INSTITUTO CAJAL

SEMINARIO PRESENCIAL

Viernes, 15 de Diciembre de 2023
12:30 h. Instituto Cajal - CSIC

DR. MARIO MARTÍN-FERNÁNDEZ

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GENERAL AND SPECIFIC DANGER REPRESENTATIONS AMONG PREFRONTAL NEURONAL POPULATIONS

Abstract

Detecting the presence of danger is essential for animal survival, but it is also crucial to discriminate among different threats in order to select the most adaptive response in each situation. These processes require neuronal populations encoding general information about the presence of danger and mechanisms allowing the discrimination of the identity of specific threats. We used a combination of electrophysiological recordings, calcium imaging, neuronal decoding approaches and optogenetic manipulations in a novel behavioral paradigm allowing the simultaneous evaluation of distinct defensive behaviors in response to different threatening situations. Our results indicate that the dorsomedial prefrontal cortex (dmPFC) encodes a general representation of fear elicited by all threatening conditions while simultaneously encoding a specific neuronal representation of each threatening situation.

Affiliation and short bio

CURRENT POSITION:
Post-doctoral researcher, at the Laboratory of Dr. Cyril Herry, Neurocentre Magendie - U1215, Bordeaux.
Employer: INSERM.
ACADEMIC DEGREES:
PhD degree in Neuroscience, Universidad Autonoma de Madrid, 2018
RESEARCH ACTIVITY:
June 2018 – Present: Post-doctoral researcher at Neurocentre Magendie (France) with Cyril Herry.
January 2014 – May 2018: PhD Student at Universidad Autonoma de Madrid (Spain), working at the University of Minnesota (USA) with Alfonso Araque.
October 2012 - September 2013: Master student at Cajal Institute (Spain) with Alfonso Araque.
September 2009 - July 2012: Undergraduate student at Universidad de Granada (Spain)

Related publications with the topic

Menegolla A.P., Lopez-Fernandez, G., Girard, D., Herry, C. *, Martin-Fernandez, M*. Differential shaping of danger representations by distinct inhibitory neuronal populations in the prefrontal cortex. In preparation. *Corresponding authors

Martin-Fernandez, M.*, Menegolla A.P., Lopez-Fernandez, G., Winke, N., Jercog, D., Kim, H., Girard, D., Dejean, C., Herry, C. * (2023). Prefrontal circuits encode general danger and specific threat representations. Nature Neuroscience. doi:10.1038/s41593-023-01472-8. *Corresponding authors.

Jercog, D., Winke, N., Sung, K., Martin Fernandez, M., Francioni, C., Rajot, D., Courtin, J., Chaudun, F., Jercog, P.E., Valerio, P., Herry, C. (2021) Dynamical prefrontal population coding during defensive behaviours. Nature. doi.org/10.1038/s41586-021-03726-6.

Martin-Fernandez, M., Jamison, S., Robin, L.M., Zhao, Z., Martin, E.D., Aguilar, J., Benneyworth, M.A., Marsicano, G., Araque, A. (2017). Synapse-specific astrocyte gating of amygdala-related behavior. Nature Neuroscience. doi: 10.1038/nn.4649

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