World Wide NeuRise

Talks by rising stars of neuroscience

Phase precession in the human hippocampus and entorhinal cortex
Salman Qasim - Gu Lab
(Icahn School of Medicine at Mount Sinai)

Knowing where we are, where we have been, and where we are going is critical to many behaviors, including navigation and memory. One potential neuronal mechanism underlying this ability is phase precession, in which spatially tuned neurons represent sequences of positions by activating at progressively earlier phases of local network theta oscillations. Based on studies in rodents, researchers have hypothesized that phase precession may be a general neural pattern for representing sequential events for learning and memory. By recording human single-neuron activity during spatial navigation, we show that spatially tuned neurons in the human hippocampus and entorhinal cortex exhibit phase precession. Furthermore, beyond the neural representation of locations, we show evidence for phase precession related to specific goal states. Our findings thus extend theta phase precession to humans and suggest that this phenomenon has a broad functional role for the neural representation of both spatial and non-spatial information.

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