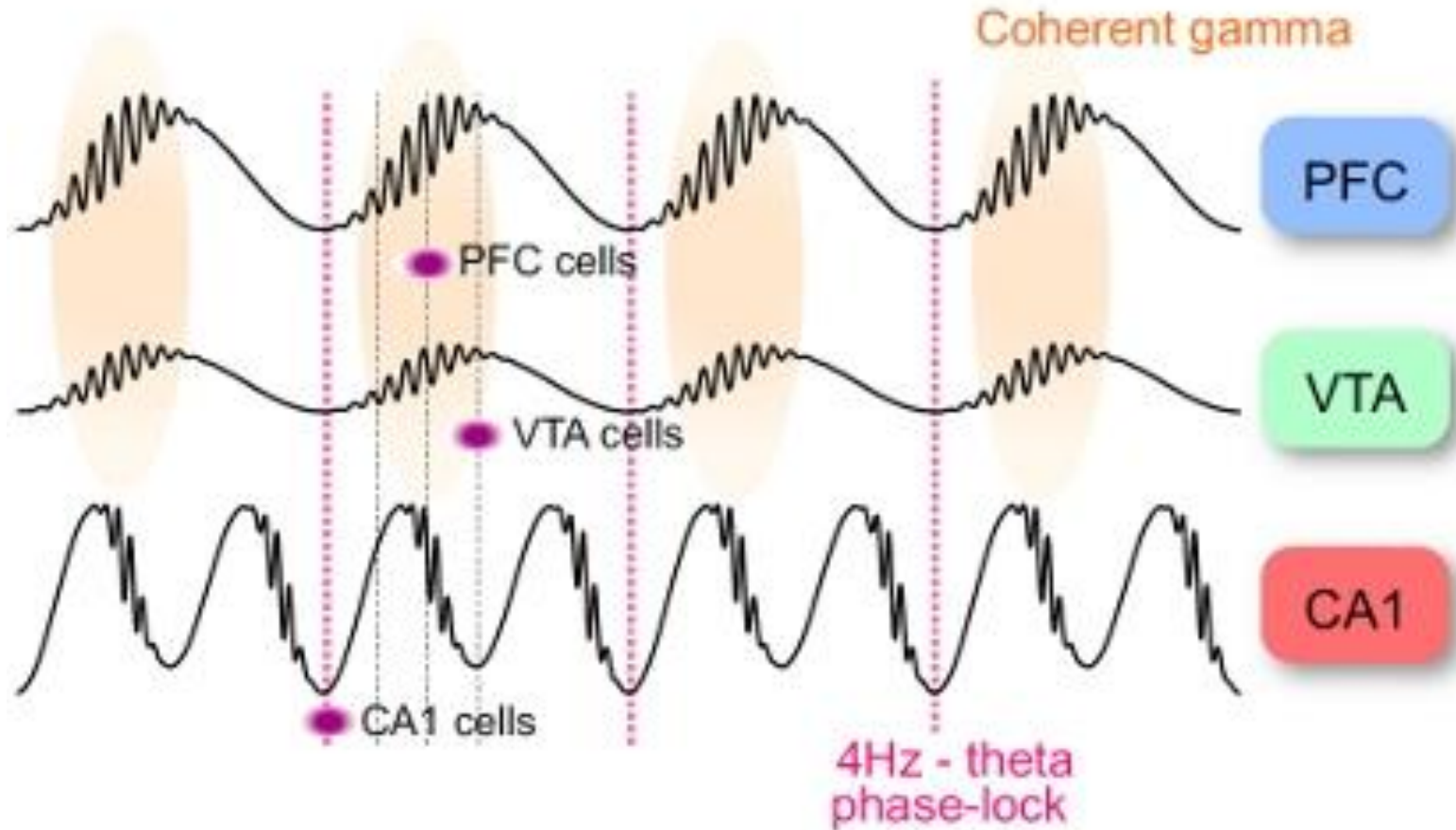
# **Cross-Frequency Phase–Phase Coupling between Theta and Gamma Oscillations**

