INSTITUTO CAJAL

SEMINARIO PRESENCIAL

Viernes, 2 de Febrero de 2024
12:30 h. Instituto Cajal - CSIC

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MINUTE-SCALE PERIODIC SEQUENCES IN MEDIAL ENTORHINAL CORTEX

Abstract

The medial entorhinal cortex (MEC), crucial for spatial navigation and episodic memory, exhibits organized neural activity across extended durations. While spatial location is encoded by various cell types in MEC, the temporal coordination of entorhinal cell activity remains unclear. I will show findings that reveal minute-scale oscillations in MEC, entraining the entire cell population with periods of 10 to 100 seconds. During these ultraslow oscillations, neural activity progresses in periodic, stereotyped sequences. This phenomenon occurs as mice freely run on a wheel in darkness, unaffected by changes in location, running direction, or scheduled rewards. I will discuss how this ultraslow may serve as a mechanism for coupling neurons and circuits over extended time scales, acting as a scaffold for behavioral processes such as navigation and episodic memory formation.

Affiliation and short bio

Soledad Gonzalo Cogno is a group leader at the Kavli Institute for Systems Neuroscience (NTNU), where she leads the Neural Dynamics and Computation lab. Her group seeks to understand how the activity of individual neurons is coordinated at the neural network level, and how this coordination underlies cognition and behaviour. To address this goal, they combine computational modeling and methods for analysing high-dimensional data sets with state-of-the-art methods for recording large neuronal populations.

Related publications with the topic

Gonzalo Cogno S, Schreiber S, Samengo I. Dynamics and reliability of bistable neurons driven with time-dependent stimuli. Neural Comput (IF: 2.03; Q4). 2014 Dec;26(12):2798-826.

Nagelhus A, Andersson SO, Cogno SG, Moser EI, Moser MB. Object-centered population coding in CA1 of the hippocampus. Neuron (IF: 17.17; Q1). 2023 Jul 5;111(13):2091-2104.e14

Gonzalo Cogno, S; Horst A. Obenhaus, R. Irene Jacobsen, Flavio Donato, May-Britt Moser, Edvard I. Moser. Minute-scale oscillatory sequences in medial entorhinal cortex. Biorxiv. https://doi.org/10.1101/2022.05.02.490273

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