

The Effect of Reserpine on the Intra-neuronal Vesicles of the Rat Vas deferens¹

In the peripheral nervous system it is generally assumed that granular vesicles are identical with the amine storage granules^{2,3}. Of great help in this connection has been the use of the drug reserpine, which is known to deplete all monoamine stores in the nervous system⁴, and studies on the effect of this drug on the appearance of the granular vesicles in different organs has therefore been made^{2,5,6}. This study gives some additional information on this problem.

Material and methods. 18 male albino Sprague-Dawley rats (200–250 g) were used. 9 animals were treated with a large single dose of reserpine (10 mg/kg i.p.). Of these, 6 rats were killed 24 h and 3 rats 6 h after administration. 3 animals were treated with a daily i.p. dose of 2 mg/kg for seven days. The rest were taken as controls. The rats were perfused with a glutaraldehyde-bichromate solution, refixed in a solution of osmic acid and embedded in Epon⁷. After light microscopic examination, the inner circular muscle layer was cut for electron microscopy. This layer is known from fluorescence microscopical studies to contain abundant adrenergic nerve terminals^{8,9}. An RCA-EMU-2c electron microscope was used.

Results and discussion. Untreated animals: Between the cells of the inner circular muscle layer, a large amount of mostly single axons of varying diameter could be seen, only occasionally surrounded by a Schwann cell. The axons with a large diameter in all probability represent the varicosities of the adrenergic nerve terminals⁹. They contained mainly mitochondria and vesicles of three types.

Small *agranular* and *granular* vesicles of about 300 to 600 Å in diameter were most common (Figure 1). Large granular vesicles with a diameter of about 800–1200 Å were also observed but usually only 1 or 2 could be seen per section surface of varicosity. These findings are in agreement with previous studies¹⁰.

Reserpine treated animals: 6 and 24 h after a single dose of reserpine, almost all the granules of the small vesicles disappeared and only some single vesicles containing a granule of mostly reduced size could be seen. The large granular vesicles, however, were not affected by this treatment but appeared in the microscope used in the same way as in normal animals (Figure 2). The same findings were made after long-term treatment. These

results are in agreement with the findings made in electron-microscopical studies on certain brain regions rich in monoamine nerve terminals. The large granular vesicles found in these areas were not affected by reserpine treatment⁷. This difference in reaction to reserpine between small and large granular vesicles has also been pointed out in a very recent paper by Bondareff in studies on the pineal gland¹¹.

Thus, it is probable that small granular vesicles are the main storage site for noradrenalin and that the large granular vesicles contain – if any – only a small store of amines.

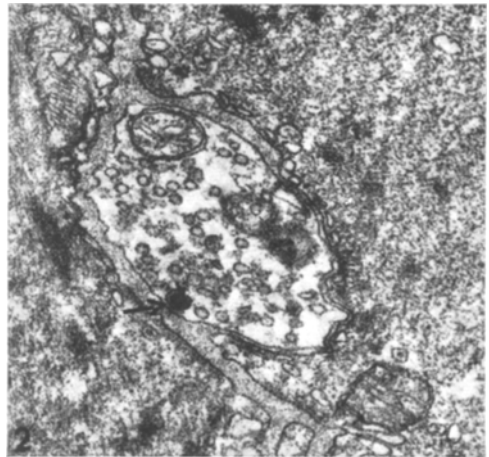


Fig. 2. Vas deferens of rat. Reserpine treated animal (10 mg/kg, 24 h). Almost all granules of the small vesicles have disappeared. The large granular vesicle (→), however, seems to be unchanged. × 33000.

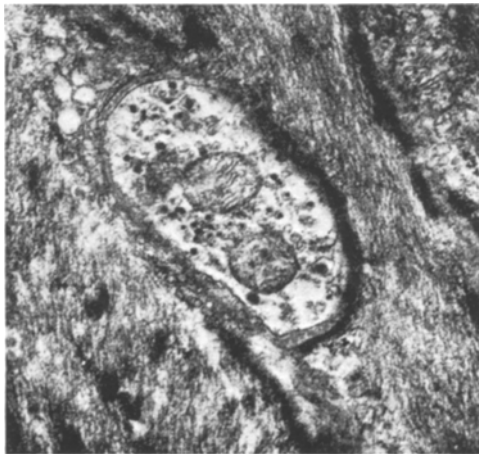


Fig. 1. Vas deferens of rat. Untreated animal. An axon containing many granular vesicles between two muscle cells. × 27000.

Zusammenfassung. Die Wirkung von Reserpin auf die intraneuronalen Vesikeln des Ductus deferens der Ratte wurde elektronenmikroskopisch untersucht. Es konnte festgestellt werden, dass die Granula der kleinen Vesikeln (3–600 Å Durchmesser) nach Reserpinbehandlung verschwanden, dass aber diejenigen der Grossen (8–1200 Å Durchmesser) unverändert blieben.

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