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and Other Communication Disorders

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FROM: Catherine Weisz, Ph.D.
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SUBJECT: Submission of manuscript to JoVE

Dear Dr. Werth,
Enclosed please find our manuscript titled Mimicking *in vivo* circuit connectivity with a novel *in vitro* slicing technique: the wedge slice, by Matthew J. Fischl and Catherine J. C. Weisz.

Our group recently published a paper titled "Synaptic inhibition of medial olivocochlear efferent neurons by neurons of the medial nucleus of the trapezoid body", by Lester Torres Cadenas, Matthew J. Fischl, and Catherine J.C. Weisz, in the Journal of Neuroscience. This study detailed newly-discovered inhibitory synaptic inputs to the medial olivocochlear (MOC) neurons, which are critical for gain control and protection against noise trauma in the cochlea. We were invited to submit a JoVE manuscript based on this work by Dr. Aaron Berard, a former editor at JoVE. The current submission details a new technique recently developed in the lab to extend our result from the Torres Cadenas et al 2020 paper to a more *in vivo*-like preparation in order to study integration of excitatory and inhibitory synaptic inputs to the MOC neurons. This technique, which we call a wedge slice, involved a novel slicing method to include the majority of the presynaptic circuitry of the MOC neurons in a slice that is thick on one side to mimic *in vivo* neuron connectivity, but thin on the other side where MOC neurons are located to allow powerful *in vitro* techniques. The manuscript details the process of creating the slice, histological methods for confirming slice contents, and some results showing an increased diversity of responses when the full auditory circuit is stimulated from the auditory nerve, relative to direct stimulation at the axons of the pre-synaptic neurons.

We believe that the wedge slice technique will be applicable to individuals studying neurons of the auditory brainstem, where *in vivo* experimentation is extremely difficult due to the location of neurons deep in the brain, but also to other deep brain regions such as the thalamic projections to cortical neurons.

Thank you for your consideration of this work,

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