

## **Characterization of the muscle-motor neuron topography of the mouse hindlimb**

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**Purpose:** Our current purpose is to explore strategies for delivering therapeutic genes to specific populations of motor neurons. This can be achieved by intramuscular injections and retrograde transport of viral vectors containing the gene sequence of interest. Current research into amyotrophic lateral sclerosis/motor neuron disease focuses predominantly on the mouse hindlimb but the relationship between the hindlimb muscles and the motor neurons that supply them has not been characterized in this species.

**Aim:** To characterize the muscle-motor neuron topography in the mouse hindlimb.

**Methods:** Mouse hindlimbs obtained through tissue sharing were subjected to acetylcholinesterase histochemistry to reveal the motor end plates (MEPs). This information was then utilized to guide a series of injections of retrograde tracer of individual hindlimb muscles in naïve C57BL/6 mice that were anaesthetised with isoflurane. One week post-surgery, the animals were intra-cardially perfused and the spinal cords dissected out, sectioned and analysed under epifluorescence for the presence of labelled motor neurons.

**Results:** Motoneurons innervating the mouse hindlimb muscles are arranged in columns spanning several spinal segments. There is considerable overlap of the motor columns along all axes.

**Conclusion:** The MEP and the motor column maps are instrumental in the selection of appropriate muscles for the delivery of therapeutic genes into specific segments of the spinal cord.