Jaeseung Jeong, Ph.D

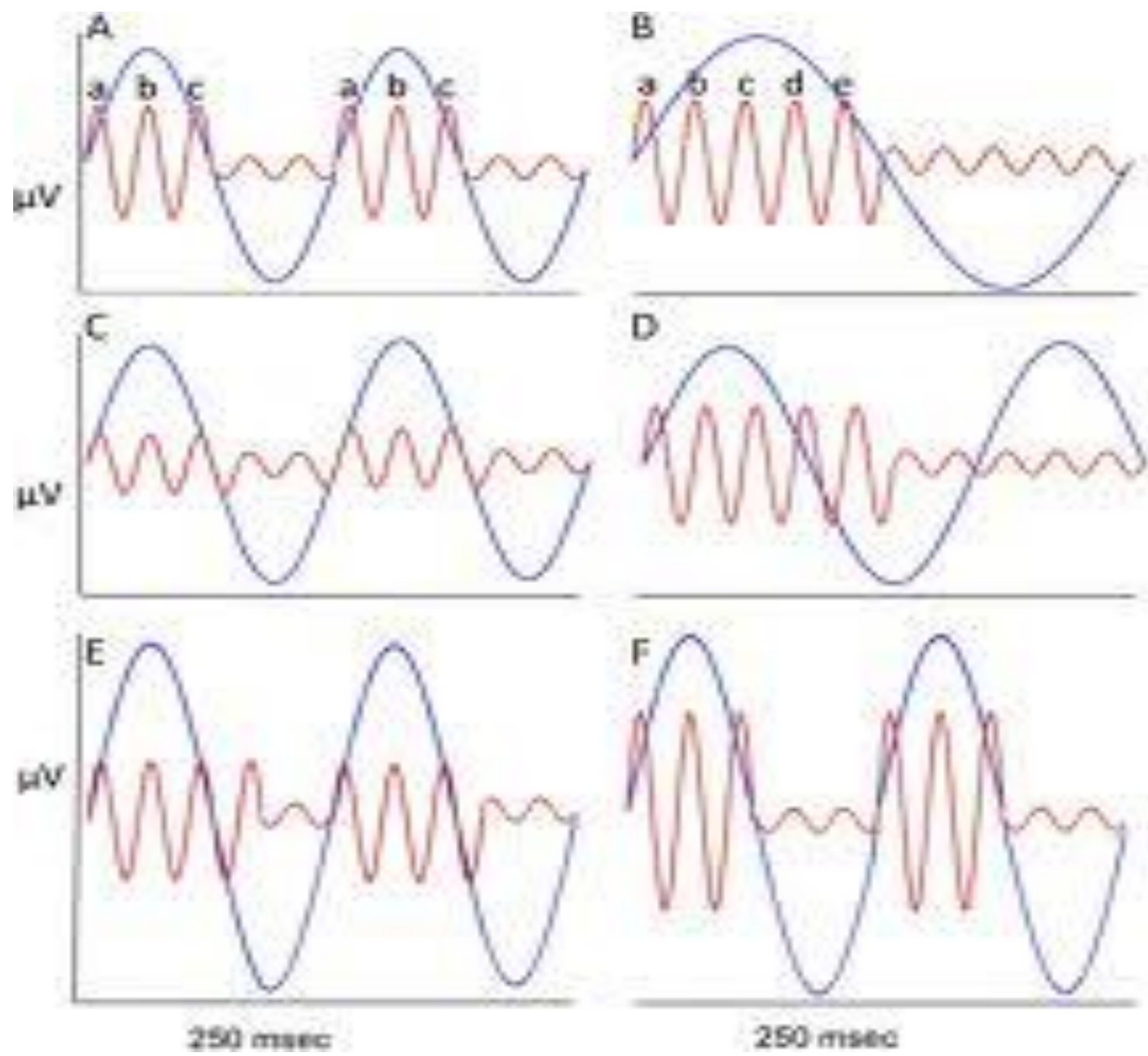
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KAIST

