



Colloquium

New insights into cell types and circuitry of the cerebellar cortex

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The cerebellum is a well-studied brain structure with diverse roles in motor learning, coordination, and cognition. We have used high-throughput transcriptional profiling to provide a complete inventory of neuron types in the cerebellar cortex. We have used a combination of molecular approaches, electrophysiology, and serial electron microscopy to provide insights into these circuit elements. I will focus on three new findings. • Surprisingly, we found that there are two molecularly distinct types of molecular layer interneurons (that did not correspond to stellate cells and basket cells). They have marked differences in their spontaneous firing, excitability, and electrical coupling, and appear to have distinct functional roles. • Candelabrum cells (CCs) are enigmatic interneurons of the cerebellar cortex that had been identified solely by their morphology. We find that CCs are a distinct cell type, and that cerebellar inputs, outputs and local signals all converge onto CCs to allow them to assume a unique role in controlling cerebellar output. • Unipolar brush cells are an interneuron population that was previously subdivided into two discrete populations that transform brief synaptic inputs into either long-lasting increases or decreases in firing. In contrast, we find that there is continuous variation in gene expression and in metabotropic signaling that generates a stable cell-autonomous basis for temporal integration and learning over multiple time scales.

Monday, April 19, 2021 04:00pm - 05:00pm

Online



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