INSTITUTO CAJAL

SEMINARIO PRESENCIAL

Viernes, 22 de Noviembre de 2024
12:30 h. Instituto Cajal - CSIC

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Achucarro Basque Center for Neuroscience

GLIAL CONTROL OF LOCAL TRANSLATION IN NEURONS

Abstract

The neuronal soma is considered the primary origin of axonal, dendritic and synaptic RNAs and local translation is thought to be mainly controlled by the neuron itself. However, increasing hypotheses suggest that surrounding glia might provide an additional layer of translational control in neurons. Several evidence indicate the existence of active horizontal RNA and even ribosome transfer from Schwann cells to regenerating peripheral nerves. These and other bioactive molecules are likely delivered within extracellular vesicles (EVs). Our lab is interested in deciphering the contribution of astroglia-derived EVs local translation in neurons of the central nervous system in the context of neurodegenerative diseases. The study of this novel aspect of glia-neuron communication might open new venues for therapies for Alzheimer's disease and related disorders.

Affiliation and short bio

Dr. Baleriola got her PhD in 2008 after conducting her research at the Center for Biological Research Margarita Salas (CIB-CSIC, Madrid). To further her career in neuroscience research Dr. Baleriola joined the laboratory of Dr. Ulrich Hengst at the Taub Institute for Research on Alzheimer's Disease and the Aging Brain, Columbia University (New York, USA) in 2010. Her research projects aimed to unravel a possible role for intra-axonal protein synthesis in amyloid pathology, a central feature of AD. When she joined the Taub Institute there was no pre-existing evidence that local translation in axons could play a role in the adult central nervous system (CNS) in the context of neurodegenerative diseases. She defined a novel unexpected molecular pathway that mediates axon-to-soma spread of amyloid pathology that requires local mRNA translation in axons. After her postdoctoral work, Dr. Baleriola joined Achucarro Basque Center for Neuroscience in 2016 as an Ikerbasque Research Fellow and she was appointed Ikerbasque Associate (permanent position) in 2021. One of her current research lines aims at defining the contribution of glia to intra-axonal protein synthesis in Alzheimer´s Disease.

Related publications with the topic

- Cláudio Gouveia Roque, Kyung Min Chung, Ethan P. McCurdy, Radhika Jagannathan, Lisa K. Randolph, Krystal Herline-Killian, Jimena Baleriola and Ulrich Hengst. “CREB3L2–ATF4 heterodimerization defines a transcriptional hub of Alzheimer’s disease gene expression linked to neuropathology”. Science Advances. 2023 Mar 3;9(9):eadd2671. doi: 10.1126/sciadv.add2671

- María Gamarra, Maite Blanco-Urrejola, Andreia FR Batista, Josune Imaz and Jimena Baleriola. “Object-based analyses in FIJI/ImageJ to measure local RNA translation sites in neurites in response to Aβ1-42 oligomers”. Frontiers in Neuroscience. 2020 Jun 3;14:547. doi: 10.3389/fnins.2020.00547.

- Chandler A Walker, Lisa K Randolph, Carlos Matute, Elena Alberdi, Jimena Baleriola and Ulrich Hengst. “Aβ1–42 triggers the generation of a retrograde signaling complex from sentinel mRNAs in axons”. EMBO Reports 2018 Jul;19(7). pii: e45435. doi: 10.15252/embr.201745435.

- Jimena Baleriola, Chandler A. Walker, Ying Y. Jean, John F. Crary, Carol M. Troy, Peter L. Nagy and Ulrich Hegst. “Axonally synthesized ATF4 transmits a neurodegenerative signal across brain regions”. Cell. 2014 Aug 28;158(5):1159-72. doi: 10.1016/j.cell.2014.07.001.

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