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Presentation Abstract

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Presentation Title: Wiring principles in lateral subdivision of central amygdala

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Topic: ++B.07.f. Modulation: ACh, amino acids and GABA

Authors: ***W. S. HO**, C.-C. LIEN;
Inst. of Neurosci., Natl. Yung-Ming Univ., Taipei, Taiwan

Abstract: Abstract
The amygdala is a key brain region for fear acquisition and expression. The lateral subdivision of the central amygdala (CeL), which comprises over 90% of GABAergic neurons, provides tonic inhibition onto the final output of the amygdala - the medial subdivision of the central amygdala (CeM) and thus controls fear expression. However, the CeL contains multiple neuronal subtypes and the functional connections between CeL neurons remain unclear. To answer this question, we performed whole-cell patch-clamp recordings from CeL neurons and found at least three different types of CeL neurons on the basis of their electrophysiology properties: late spiking (LS), regular spiking (RS) and low-threshold bursting (LTB) neurons. Among them, 90% of neurons were LS and RS neurons. Simultaneous pair- or triple-recordings from CeL neurons showed that temporal dynamics of GABA transmission within the CeL was target cell-specific. Specifically, synaptic transmission at LS-to-RS or RS-to-LS neuron output synapses exhibited activity-dependent depression, whereas the output synapses of LS-to-LS or RS-to-RS neurons were relatively insensitive to presynaptic activity or exhibited use-dependent facilitation. In addition to mutual inhibition, we also found that both LS and RS neurons exhibited autapses, which sent their axons back to modulate their own activity. Our preliminary results suggest that the diversity of GABAergic neurons and synapses may enable combinatorial inhibitory effects in the CeL and thus modulate fear expression.

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GABA

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