

Transcriptional control of motor neuron diversity and neuromuscular junction formation

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Motor neurons control our body movement, which requires numerous muscles innervated by distinct motor pools. Many transcription factors are known to successively restrict specific motor neuronal fates over neural development but it is still unclear whether it contributes to organization of neuromuscular (NMJ) junctions in adults. We previously demonstrated that spatiotemporal control of LIM homeodomain (LIM-HD) transcription factors specifies diverse motor neuron subtypes. In this study, we show that elimination of LIM-HD transcription factor in mice resulted in disorganized motor pool formation and NMJ formation, leading to defective movements. Our result provides the molecular basis for motor neuron subtypes and may explain variable susceptibility of motor neurons in many motor neuron diseases.