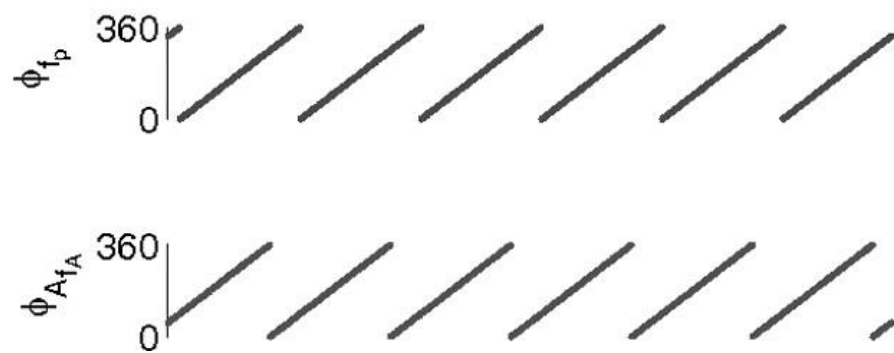
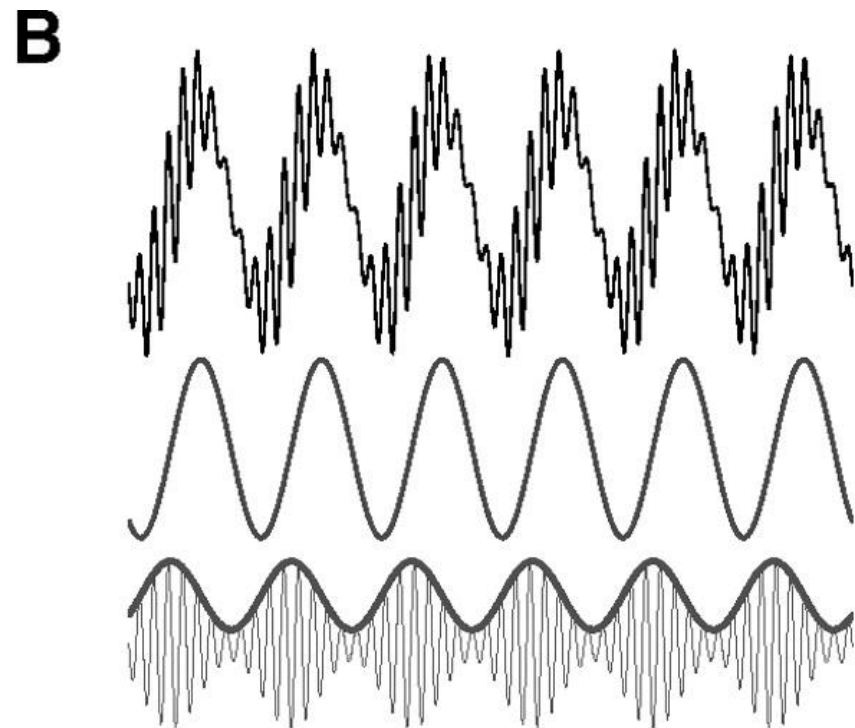
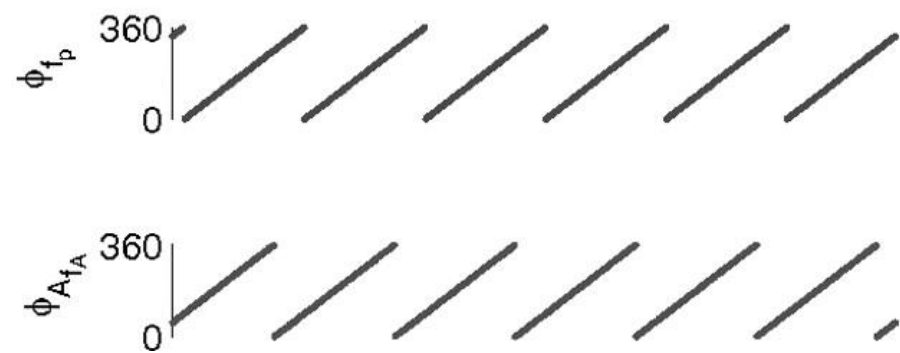
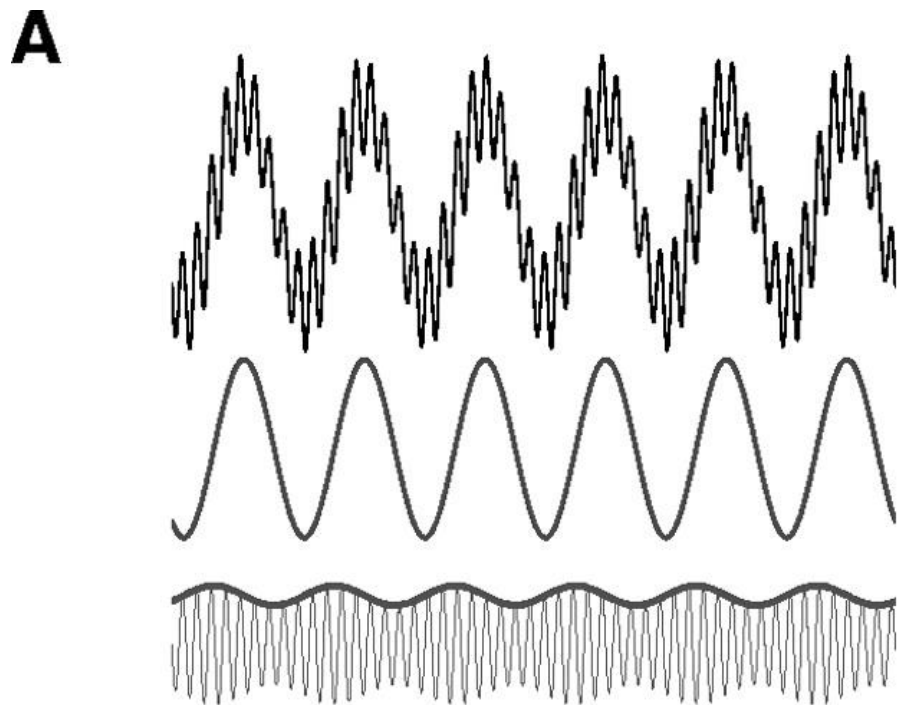


