

Short Communication

## Schwann Cell "Necrosis" in Unmyelinated Nerve Fibres of Patients with Polyneuropathy

F. CARLSEN, G. G. KNAPPEIS and H. SCHMALBRUCH\*

Institute of Neurophysiology and Physical Laboratory II  
University of Copenhagen

Received October 23, 1969

### *Koagulationsnekrose der Schwannschen Zellen unmyelinisierter Nerven bei Patienten mit Polyneuropathien*

*Zusammenfassung.* 5 von 8 Patienten mit Polyneuropathie zeigten Koagulationsnekrosen der Schwannschen Zellen unmyelinisierten Nervenfasern.

*Summary.* Five of eight patients with polyneuropathy showed coagulation necrosis in Schwann cells of unmyelinated fibres.

In five patients with polyneuropathy the Schwann cell cytoplasm of one third of the unmyelinated nerve fibres of the sural nerve showed a marked increase in electron density (Fig. 1a and b). This did not occur in normal nerves prepared for electron microscopy in the same way (fixed in 2% isotonic glutar aldehyde and 1% osmic acid, sections stained with uranyl acetate and lead citrate). The higher density of the cytoplasm, due both to a closer packing of microfilaments and microtubuli and to an amorphous substance, resembled "coagulation necrosis" (David, 1967). The changes of the Schwann cell cytoplasm were associated with pycnosis and lysis of the nuclei as well as with pseudo-inclusions within them. The cytoplasmic and nuclear changes occurred in cells containing axons and in "empty" Schwann cells incorporated in the bands of Büngner (Fig. 1b). The additional changes in the non-myelinated fibres were also seen in three other patients with polyneuropathy (Fig. 2) in whom Schwann cell necrosis and nuclear changes were virtually absent: the number of "empty" Schwann cells was 30 times that of normal nerve, the number of axons per Schwann cell containing axons was decreased by one third, and collagen pockets (Gamble and Eames, 1964) were three times more frequent than normal. These changes were more pronounced when Schwann cell necrosis was present. Whether or not a polyneuropathy showed Schwann cell necrosis could not be related to the aetiology nor to the duration of the disease.

---

\* Present address: Institute of Biophysics and Electronmicroscopy, University of Düsseldorf.

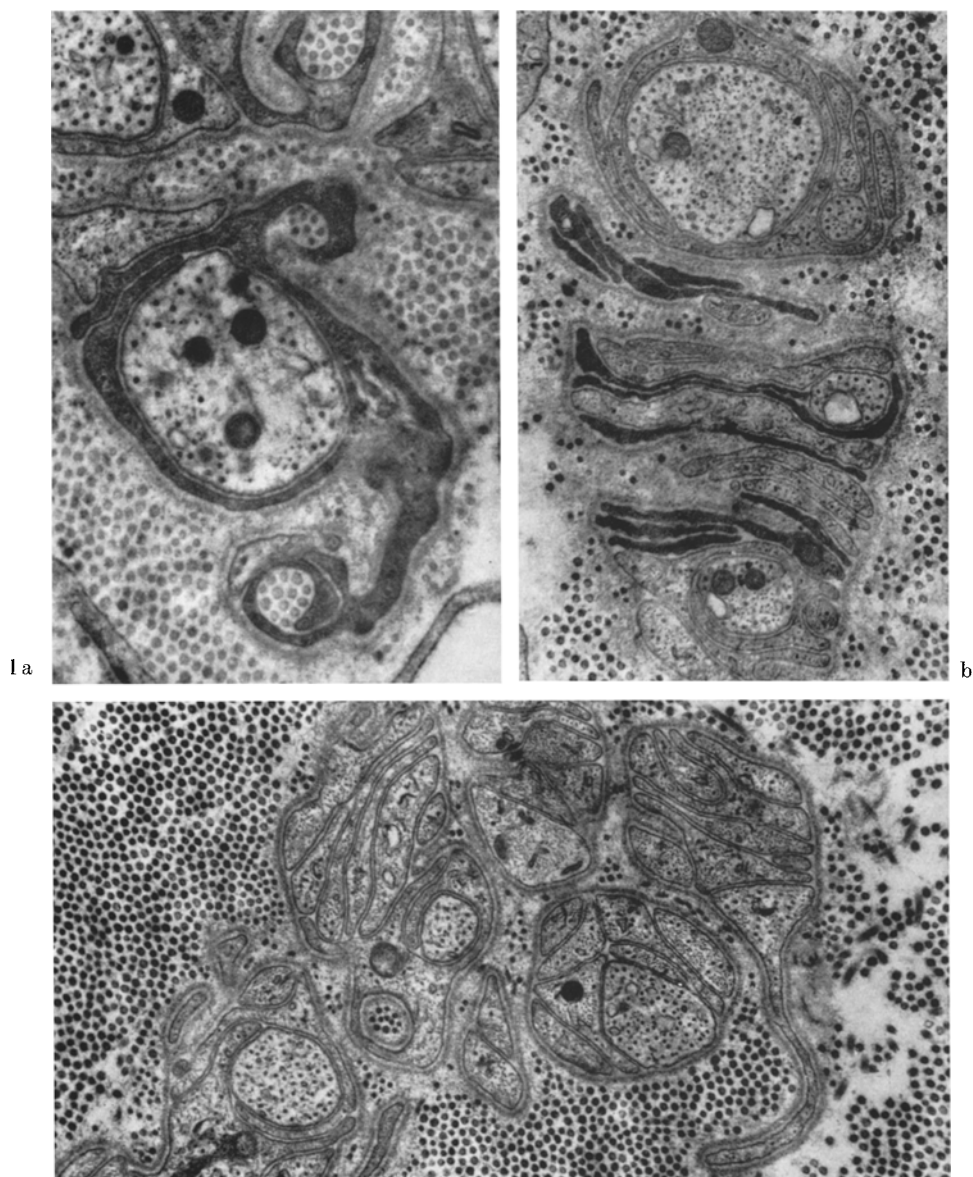


Fig. 2

Fig. 1. a. "Necrotic" Schwann cell with normal axon and two collagen pockets. b. Two small axons within a band of Büngner formed by Schwann cells with and without "coagulation necrosis".  $\times 28,000$

Fig. 2. Band of Büngner. "Empty" Schwann cells without "coagulation necrosis", axons and one collagen pocket. The number of cytoplasmic filaments within the Schwann cells is increased as compared to normal.  $\times 18,000$

### References

- David, H.: Elektronen-mikroskopische Organpathologie. Berlin: Verlag Volk und Gesundheit 1967.
- Gamble, H. J., Eames, R. A.: An electron microscope study of the connective tissues of human peripheral nerve. *J. Anat. (Lond.)* **98**, 655—663 (1964).

Gustav G. Knappeis  
Institute of Neurophysiology  
University of Copenhagen  
36 Juliane Maries Vej  
2100 Copenhagen ø, Denmark