



SEMINARIO PRESENCIAL

Viernes, 21 de Marzo de 2025
12:30 h. Instituto Cajal - CSIC

Dr. João Peça

Center for Neuroscience and Cell Biology, University of Coimbra

FROM GENES TO ENVIRONMENT: A NEUROIMMUNE LINK BETWEEN ALLERGIC DISEASES, ADHD AND THE DEVELOPING CEREBELLUM

Abstract

The crosstalk between the nervous and immune system is bidirectional, highly regulated, and crucial for an animal's survival. In the brain, microglia play a role as mediators in this relationship and assist in extensive neuronal circuit remodelling, while responding to cytokines and other cues from the immune system. However, we have limited knowledge on how different epochs of development involve coordinated neuroimmune responses. In this talk, I will present recent data showing that IL-4 (a Th2 cytokine), delineates a critical period needed for microglia to extensively prune cerebellar neurons. Perturbing this system leads to defective pruning, permanent increase in cerebellar granule cells, as well as circuit and behavioural alterations. I will also present unpublished data, where we are studying the role of Th2 immunity in brain physiology and the mechanisms that links well-established comorbidities between allergic disease and neurodevelopmental disorders.

Affiliation and short bio

João Peça is Tenured Assistant Professor at the University of Coimbra and Group Leader at the Center for Neuroscience and Cell Biology (CNC-UC). João completed his Ph.D. research at Duke University, where he pioneered the field of optogenetics and specialized in mouse molecular genetics. He then performed postdoctoral research at MIT researching the role for cortico-striatal dysfunction in autism spectrum disorders. His current research interest centres on using advanced models to understand how genetic and environmental risk factors translate to neuronal circuit alterations in neuropsychiatric disorders. His work has led to primary research papers in high-impact journals, including Nature, Nature Communications, Molecular Psychiatry, PNAS, and Neuron. João Peça was an FCT Investigator (2013-2018), won a Marie Curie Career Integration Grant (2014) and was a NARSAD Young Investigator (2014–2016). In 2018 he became Group Leader at CNC-UC, in 2019 won the "Pfizer Prize in Basic Research", in 2022 he was awarded a "Special Recognition in Science" by the World Cultural Council.

João Peça is a member of the Board of Directors of CNC-UC, he is Treasurer of the Portuguese Society for Neuroscience, and a member of the Board of Education for "Neurasmus: the European Masters in Neuroscience.

Instituto Cajal. CSIC

Avda. Doctor Arce, 37. 28002. Madrid. Tel. 91 585 4750

Related publications with the topic

Guedes, J. R., Ferreira, P. A., Costa, J., Laranjo, M., Pinto, M. J., Reis, T., Cardoso, A. M., Lebre, C., Casquinha, M., Gomes, M., Shkatova, V., Pereira, M., Beltrão, N., Hanuscheck, N., Greenhalgh, A. D., Vogelaar, C. F., Carvalho, A. L., Zipp, F., Cardoso, A. L., & Peça, J. (2023). IL-4 shapes microglia-dependent pruning of the cerebellum during postnatal development. *Neuron*

Ferreira, P. A., Lebre, C., Costa, J., Amaral, F., Ferreira, R., Martinho, F., Paiva, V. H., Cardoso, A. L., Peça, J.*, & Guedes, J. R.* (2025). Early-life IL-4 administration induces long-term changes in microglia in the cerebellum and prefrontal cortex. *Journal of neurochemistry*

Guedes, J. R., Ferreira, P. A., Costa, J. M., Cardoso, A. L., & Peça, J. (2022). Microglia-dependent remodeling of neuronal circuits. *Journal of neurochemistry*