

A. Nerve Cell

The nerve cell (*ganglion cell*) is made up of a nucleated cell section (*perikaryon*: A) and the processes. The main process is the *neurite* which is constant and has no branches. As an axis-cylinder (*axon*, *neuraxon*) (6) it forms the basic unit peripheral cell B. It extends from the perikaryon in a broad cone (1). The *dendrites* (14) are more or less multi-branched processes of the nerve cell afferent to the perikaryon. The nucleus (2) itself is relatively large and has a fine chromatin network with clearly defined nucleolus. The nuclear membrane (transparent) shows regular nuclear pores.

The cytoplasm of the nerve is rich in mitochondria (10) (neurosomes). Being a very active metabolic element an ergastoplasm structure, the Nissl substance, can be shown by staining with toluidine blue. This appears in the form of small granules at the root of the dendrites but not in the cone of the neurites. They give the cell a flecked, or tigroid, appearance.

The Nissl substance degenerates through nerve cell activity and regenerates in periods of rest. The cytoplasm, both in the

area of the dendrites and of the neurites and perikaryon, contains neurofibrils, neurofilaments and neurotubules (4). The nerve cells vary between 4 μ and 130 μ in size but the neurites can be over one metre in length.

B. Nerve Fibre

The peripheral nerve fibre B consists of the neurite (axon) and its various sheaths, namely the medullary (or myelin) sheath (11) and the Schwann sheath (12). The medullary sheath contains various lipoids known collectively as myelin. This sheath is interrupted at regular intervals to form nodes of Ranvier (9) between which interannular segments (internodes) are to be found. The Schwann sheath, or neurilemma, is formed by peripheral neuroglial cells, or Schwann cells (7), which also go to make up the medullary sheath. Each segment (between two nodes of Ranvier) corresponds to one Schwann cell. In the region of the node the Schwann cells are closely linked together. Under an electron microscope the myelin coating can be seen to have a lamellar spiral structure caused by

the windings of the cell membrane around the axon. The thicker the medullary sheath the more rapid the conduction of impulses. The peripheral nerve fibres can be partially regenerated by separation (injury, severing) from the cell body.

- A Perikaryon of the nerve cell with dendrites
- B Peripheral nerve with sheaths
- 1 neurite cone
- 2 nucleus of nerve cell with nucleolus
- 3 BS 35: endoplasmatic reticulum
- BS 35/1: Nissl's granules
- 4 neurofibrils (for BS 35/1 only)
- 5 synaptic terminals
- 6 neuraxon
- 7 Schwann cell with nucleus
- 8 Schwann sheath
- 9 linked Schwann cells at node of Ranvier
- 10 mitochondria
- 11 medullary (myelin) sheath
- 12 pennineal sheath of connective tissue
- 13 mesaxon
- 14 dendrites
- 15 Lysosomes (for BS 35 only)
- 16 Neurotubules (for BS 35 only)
- 17 Golgi apparatus (for BS 35 only)