- Neuronal oscillations allow for temporal segmentation of neuronal spikes. Interdependent oscillators can integrate multiple layers of information.
- Neuronal oscillations are a natural mechanism for forming cell assemblies since most brain oscillations are inhibition based, and inhibition can segregate spike train messages.
- The cerebral cortex generates multitudes of oscillations at different frequencies, but how the various rhythms interact with each other is not well understood.



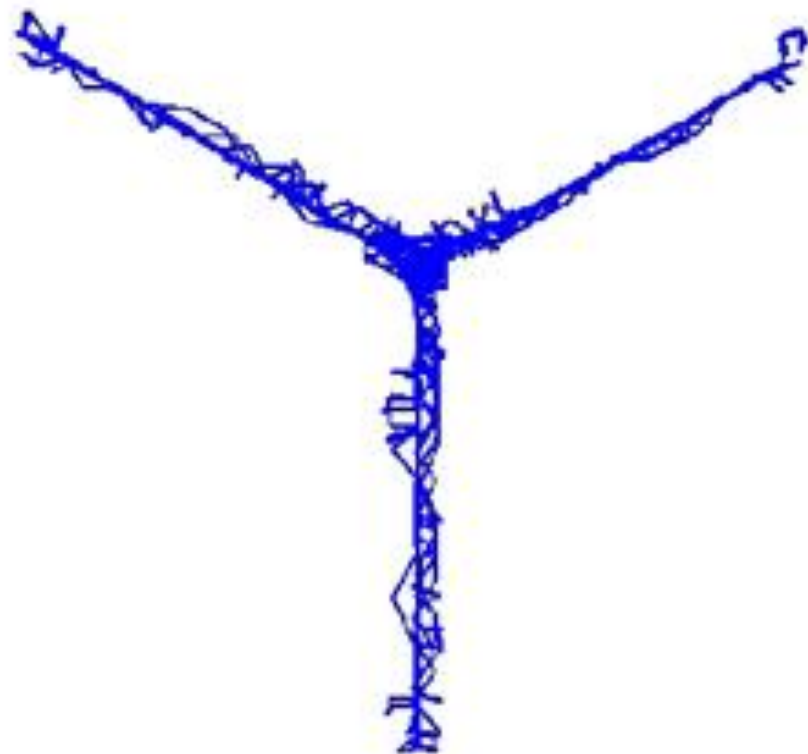
- A well-studied mechanism is cross-frequency coupling. As described first in the hippocampus, the phase of theta oscillations biases the amplitude of the gamma waves [phase–amplitude (P–A) coupling or “nested” oscillations].

