INSTITUTO CAJAL

SEMINARIO PRESENCIAL

Viernes, 28 de Abril de 2023
12:30 h. Instituto Cajal (CSIC) Madrid

DRA. MARTA NAVARRETE LLINÁS

Instituto Cajal - CSIC

UNLOCKING THE KEY TO MOTIVATION: DISCOVERING THE POWER OF ACTIVATED ASTROCYTE ENSEMBLES IN THE NUCLEUS ACCUMBENS

Abstract

To understand how complex cell circuits process information, it is necessary to use techniques that can precisely target and modulate the activity of the involved elements. Neuro-astrocyte networks are highly complex, and understanding their involvement in circuit modulation and behavior requires state-of-the-art complementary tools. Although most genetic tools have focused on neuronal activity, my talk will introduce newly developed techniques from our laboratory that can dissect active astrocyte circuits with spatio-temporal precision, such as $CaMPARI_{GFAP}$ and Astro-Light. Additionally, I will present our recent data on mapping the functional astrocytic circuitries in the Nucleus Accumbens (NAc), which reveal the existence of specific astrocyte circuits in this region. Finally, we will show that activating the astrocyte ensemble related to a specific reward can shift behavior towards that option through optogenetic stimulation. Overall, the cutting-edge data I will present supports the idea that NAc astrocytic networks play a critical role in integrating information.

Affiliation and short bio

Marta Navarrete is a chemist who holds a degree in Chemistry-Physics from Extremadura University. She then moved to the Cajal Institute, CSIC, Madrid to pursue her PhD in Neuroscience and received her PhD in 2009 from UAM, Madrid. She completed her postdoctoral research at the CBMSO before establishing her independent laboratory in 2018 at the Cajal Institute, under a Ramon y Cajal contract. Currently, she leads the Synaptic Plasticity and Astrocyte-Neuron Iterations lab at the Cajal Institute as Científico Titular. Her research focuses on the impact of neuron-glia interactions on complex cognitive functions with the ultimate goal of understanding how astrocytes contribute to animal behavior and how their dysfunction may lead to brain disorders. To achieve this, her group uses cutting-edge techniques such as optogenetics, chemogenetics, multiphoton microscopy, fiber photometry, combined calcium imaging, and multiple electrophysiological recordings, both *in vivo* and *ex vivo*, as well as in transgenic and experimental animal models.

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Related publications with the topic

Serra I, Esparza J, Delgado L, Martin-Monteagudo C, Puigròs M, Podlesniy P, Trullás R, Navarrete M&. (2022) Ca2+-modulated Photoactivatable Imaging Reveals Neuron-Astrocyte Glutamatergic Circuitries within the Nucleus Accumbens. **Nature Communications.** doi: 10.1038/s41467-022-33020-6

Durkee C, Kofuji P, Navarrete M&, Araque A. 2021 Astrocyte and neuron cooperation in long-term depression. **Trends in Neurosci**. doi: 10.1016/j.tins.2021.07.004

Domingo-Rodriguez L, Ruiz de Azua I, Dominguez E, Senabre E, Serra I, Kummer S, Navandar M, Baddenhausen S, Hofmann C, Andero R, Gerber S, Navarrete M, et al (2020) A specific prelimbic-nucleus accumbens pathway controls resilience versus vulnerability to develop food addiction. **Nature Communications**. 11, 782 doi: 10.1038/s41467-020-14458-y

Navarrete M&, Cuartero MI, Palenzuela R, Draffin J, Konomi A, Serra I, Colié S, Castaño-Castaño S, Hasan MT, Nebreda AR, Esteban JA&. 2019 Astrocytic p38α MAPK drives NMDA receptor-dependent long-term depression and modulates long-term memory. **Nature Communications**. 10:2968

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