lipid droplets, revealed numerous large lipid droplets after reserpine treatment, see Figure 4. The pituicytes had formed processes which surrounded the neurosecretory axons. Some of the terminals were found to be invaginated in the cytoplasm of the pituicytes (Figure 4).

The doses of reserpine used in the present study: 1, 2.5, 5 and 10 mg/kg, which are generally used on experimental animals to deplete the amines, were found to produce marked ultrastructural changes in the nerve terminals, suggesting a vigorous release of hormone granules. Due to the depletion of granular material, the reaction of the pituicytes seemed well-adapted. It has been suggested that the pituicytes are involved in the secretion process of the hormone release[9]. The phagocytosis of the nerve terminals by the pituicytes has been observed, e.g. after stalk transsection leading to an increase in the lipid droplets[10, 11]. The conspicuous finding of enhanced clear small vesicles in the axon terminals suggests their participation in the release of hormones in some way. Their origin, content and function, and especially their relation to the hormone storage granules, is still unsettled[12]. If the hormone release induced by reserpine treatment is caused by inhibition of the amine-ergic control of the hormone release, is it due to other pharmacological properties of reserpine, e.g. toxic or lytic properties of the dosages used, or does reserpine interact in the granular bonding mechanism? This question remains to be answered. To differentiate the possible mechanisms, studies with different dosages of reserpine combined with in vitro studies and using chemical sympathectomy to exclude the effect of aminergic innervation, are in progress.

Summary. The doses of reserpine, which are generally used to deplete amines from the nervous tissue caused marked ultrastructural changes in the neural lobes of reserpine treated rats. The findings suggested depletion of neurosecretory granules, increased lysosomal activity and changes in the pituicytes.

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Unusual Mitochondria in Human Skeletal Muscle

During recent years, many atypical mitochondria have been reported, and several pathological conditions are known in which mitochondrial alterations have been observed[1-11]. Megamitochondria, for instance, characterized by an enormous dimension of the matrix and a reduced number of cristae have been found in a nephrotic syndrome, idiopathic cardiomyopathy, and can be experimentally induced in hepatocytes of rodents after feeding ethidium bromide or chloramphenicol[12, 13].

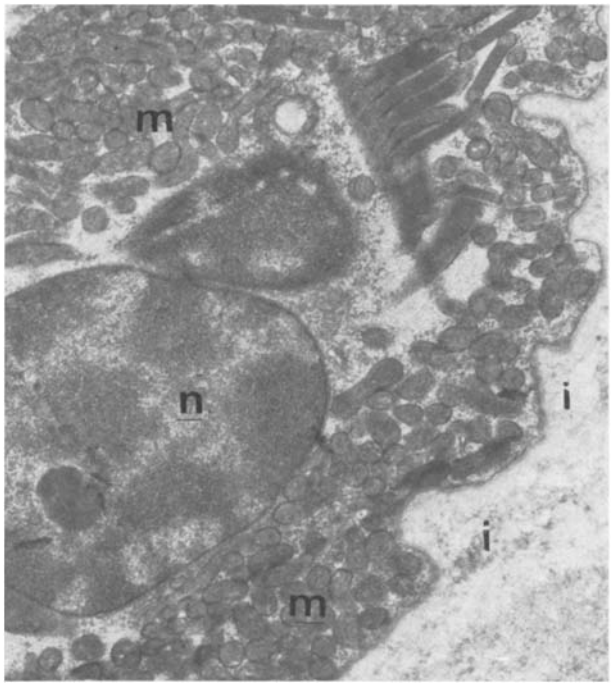

Fig. 1. Tis micrograph presents the subsarcolemmal part of a muscle fibre which contains a nucleus (n) and abundant mitochondria (m) partly showing a drumstick-like shape. i = interstitial space. × 12,500.

The purpose of this communication is to report on a hitherto unknown morphological phenomenon of mitochondria which has been observed in one case of systemic sclerosis (scleroderma) during electron microscopical studies of human skeletal muscle.

Material and method. The patient was a 40-years-old male who showed a generalized cutaneous scleroderma of at least 2 years duration. The specimens of the muscle biopsy were prefixed in buffered glutaraldehyd and postfixed in buffered OsO_4-solution. Ultrathin section were investigated electron microscopically after staining with uranyl acetate and lead citrate solutions.

Results and discussion. The muscle cells investigated in this case are characterized by the presence of abundant mitochondria, most of which are located near the sarcolemma surrounding the nucleus (Figure 1). The mitochondria – usually spherical or somewhat elongated – are located very close, so that no other organells can be seen. They

