Speaker name:
Rafael Rodriquez Puertas, PhD

Institution affiliation:

Researcher Doctor Permanent. Accredited Full Research Professor

Photograph of the speaker

Title of the seminar:

Neurolipid-based therapies for dementia of the Alzheimer's type and development of Imaging cellular brain lipotypes by mass spectrometry

Brief summary of the seminar:

Our studies are analysing the signalling by neurolipids in Alzheimer's type dementia for the development of new therapeutic strategies. The study identifies the cellular lipid specialization in the brain of the lipotypic profiles for neurons, astrocytes, oligodendrocytes, microglia, and choroid plexus, using mass spectrometry imaging (MSI) on purified cell cultures from rat brain. Next, we imaged with MSI different brain regions from rats, mice and human samples, collecting anatomically detailed maps of spectral lipidic profiles. Finally, we quantified in each anatomical map the presence of each cell type using its own spectral lipidic signature (lipotype). Our computational approach represents a novel methodology to study the anatomical distribution of cell lipotypes and its regulation in brain circuits without any labelling. Furthermore, we applied this method to both healthy and lesion-induced brain tissues, demonstrating its potential to track lipid changes in pathological conditions.

Brief summary of the CV (max. 200 words):

Dr. R. Rodríguez Puertas from the Department of Pharmacology at the University of the Basque Country (UPV/EHU) returned in late 1997 from a three-year postdoctoral stay at the Karolinska Institute (Stockholm). In 2001, he obtained a Ramón y Cajal position in the program's first call. In

2011, he secured one of the first Permanent Research Professor positions at the University of the Basque Country through a competitive process and is accredited as a Full Research Professor.

He has made significant scientific contributions to the study of neurochemistry in Alzheimer's disease (AD) since his doctoral work (University of Cantabria, 1995). His research has been published in over 70 scientific papers. He has served as the principal investigator (PI) of research projects since founding the Neurochemistry and Neurodegeneration Group in 2003. His notable studies focus on neurotransmission alterations in AD patients and animal models and modulation by neurolipid system, pioneering in develop and application of mass spectrometry imaging (MSI) technology in neuropharmacology.

PI of two patents currently being exploited by IMGPharma, a NEBT (New Technology-Based Company) arising from his group.

Promising recent results with new patented treatments in animal models position the research group for impactful outcomes.

ehu.es/alzheimer

https://research.science.eus/grupos/16857/detalle

Related recent publications with the topic

- Moreno-Rodríguez M, Bengoetxea de Tena I, Martínez-Gardeazabal J, Pereira-Castelo G, Llorente-Ovejero A, Manuel I, Rodríguez-Puertas R. Cannabinoid agonist WIN55,212-2 prevents scopolamine-induced impairment of spatial memory in rats. Eur J Pharmacol. 2025. 998: 177612. https://doi.org/10.1016/j.ejphar.2025.177612

- Cell lipotypes localization in brain by mass spectrometry imaging. Jonatan Martínez-Gardeazabal, Marta Moreno-Rodríguez, Alberto Llorente-Ovejero, Estibaliz González de San Román, Laura Lombardero, Iker Bengoetxea de Tena, Juan Sustacha, Carlos Matute, Iván Manuel, Paolo Bonifazi, Rafael Rodríguez-Puertas. bioRxiv. 2024. 02.02.578599. https://doi.org/10.1101/2024.02.02.578599

- Moreno-Rodríguez M, Martínez-Gardeazabal J, Bengoetxea de Tena I, Llorente-Ovejero A, Lombardero L, González de San Román E, Giménez-Llort L, Manuel I, Rodríguez-Puertas R (AC). Cognitive improvement via cortical cannabinoid receptors and choline-containing lipids. Br J Pharmacol. 2025. 182(4):1038-1058. https://doi.org/10.1111/bph.17381

- Martínez-Gardeazabal J, Pereira-Castelo G, Moreno-Rodríguez M, Llorente-Ovejero A, Fernández M, Fernández-Vega I, Manuel I, Rodríguez-Puertas R. 2024. Sphingosine 1-phosphate receptor subtype 1 (S1P1) activity in the course of Alzheimer's disease. Neurobiol Dis. 2024. 202:106713. https://doi.org/10.1016/j.nbd.2024.106713

- Moreno-Rodriguez M, Perez SE, Martinez-Gardeazabal J, Manuel I, Malek-Ahmadi M, Rodriguez-Puertas R (AC), Mufson EJ. Frontal Cortex Lipid Alterations During the Onset of Alzheimer's Disease. J Alzheimers Dis. 2024;98(4):1515-1532. https://doi.org/10.3233/JAD-231485