Presentation Abstract

Program#/Poster#:	480.07/B49
Presentation Title:	Axonal action potentials in hippocampal dendrite-targeting interneurons
Location:	Hall A
Presentation time:	Tuesday, Oct 20, 2015, 8:00 AM -12:00 PM
Presenter at Poster:	Tue, Oct. 20, 2015, 10:00 AM - 11:00 AM
Topic:	++B.10.a. Neural oscillators and activity-dependent plasticity of intrinsic membrane properties
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Abstract:	Activity-dependent modulation of action potential (AP) waveforms occurs in axons of glutamatergic neurons and contributes to synaptic plasticity. Yet, how AP waveforms are regulated in GABAergic interneuron axons is unknown. Here, we combined whole-cell patch-clamp recording and voltage imaging to investigate APs in a typical dendrite-targeting interneuron, oriens-lacunosum-moleculare cells (OLM cells) in the rat hippocampal CA1 region. We found that axonal APs in a train had no accommodation in amplitudes and no broadening in AP width compared to APs in soma and dendrites. Pharmacological experiments indicate that Kv1- and Kv3-like channels underlie AP repolarization and prevent use-dependent AP broadening. Although axonal AP waveforms are not dynamically modulated by activity, AP propagation failures in axons were noted. Notably, axonal AP propagation failures can be reduced by the GABAA receptor blocker SR-95531, but enhanced by the GABAA receptor agonist muscimol. Our results indicate that OLM cells are featured by unique axonal AP signaling.
Disclosures:	**J. Weng:** None. **C. Lien:** None.
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