Unmasking the identity of superheroes: revealing the markers of terminal Schwann cells

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Abstract

Terminal Schwann cells (tSCs) are a vital component of the neuromuscular junction, providing stability and specificity to the synapses between muscle fibers and the motor neurons that innervate them. Degradation or instability of tSCs are associated with neuromuscular diseases such as ALS. However, they are difficult to study because we lack specific molecular markers to identify them from other cells in the muscle. This research is aimed at discovering surface markers that recognize all tSCs, which would allow further studies on molecular mechanisms in tSCs during injury and the development of ALS and similar diseases. From RNA sequence data, we identified candidate surface maker genes that are upregulated in a population of tSCs when compared to other glial cells. I first used RT-PCR to confirm the expression of 11 out of 12 of these genes in brain cDNA. I then used immunohistochemistry and in situ hybridization on muscle sections to examine whether these candidate genes are specifically expressed by tSCs. Preliminary results indicate that at least one of these candidate genes is in fact localized on tSCs. We hope that identification of these markers for tSCs at the NMJ will be a useful tool for other labs and enable future studies into the events that cause muscle loss in neuromuscular diseases and aging.