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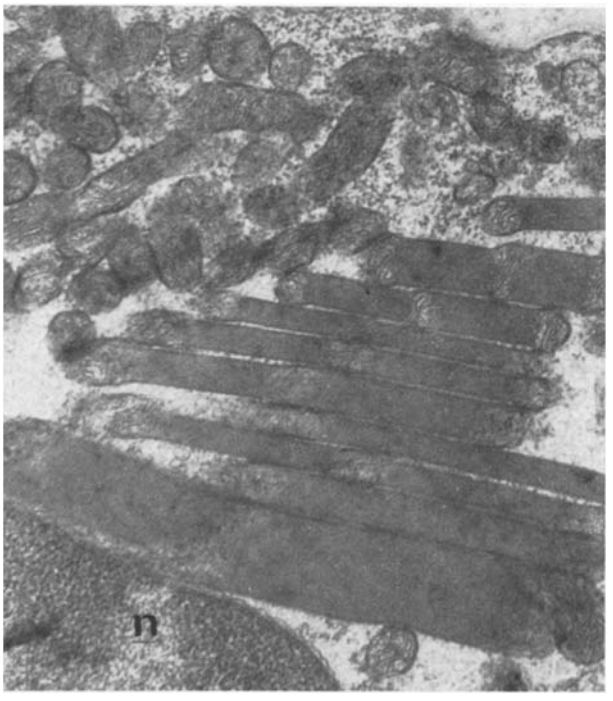

Fig. 2. Parallel arrangement of morphologically unusual mitochondria surrounded by numerous mitochondria showing typical structure. n = nucleus. ×31,500.

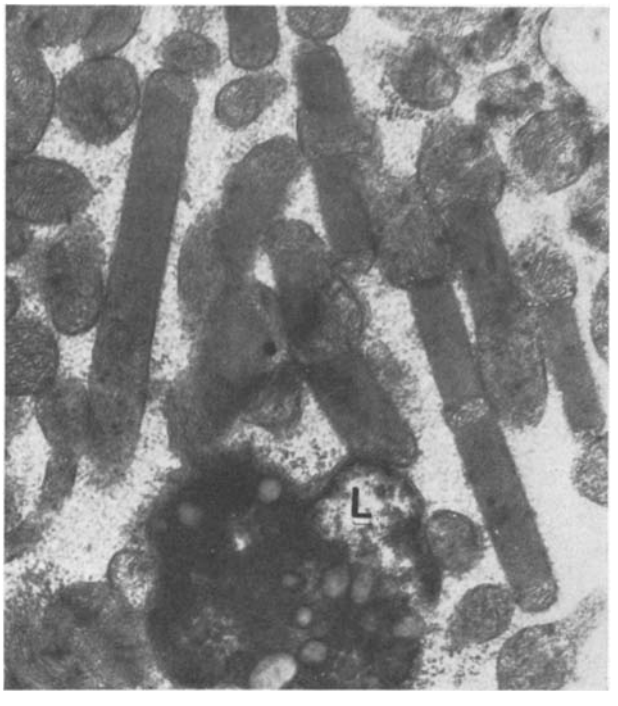

Fig. 3. Among normal mitochondria single abnormal forms clearly showing the hooded ends. l = lipid droplet. ×31,200.

have a moderately dense matrix and a diameter of only 0.03–0.05μm. The most striking feature of these mitochondrial accumulations is the presence of numerous mitochondria which are about 1–3 μm long and 0.15–0.75 μm thick, partly showing a parallel arrangement (Figures 1 and 2). These mitochondria contain a matrix having greater electron opacity than others, so that no internal structure can be seen. However, the surrounding membrane of these organelles exhibits a hoodlike formation at their ends in which membraneous structures are randomly distributed, which gives only this region the typical mitochondrial appearance (Figure 3). The hoods are clearly bordered by the usual mitochondrial membrane, showing a distinct separation of the inner and outer

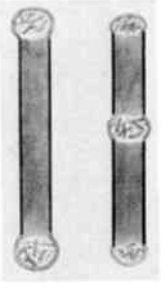

Fig. 4. Schematic illustrations of both types of the unusual mitochondria.

membrane. The internal structures are considered to be mitochondrial cristae. Some of these hooded mitochondria exhibit a similar interruption of their homogeneous matrix in the middle of their drumstick-like shape. A graphic interpretation of these mitochondria is presented in Figure 4. Occasionally, the surrounding cytoplasm contains single lipid droplets from which the lipid has partly been removed during dehydration (Figure 3).

It should be emphasized that similar alterations of the mitochondria were never observed during our studies on muscle biopsies in numerous cases of progressive scleroderma and other collagen diseases[14–17]. Therefore, we are convinced that the unusual mitochondria described have no significance for the pathological changes of the muscle cells observed in collagen diseases. Thus, an explanation of the presence of these mitochondria is not immediately apparent. Such a modification of mitochondria may be dependant, at least in part, on local pathological conditions, which may facilitate exchange of metabolic intermediates between the mitochondria matrix and the surrounding cytoplasm so that the matrix becomes more extensive and of a greater electron density.

Zusammenfassung. Bei elektronenmikroskopischen Untersuchungen an Muskelbiopsien von Kranken mit progressiver Sklerodermie konnten in einem Fall ungewöhnlich viele, grösstenteils kugelige Mitochondrien mit einem Durchmesser von 0,03–0,05 μm subsarkolemmal beobachtet werden. Zwischen diesen befanden sich zahlreiche stäbchenförmige Mitochondrien mit einer Länge von 1–3 μm und einer Dicke von 0,15–0,75 μm, deren Enden etwas kappenartig erweitert sind und eine normale Matrix mit einzelnen Cristae aufweisen, während die übrige Matrix homogen erscheint.

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