EXPERIMENTAL STUDY

Ultrastructural Changes of Schwann Cells during Nerve Regeneration Following a Crush Injury of the Sural Nerve in Rats

Abdulmonem Al-Hayani PhD

Department of Anatomy, Faculty of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia

Abstract

Twenty-four male albino rats (200 to 250g in weight) were used in the present study. The left sural nerve of 18 rats was subjected to crush injury while the sural nerves of 6 animals were used as control. After one week of the crush injury the Schwann cells showed multiple cytoplasmic processes. Those with long cytoplasmic processes wrapped only one axon while those wrapping multiple unmyelinated axons showed shorter processes. Some of these processes wrapped or surrounded collagen bundles "collagen pockets" and degenerated myelin, and some contained electronlucent vacuoles. Schwann cell cytoplasm showed asymmetric hypertrophy and contained dilated rough endoplasmic reticulum and ribosomes. Also, electronlucent vacuoles and whorls of degenerated myelin were seen in the cytoplasm of some Schwann cells. Schwann cells were surrounded by basal laminae which may be redundant. Two weeks post-crush, the number of regenerating Schwann cells increased and the myelin sheaths covering the myelinated axons were thicker. Schwann cells possessed long cytoplasmic processes that wrapped unmyelinated axons. After the third week of the crush injury, the Schwann cells wrapped shrunken myelinated axons with degeneration of the myelin of such axons. The number of myelinated axons increased, together with the thickness of their myelin sheath. It could be concluded that the Schwann cells play a phagocytic role during regeneration of peripheral nerves which is indicated by the presence of cytoplasmic vacuoles and degenerated myelin. Such phagocytic process might be performed by the use of their cytoplasmic processes.

Key words: Schwann cell, regeneration

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Correspondence to
Dr Abdulmonem Bin Abdulsalam Al Hayani
Associate Professor, Department of Anatomy
King Abdulaziz University ✉ 1931 Jeddah
Saudi Arabia
☎+966 2 6408356
🖷 +966 2 6400592
hayani30@hotmail.com