



SEMINARIO PRESENCIAL

Lunes, 12 de Julio de 2024
12:30 h. Instituto Cajal - CSIC

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NEURONAL MECHANISMS FOR SENSORIMOTOR FLEXIBILITY IN DROSOPHILA

Abstract

A core feature of the nervous system is its ability to process information in a flexible, context-dependent way. For example, hunger increases the sensitivity for food odors, shifts taste preferences, and increases locomotor activity. These changes enable animals to find food - and thus ensure survival. Despite their ubiquitous importance, the neuronal mechanisms enabling such context-dependent sensorimotor flexibility are not well understood. My lab aims to shed light on these mechanisms by combining neurogenetics, connectomics, and recordings from sensorimotor pathways in behaving *Drosophila*.

Here, I will focus on two key aspects of sensorimotor flexibility. First, I will talk about sensorimotor pathways controlling flexible, adaptive locomotion. Second, I will discuss our efforts to develop a better understanding of neuromodulation in conferring flexibility to sensorimotor pathways. In particular, I will highlight the role of insulin as a neuromodulator and the neuronal control of insulin release.

Affiliation and short bio

Dr. Jan M. Ache is heading the Emmy Noether group 'Sensorimotor Flexibility' at the Biocenter of the University of Würzburg, Germany. Jan hails from Dortmund, Germany, and studied Biology and Neuroscience at the University of Cologne. For his Master's thesis, he worked on insect leg biomechanics at the University of Leicester, UK, in the lab of Dr. Tom Matheson. Subsequently, he joined the Department of Biological Cybernetics, headed by Prof. Volker Dürr, to study the descending control of adaptive locomotion in stick insects during his PhD at Bielefeld University. He graduated with Summa cum laude in 2015. For his postdoc, Jan joined Dr. Gwyneth Card's lab at the Janelia Research Campus, USA, where he investigated how behavioral flexibility is implemented in descending sensorimotor pathways in the *Drosophila* CNS. After finishing his postdoc in 2019, Jan accepted a junior group leader position at the University of Würzburg, where he established an independent research group at the Chair of Neurobiology and Genetics. In 2020, Jan was awarded an Emmy Noether Fellowship from the German Research Foundation, which allowed him to significantly expand his research portfolio. Jan is also a Co-PI on the NeuroNex project 'Communication, Coordination, and Control in Neuromechanical Systems'.

Related publications with the topic

Bisen, RS, Iqbal, F, Cascino-Milani, F, Bockemühl, T, and Ache, JM (2024): 'Nutritional state-dependent modulation of Insulin Producing Cells in Drosophila', eLife 13:RP98514 (V1) <https://doi.org/10.7554/eLife.98514.1>

Liessem, S, Held, M, Bisen, RS, Haberkern, H, Lacin, H, Bockemühl, T, and Ache, JM (2023): 'Behavioral state-dependent modulation of insulin-producing cells in Drosophila', Current Biology 33 (3) 449 - 463 ^[L]_[SEP]

Ache, JM, Namiki, S, Lee, A, Branson, K, and Card, G (2019): 'State-dependent decoupling of sensory and motor circuits underlies behavioral flexibility in Drosophila', Nature Neuroscience 22 (7), 1132–1139

Ache, JM, Polsky, J, Alghailani, S, Parekh, R, Breads, P, Peek, M, Bock, D, von Reyn, C and Card, GM (2019): 'Neural basis for looming size and velocity encoding in the Drosophila Giant Fiber escape pathway', Current Biology 29 (6), 1073-1081