



SEMINARIO PRESENCIAL

Viernes, 19 de Mayo de 2023

12:30 h. Instituto Cajal (CSIC) Madrid

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CELLULAR AND SUB-CELLULAR TARGETS OF CANNABINOIDS IN THE BASAL GANGLIA: FROM SIGNALLING TO BEHAVIOUR AND BEYOND.

Abstract

During the past 15 years my research has focused on the role of the ECS and in particular the CB1 receptor in the regulation of several physiological and behavioral outcomes. A high degree of heterogeneity exists for CB1 mediated actions in different neuronal circuits in response to endogenous and exogenous ligands, which support the idea that selective CB1 signaling might be specific to brain region/cell population/subcellular compartment involved. I focus my attention on the basal ganglia, which represent the most abundant brain CB1 receptor pools. I contributed to show that CB1 activation can modulate several cellular processes which goes beyond regulation of neurotransmitter release. These include several intracellular signaling pathways involved in maintaining cellular homeostasis, e.g. kinases pathways, autophagy, neurosteroids, bioenergetics and many more processes. Moreover, we found that, based on the specific brain regions/cell types/subcellular compartments involved, CB1 signaling orchestrates many neurophysiological readouts that eventually lead to behavioral alterations, ranging from feeding to motor, cognitive and pain related processes. These processes are well known targets of cannabinoid-based medicine, as well as side effects often associated with recreational use of this drug, two phenomena that are exponentially rising worldwide.

Affiliation and short bio

Luigi Bellocchio obtained a faculty position (CRCN) at NeuroCentre Magendie in 2017. Since his PhD studies in the lab of Giovanni Marsicano, he has been focusing his research on the role of the endocannabinoid system in the regulation of energy balance in the brain, acquiring a complete technical expertise in the use of transgenic mouse models combined with pharmacological approaches in order to study physiological processes involving the endocannabinoid system. With his post-doctoral studies, he went deeper into cellular mechanisms underlying the activity of G-protein signalling (with particular emphasis on CB1 receptor) in order to understand how this receptor can exert different functions according to the cellular population (and the subcellular compartment) involved. Since 2012, in Manuel Guzman's lab at Complutense University of Madrid, he acquired a strong theoretical background on the role of GPCRs signaling in the regulation of motor and cognitive functions at basal ganglia level, as well as the knowledge and ability to apply genetic (particularly the use of viral vectors), pharmacological and pharmacogenetic tools to dissect it in different behavioural contexts. Re-joining the lab of Giovanni Marsicano in 2014, he used the knowledge acquired to study the role of mitochondrial CB1 signalling in the regulation of mitochondrial activity, and how it can modulate certain brain functions, such as memory. His research interest mainly focus on the link between mitochondrial CB1R and motor regulation at basal ganglia level, integrating his recently acquired knowledge of signalling pathways and mitochondrial processes.

Related publications with the topic

- Soria-Gomez E, Pagano Zottola AC, Mariani Y, Desprez T, Barresi M, Bonilla-Del Río I, Muguruza C, Le Bon-Jego M, Julio-Kalajzić F, Flynn R, Terral G, Fernández-Moncada I, Robin LM, Oliveira da Cruz JF, Corinti S, Amer YO, Goncalves J, Varilh M, Cannich A, Redon B, Zhao Z, Lesté-Lasserre T, Vincent P, Tolentino-Cortes T, Busquets-García A, Puente N, Bains JS, Hebert-Chatelain E, Barreda-Gómez G, Chaoulouff F, Lohman AW, Callado LF, Grandes P, Baufreton J, Marsicano G*, Bellocchio L*. Subcellular specificity of cannabinoid effects in striatonigral circuits. *Neuron*. 2021 May 5;109(9):1513-1526.e11.
- Blázquez C, Ruiz-Calvo A, Bajo-Grañeras R, Baufreton JM, Resel E, Varilh M, Pagano Zottola AC, Mariani Y, Cannich A, Rodríguez-Navarro JA, Marsicano G, Galve-Roperh I, Bellocchio L*, Guzmán M*. Inhibition of striatonigral autophagy as a link between cannabinoid intoxication and impairment of motor coordination. *Elife*. 2020 Aug 10;9:e56811.
- Ruiz-Calvo A, Maroto IB, Bajo-Grañeras R, Chiarlone A, Gaudioso Á, Ferrero JJ, Resel E, Sánchez-Prieto J, Rodríguez-Navarro JA, Marsicano G, Galve-Roperh I, Bellocchio L*, Guzmán M*. Pathway-Specific Control of Striatal Neuron Vulnerability by Corticostriatal Cannabinoid CB1 Receptors. *Cereb Cortex*. 2018 Jan 1;28(1):307-322.
- Hebert-Chatelain E*, Desprez T*, Serrat R*, Bellocchio L*, Soria-Gomez E, Busquets-Garcia A, Pagano Zottola AC, Delamarre A, Cannich A, Vincent P, Varilh M, Robin LM, Terral G, García-Fernández MD, Colavita M, Mazier W, Drago F, Puente N, Reguero L, Elezgarai I, Dupuy JW, Cota D, Lopez-Rodriguez ML, Barreda-Gómez G, Massa F, Grandes P, Bénard G, Marsicano G. A cannabinoid link between mitochondria and memory. *Nature*. 2016 Nov 24;539(7630):555-559.