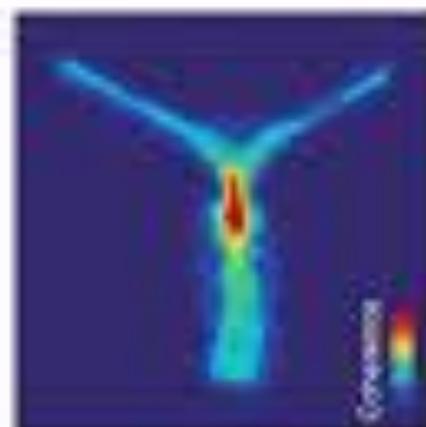
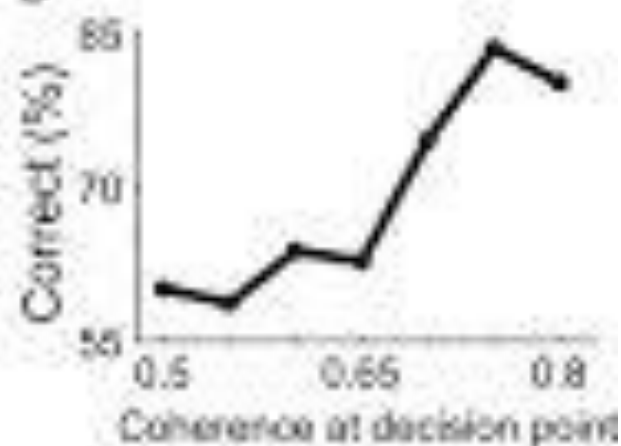
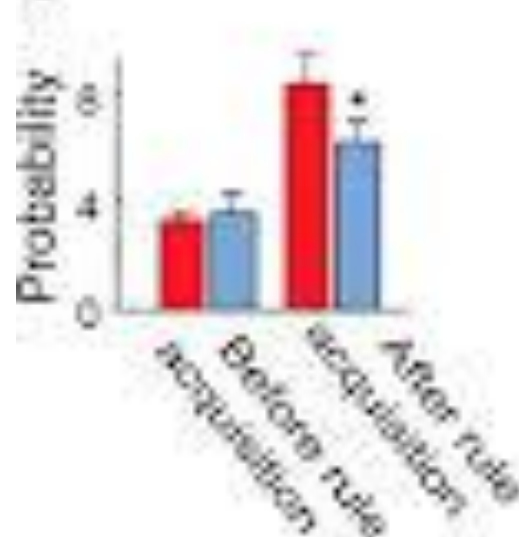
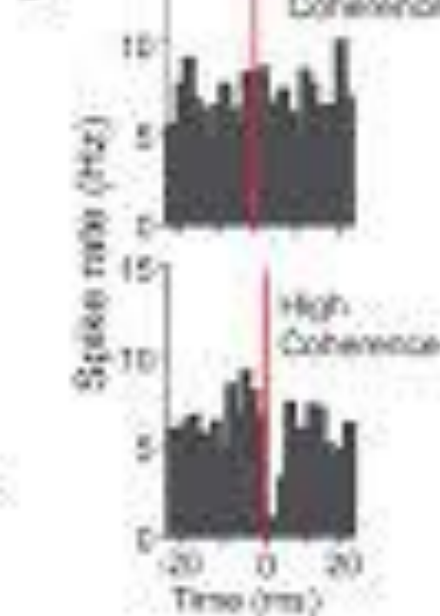




What is the role for theta-gamma coupling?

## Y Maze Activity: Test for Spontaneous Alternation



**A****B****C****D****E**