

**Title**

The concept of Demyelinating Schwann cells in peripheral neuropathies

**Abstract**

Schwann cells (SCs) that create the peripheral myelin sheath have the unique ability to dedifferentiate and to destroy the myelin sheath under various demyelination conditions. Transdifferentiated Demyelinating Schwann cell (DSC) performs irreversible demyelination process in many demyelinating neuropathies that show complete demyelination in an internode, and the cell seems to share a common mechanism of demyelination in Wallerian degeneration. The introduction of DSC provides an important conceptual advance for understanding the pathophysiological mechanisms of demyelinating neuropathies. Using serial block-face scanning electron microscopy, here we show that demyelination by SC accompanies highly dynamic membrane remodeling of SC, which potentially implicates SC autophagy, thereby ultimately resulting in myelin exocytosis from SC. Macrophages appear to be responsible for final myelin digestion in both conditions. To determine the presence of DSC in human neuropathic nerves, we examined the levels of p75 neurotrophin receptor (p75), those expressed in DSC in an animal model, in the serum of peripheral neuropathy patients using ELISA. We found that the serum levels of p75 in chronic inflammatory demyelinating neuropathies than that in healthy controls, suggesting that the DSC properties could be reflected in the patient serum. Our findings provide insight into the pathophysiological mechanism of demyelination in a variety of demyelinating neuropathies.

**Keyword**

Schwann cells, Demyelination, Wallerian degeneration, Inflammatory demyelination, Peripheral neuropathy