A role for Runx transcription factor signaling in dorsal root ganglion sensory neuron diversification

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Subpopulations of sensory neurons in the dorsal root ganglion (DRG) can be characterized on the basis of sensory modalities that convey distinct peripheral stimuli, but the molecular mechanisms that underlie sensory neuronal diversification remain unclear. Here, we have used genetic manipulations in the mouse embryo to examine how Runx transcription factor signaling controls the acquisition of distinct DRG neuronal subtype identities. Runx3 acts to diversify an Ngn1-independent neuronal cohort by promoting the differentiation of proprioceptive sensory neurons through erosion of TrkB expression in prospective TrkC+ sensory neurons. In contrast, Runx1 controls neuronal diversification within Ngn1-dependent TrkA+ neurons by repression of neuropeptide CGRP expression and controlling the fine pattern of laminar termination in the dorsal spinal cord. Together, our findings suggest that Runx transcription factor signaling plays a key role in sensory neuron diversification.

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