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P3.14

Role of endocannabinoids and TRPV1 channels in the bioelectric activity of hippocampal neurons

Daniele Gallo, G. Giglia, G. Ferraro, P. Sardo, G. Gambino
Department of Biomedicine, Neuroscience and Advanced Diagnostics (BIND), University of Palermo

It has been reported that endocannabinoid system is an important player in the regulation of neuronal bioelectrical activity, relying on receptor-mediated mechanisms. Amongst these, Cannabinoid receptor type 1 (CB1r) and Transient Receptor Potential Vanilloid type 1 (TRPV1) are both modulated by endocannabinoids, involved in the transduction of stimuli in the pre-synaptic neuron and prompt downstream pathways in the post-synaptic neuron. To investigate the role of CB1r/TRPV1 interplay, we applied whole-cell patch clamp technique to visualize the eventual variations in terms of membrane current and action potentials induced by pharmacological manipulation in rat hippocampal neurons. We modulated the activity of the CB1r and TRPV1 exploiting anandamide (AEA), CB1r and TRPV1 agonist, capsaicin (CAP), a TRPV1 agonist and capsazepine (CPZ), a TRPV1 antagonist. Our data show that AEA influences steady membrane current with respect to controls. Furthermore, drug application significantly modifies action potentials amplitude, duration and frequency. In particular, the co-treatment of AEA and CPZ increases the amplitude of action potentials, reduces their duration and thus increases their frequency. These preliminary results support the involvement of TRPV1 in the cannabinoid modulation of the bioelectrical activity in rat hippocampal neurons. Indeed, the concurrent blockade of these channels and activation of CBr influences basic properties of neuronal function.

P3.31

Orally administered indicaxanthin is able to modulate human motor cortical excitability and plasticity

Bernardo Puccio*[1], R. Ruggirello*[1], G. Giglia [1], M. Allegra [2], P. Sardo[1] ,G. Ferraro[1], F. Brighina[1], G. Gambino[1]
[1]Department of Biomedicine, Neuroscience and Advanced Diagnostics - BIND , Section of Human Physiology (University of Palermo)
[2]Department of Biological, Chemical and Pharmaceutical Sciences and Technologies - STEBICEF (University of Palermo)
*BP and RR equally contributed to this work

Opuntia Ficus Indica contains Indicaxanthin (IX), an antinflammatory and antioxidant betalaine pigment. This phytochemical is also able to cross the blood brain barrier (BBB) in rats and modulate neuronal activity. Considering these evidence, we aimed at investigating if orally administered IX could affect human brain tissue. 8 healthy and right-handed male subjects were recruited (20-45 years) with no history or clinical signs of neurological diseases, brain trauma or use of drugs acting on neuronal process, as assessed by a clinical neurologist. Non invasive Brain Stimulation and Neuromodulation (NIBS and NIN) instructions were applied in basal condition (T0) and 2 hours after having assumed 400 gr of cactus pear fruits (T1), over one week distance at least. Each subject experienced 30 pseudorandomised stimuli of paired pulse transcranial magnetic stimulation (ppTMS) over the M1: 10 short intracortial inhibition (SICI), 10 intracortical facilitation (ICF) and 10 test stimuli. They were delivered before and after 20 minutes of anodal transcranial Direct Current Stimulation (a-tDCS). IX significantly increased PRE-tDCS TEST ($p<0.0103$) and PRE-tDCS ICF ($p<0.052$), POST-tDCS ICF ($p<0.0001$) and SICI ($p<0.001$) were reduced, PRE-tDCS SICI was unchanged. All considered, IX is able to increase cortical excitability of human motor cortex. Finally, this nutraceutical seems to achieve an excitatory drive on motor cortical plasticity due to the paradoxical effects emerged after tDCS.