were left for 4 min in Li (Figure, a). This time-period was found, in control experiments with sucrose-Krebs, to be sufficient for exchanging more than 90% of the extracellular fluid. Potentiation also occurred when the preparations were kept for 5–8 min in Li: on returning to Na there was then an increase in the amplitude of the contractions prior to tetanic stimulation. When the preparations were kept for about 10 min in Li, the post-tetanic potentiation was abolished (Figure, b), on still longer exposure to Li, neuro-muscular block was found. In Na the block disappeared slowly over a few hours.

The observation of post-tetanic potentiation in Li suggests that the potentiation is not caused by post-tetanic hyperpolarization. The post-tetanic hyperpolarization in non-myelinated fibres is greatly reduced after short exposure to Li and abolished after 4–5 min in Li[4]. Similar effects are seen in myelinated fibres where studies of the Li effects[7,8] showed that an initial short phase of hyperpolarization may still be found after exposure to Li for some minutes, whereas the long-lasting hyperpolarization, which follows about the same time course as the post-tetanic potentiation, is abolished as the extracellular Na is replaced by Li. The present experiments also exclude the hypothesis that post-tetanic facilitation is caused by accumulation of intracellular Na[9]. Our conclusions are similar to those of HUBBARD and GAGE[10] who used metabolic inhibitors, cardiac glycosides and reduced Na concentrations for inhibiting the post-tetanic potentiation.

Zusammenfassung. Am partiell curarisierten Zwerchfell-Phrenicus-Präparat des Meerschweinchens wurde gefunden, dass die post-tetanische Fazilitation auch in Li-haltiger Lösung auftritt. Die Fazilitation scheint nicht durch post-tetanische Hyperpolarisation entstanden zu sein, da diese nach Li-Applikation ausbleibt.

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Nucleolar Changes in Spinal Ganglion Neurons During the Course of Axon Regeneration

The increase of nucleolar volume in neurons after axonal section has been known for a long time. However, the changes which occur in this process have not been studied in the light of some new concepts of nucleolar structure. It is generally accepted[1] that the nucleolus is made up by a filament, the nucleolonema, which is embedded in a matrix or pars amorpha. The nucleolonema of rat spinal ganglion neurons was easily demonstrated with silver impregnation techniques[2] (Figure 2) or by phase contrast microscopy in vivo following a procedure for cell isolation[3] (Figure 1). Nucleolar changes were studied after crushing the left sciatic nerves of 20 rats of our stock at the proximal third of the femur. The animals were sacrificed after 1 to 15, 20, 30, 40, 50 and 60 days. The left (operated) and right (control) spinal ganglia were carefully dissected and fixed in ethanol-acetic acid, 3:1. After paraffin embedding 5 μ sections were stained with buffered thionin[4]. This method demonstrated the nucleolonema quite well and it appeared like a network instead of a clear-cut filament (Figure 3).

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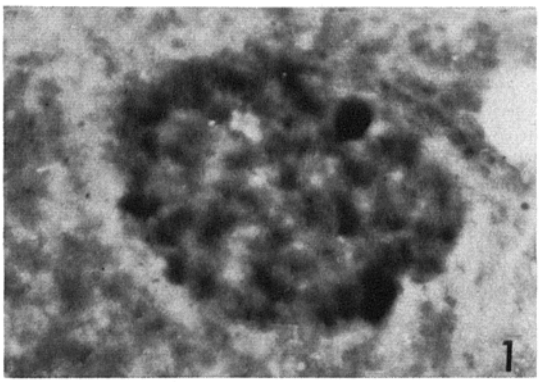

Fig. 1. Squash preparation of a spinal ganglion neuron isolated in vivo observed with the phase contrast microscope. The helicoidal filament contrasts neatly against a clear background. ×3000.

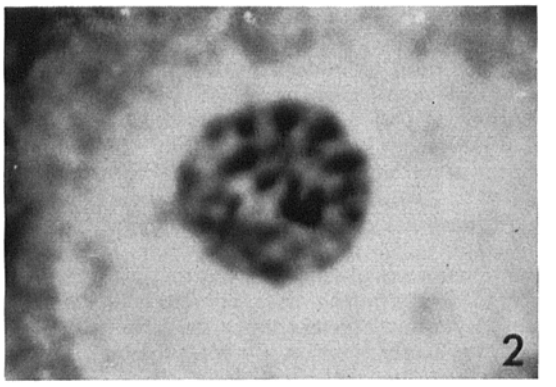

Fig. 2. Silver impregnation of a spinal ganglion neuron of the rat. The nucleolonema appears as a heavily impregnated filament. ×3000.

