

Sara Mederos, Ph.D.
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2025 Finalist: Sara Mederos, Ph.D.

Sara Mederos obtained her PhD at the Cajal Institute (CSIC, Madrid), where she pioneered new approaches to study astrocyte-neuron communication and demonstrated the role of astrocytes in goal-directed behavior. She was awarded the FENS Young Investigator Prize 2022 for this work.

In 2020 she joined the Sainsbury Wellcome Centre at University College London as a postdoctoral researcher in Sonja Hofer's lab, where she focused on the mechanisms underlying learned suppression of instinctive fear. She is now a Wellcome Early Career Fellow, studying how cortical and subcortical circuits shape adaptive behavior.

In January 2026, she will establish her independent lab

Essay: "Fear protects. Until it doesn't"

Sara Mederos' research seeks to understand how flexible behaviors emerge from brain circuits, with a recent focus on how the brain adapts instinctive responses through experience. In her work she uncovered the circuit and synaptic mechanisms that allow animals to suppress instinctive fear when repeated experience shows a stimulus is harmless. She identified a corticofugal pathway from higher visual areas to the ventrolateral geniculate nucleus (vLGN), an inhibitory nucleus in the prethalamus, that instructs this form of learning. While cortical activity is essential during learning, the vLGN becomes the site where the learning is stored. Recordings in mice revealed that vLGN neurons receiving cortical input increase their activity after learning, suppressing defensive escapes. This change is driven by endocannabinoid-mediated long-term depression of inhibitory synapses, providing in vivo evidence for this form of plasticity in the vLGN. Sara's findings reveal a mechanism by which the brain can overwrite innate responses with experience. This discovery opens new avenues on how subcortical networks contribute to behavioral flexibility and how their disruption may underlie maladaptive fear.