Session 124 - GABA

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124.03 / E27 - Functional characterization of VIP-expressing interneurons in the hippocampal dentate gyrus

November 13, 2016, 8:00 - 12:00 PM | Halls B-H

Presenter at Poster
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Abstract
The hippocampus is a key brain structure for learning and memory. The dentate gyrus (DG) serves as the primary gate of the hippocampus and controls information flow from the cortex. To maintain normal functions, granule cells (GCs), the principal neurons in the DG, receive fine-tuned inhibition from local-circuit GABAergic interneurons (INs). There are various classes of GABAergic inhibitory INs with different physiological, anatomical and molecular features. Among them, vasoactive intestinal peptide-expressing (VIP^+) INs mainly target somatostatin-expressing INs in both the hippocampal CA1 area and cortex. As a result, VIP^+ INs are thought as IN-specific cells. However, the functional and anatomical properties of VIP^+ INs in the DG remain largely unknown. Here, we combined electrophysiology and single-cell biocytin staining to investigate the intrinsic properties and anatomical structures of DG VIP^+ INs using ***VIP-ires-cre*::*Ai14*** mice. Our preliminary results revealed that VIP^+ INs in the DG showed diverse electrophysiological properties, but relatively specific axonal projection patterns. VIP^+ INs show various input resistances, ranging from 200 MΩ to 2 GΩ and different firing patterns, including fast-spiking, accommodating, and

stuttering. In addition, we observed approximately 80% of VIP^+ INs with axonal distribution in the hilus. By combining optogenetics and electrophysiology, we will further identify their potential target neurons in the DG.

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