ABSTRACT

MNS 2022 Dubrovnik, Croatia

- Symposium S19 - Understanding the role of GPCR heteroreceptor complexes and their adaptor proteins in the neuronal networks of the brain in health and mental disorders

On the role of GPCR heteroreceptor complexes neuromodulation of the Claustrum

Dasiel O. Borroto-Escuela[1,2]

[1]*Receptormics and Brain Disorders Lab, Department of Human Physiology, Faculty of Medicine, University of Malaga, Spain. e-mail: dasiel@uma.es*

[1]*Department of Neuroscience, Karolinska Institutet, Stockholm, Sweden. e-mail: dasiel.borroto.escuela@ki.se*

G protein-coupled receptors (GPCRs) modulate the synaptic glutamate and GABA transmission of the claustrum. Our work focused on the transmitter-receptor relationships in the claustral catecholamine system and receptor-receptor interactions between kappa opioid receptors (KOR), dopamine receptor (D1R, D2R and D4R) and SomatostatinR2 (SSTR2) in claustrum. Methods used involved immunohistochemistry and in situ proximity ligation assay (PLA) using confocal microscopy. Double immunolabeling studies on D1R and tyrosine hydroxylase (TH) immunoreactivities (IR) demonstrated that D1R IR existed in almost all claustral and endopiriform nucleus nerve cell bodies, known as glutamate projection neurons, and D2R and D4R IR in large numbers of nerve cell bodies of the claustrum and endopiriform nucleus. However, only a low to moderate density of TH IR nerve terminals was observed in the endopiriform nucleus versus de few scattered TH IR terminals found in the claustrum. These results indicated that dopamine transmission in the rat operated via long distance dopamine volume transmission in the rat claustrum and endopiriform nucleus to modulate claustral-sensory cortical glutamate transmission. Large numbers of these glutamate projection neurons also expressed KOR and SSTR2 which formed KOR-SSTR2 together with D2R heteroreceptor complexes. The findings indicate that the sensory cortical glutamate drive on the glutamate claustral-cortical projection neurons is modulated by GPCRs and their receptor complexes located in the plasma membrane of these glutamate projection neurons. This can give the sensory cortical regions significant help in deciding on the salience to be given to various incoming sensory stimuli.