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Presentation Abstract

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Presentation Title: Distinct dynamic switch of gaba release in dendritic- and perisomatictargeting interneurons Location: Hall F-J Presentation time: Sunday, Oct 14, 2012, 10:00 AM -11:00 AM Authors: *Y.-C. LIU, C.-C. LIEN; Inst. of Neurosci. & Brain Res. Ctr., Natl. Yang-Ming Univ., Taipei, Taiwan Abstract: Various subtypes of GABAergic interneurons provide local inhibition at different subcellular domains and concert the action potential (AP) patterns of neurons. However, how distinct subtype of GABAergic interneurons exerts dynamic GABA release is relatively unknown. Here we showed that GABA transmission at non-fast-spiking interneuron - dentate granule cell (DGC) synapses are rapidly switched to the high release mode when driven by a burst AP pattern in a presynaptic population whereas the dynamics of fast-spiking interneuron - DGC synapses are relatively independent of presynaptic activity. Detailed anatomical analysis of recorded interneurons revealed that non-fast-spiking interneurons are dendritic inhibitory interneurons (DIs) consisting of CCK+ basket, HICAP and HIPP cells. By contrast, fast-spiking interneurons are perisomatic inhibitory interneurons (PIs), including PV+ basket and axo-axonic cells. To explore potential mechanisms underlying the rapid dynamic switch of GABA release, we performed calcium imaging and found that compared with PIs, DIs show relatively low calcium buffering capacity. These results suggest that burst AP activity in DIs may confer calcium accumulation, thereby resulting in an increase of release probability. Overall, these findings reveal a general view of activity-dependent dendritic inhibition and reliable perisomatic inhibition in hippocampal inhibitory circuits. Y. Liu: None. C. Lien: None. Disclosures:

Keyword(s): interneuron

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