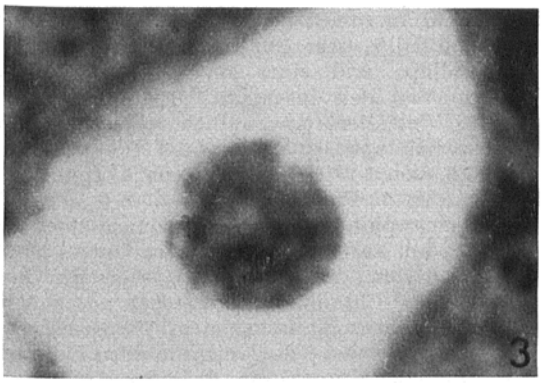

Fig. 3. Nucleolus of a control spinal ganglion neuron of the rat stained with buffered thionin. The nucleolonema and pars amorpha are clearly depicted. × 2800.

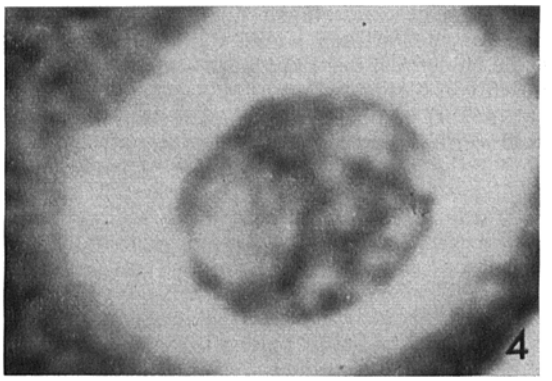

Fig. 4. Nucleolus of a spinal ganglion neuron of a rat operated 15 days before. It belongs to the controlateral spinal ganglion of the same animal of Figure 3. Thionin staining reveals the increase of the pars amorpha and loosening of the nucleolonema. × 2800.

On the operated side, the increase of nucleolar volume of spinal ganglion neurons took place principally at the expense of the pars amorpha. The nucleolonema becomes gradually less stained and more loosely arranged. This pattern was very marked at 15 days (Figure 4), it was less definite from the 30th day, and became imperceptible on the 60th day. Nucleolar 'vacuoles' had been observed[5–7] during chromatolysis before the restoration of the Nissl substance is completed. SOUDEK[8] described in the nucleolus of *Basidobolum ranarum* an increase of the volume of 'vacuoles' in the stage of active synthesis and their diminution during metabolic rest. These 'vacuoles' correspond to the pars amorpha, which is also detectable in normal cells.

We have observed (unpublished) in spinal ganglia of human and rat embryos the apparition of identifiable pars amorpha in the nucleolus of neuroblasts coincidentally with the beginning of the accumulation of Nissl substance in the cytoplasm. It has been suggested that there is a correlation between nucleolar changes and cellular activity[9]. These results and those of EAKIN[10] allow us to advance the hypothesis that the increase of the volume of the pars amorpha and a corresponding loosening of the nucleolonema may result from an increase of substances elaborated or stored by the nucleolus.

Résumé. L'écrasement du nerf sciatique du rat modifie de plusieurs manières les nucléoles des neurones ganglionnaires rachidiens correspondants. Tandis que le volume de la pars amorpha augmente considérablement, le filament nucléolaire ou nucleolonema s'allonge, sa disposition est plus lâche, et sa coloration devient moins évidente. Ce processus atteint son maximum 15 jours après le résection du nerf et il est négligeable 60 jours plus tard. Les changements du nucleolonema et de la pars amorpha pourraient être en rapport avec la synthèse cytoplasmatique.

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Zur Polymorphie eines Chromosoms innerhalb von Populationen des Laufkäfers *Carabus auronitens* Fabr.

Die bisher untersuchten Carabus-Arten besitzen $2n = 26$ Autosomen, die ♂♂ sind heterogametisch (XY-Typ)[1–4]. Die interspezifischen Unterschiede der Karyotypen sind gering: bei allen Arten treten im diploiden Satz 2 relativ grosse, meist submediokinetische Autosomen (A-Chromosomen) auf. Mit Ausnahme einer Art sind auch die meist mediokinetischen X-Chromosomen vergleichsweise gross. Im Gegensatz zur interspezifischen Gleichartigkeit des Karyotyps wurden bei einigen Arten erhebliche, intraspezifische (intraindividuelle) Unterschiede zwischen den homologen A-Chromosomen gefunden[4]. Es sollte geklärt werden, wie häufig bei *C. auronitens* das A-Chromosom intraindividuell anisomorph auftritt, in wieviel verschiedenen Formen es vorkommt und worin der Unterschied zwischen seinen verschiedenen Formen besteht.

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