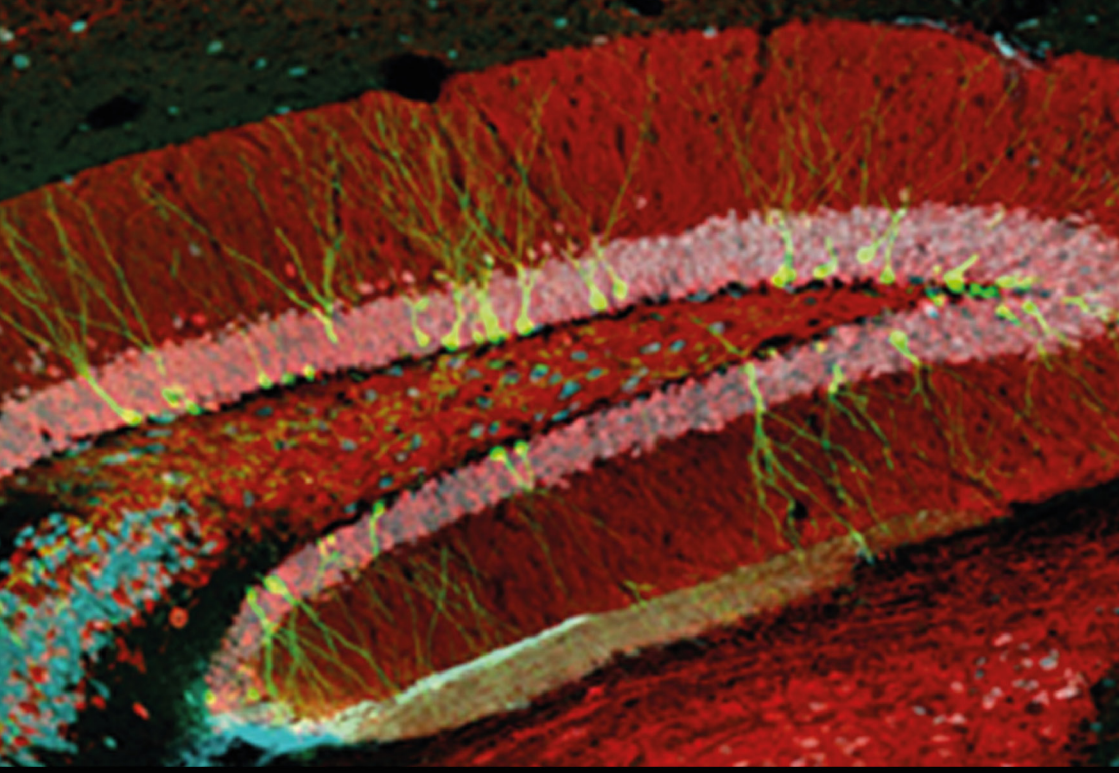

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SOCIEDAD ARGENTINA DE INVESTIGACIÓN EN NEUROCIENCIAS

XXIX ANNUAL MEETING
AND SAN-ISN SMALL CONFERENCE AND COURSE

"New mechanisms of neuro-glial interaction: Their contribution to nervous system development and repair"

September 29 | October 3, 2014
Huerta Grande, Córdoba, Argentina

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P144.-Activation of presynaptic GABAB receptors enables sustained transmission at high rate of stimulation in cholinergic olivocochlear-hair cell synapses

Carolina Wedemeyer[1°],Eleonora Katz[1°2°],Ana Belen Elgoyhen[1°]

[1°]Instituto de Investigaciones en Ingenieria Genetica y Biologia Molecular -INGEBI (CONICET); [2°]DFBMC, FCEN, UBA

eleokatz@gmail.com

During development, medial olivocochlear (MOC) neurons transiently innervate cochlear inner hair cells (IHCs). Although ACh is the main neurotransmitter at this synapse, an abundant GABA innervation is also present. Electrical stimulation of efferent fibers triggers the release of ACh but also activates presynaptic GABAB receptors that reduce ACh release. The mechanism of action of GABA is through the inhibition of P/Q type Ca2+ channels. We are now studying the consequences of GABAB-mediated inhibition in the short-term plasticity properties of this synapse. Inhibitory synaptic currents (IPSC) were recorded in IHCs of acutely isolated organs of Corti while MOC fibers were electrically stimulated. In controls, 15 pulses applied at high frequency (50-100 Hz) progressively decreased IPSC amplitudes. At 50 Hz, the amplitude of the last IPSC of the train was reduced to 32% with respect to the first one. This reduction increased to 53% at a 100 Hz train. At low-frequency (10 Hz), the GABAB agonist, baclofen, reduced IPSC amplitudes throughout the train. However, at higher stimulus rates, the initial IPSC was reduced but the following responses were always larger than controls. A maximal enhancement of 43% was observed for the last IPSC of the train at 100 Hz. These results show that activation of GABAB receptors reduce synaptic depression, suggesting that gabaergic inhibition enables sustained transmission during high-frequency stimulation at the MOC-inner
hair cell synapse.