

**THE EFFECTS OF AXOTOMY ON THE BIOPHYSICAL PROPERTIES OF
RETICULOSPINAL NEURONS IN LARVAL LAMPREY**

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ABSTRACT

Following severe spinal cord injury (SCI), in adult higher vertebrates there is little or no axonal regeneration, and animals remain paralyzed below the lesion. In contrast, lower vertebrates such as the lamprey, following SCI, descending brain neurons, particularly reticulospinal (RS) neurons, regenerate their axons and locomotor function recovers in a few weeks.

Following SCI in lamprey, we have shown that axotomized RS neurons change their biophysical properties. Results from the present study suggest that rostral spinal cord transections alter the biophysical properties of axotomized RS neurons to a greater degree than more caudal transections. In addition, injured RS neurons have significantly smaller slow afterhyperpolarizations (sAHP) than uninjured RS neurons. The sAHP is due to calcium influx during action potentials. A reduction in the sAHP amplitude in axotomized RS neurons suggests that calcium channels may be down regulated to maintain relatively low intracellular calcium levels and to promote axonal regeneration.