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MACROTUBULES IN RAT LEYDIG CELLS. A MODIFICATION OF SMOOTH ENDOPLASMIC RETICULUM?

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Various studies have shown that the testosteron-producing capacity of rat Leydig cells increases during maturation but the total androgen-producing capacity of the cells remains guite constant, except for a transitory increase very early in maturation (4). After anesthetization with thiopental, thoraces of 8 sex matured male rats (Wistar) were opened and the animals perfused with fixative via thoracic aorta. Both testes from each animal were prepared routinely for electron microscopy. Bundles of well-arranged macrotubules (fig. 1) were found in Leydig cells. These cytoplasmic structures were found in the testis of one rat. The macrotubules showed a diameter of 95 nm, with a wall of 14 nm and inside diameter of 59 nm. Macrotubular bundles were always in close relation with cisternae and vesicles of smooth endoplasmic reticulum (SER). Enclosed elements of reticulum appeared regularly round like macrotubules and parts of its membrane begin to thicken (arrow). That arises two questions: 1) Do these macrotubules represent a SER modification and work as reservoir for cholesterol storage, or 2) Whether the mechanism(s) taking part in cholesterol translocation from SER mitochondria is (are) not altered? The enzumes for androgen biosynthesis are found mainly in the microsome fraction, i. e. they are probably associated with agranular endoplasmic reticulum of rat interstitial cells. Cholesterol, one of the main substrates of androgen biosynthesis is synthesized in the endoplasmic reticulum. The amount of agranular reticulum correlates well with the extent of cholesterol synthesis in rat testis and adrenals. In addition the membranes of agranular reticulum may also serve to some extent as a reservoir for the storage of cholesterol (3). It is, therefore, comprehensible that the abundance of agranular membranes in the cytoplasm of interstitial cells serves as a depot of cholesterol for eventual use as a substrate for androgen biosynthesis. Boar Leydig cells show focal SER dilatations that contain a flocculent material and rectangular inclusions suggestive of cholesterol crystals (1). The structural organization of steroidogenic cells predicts that the cytoskeleton and tubulins can play a critical role in the cholesterol transport from SER to mitochondria (5). The wall of mega-

tubules of renomedullar interstitial cells and macrotubules of Leydig cells are built up of spirally twisted miniature tubules (2).

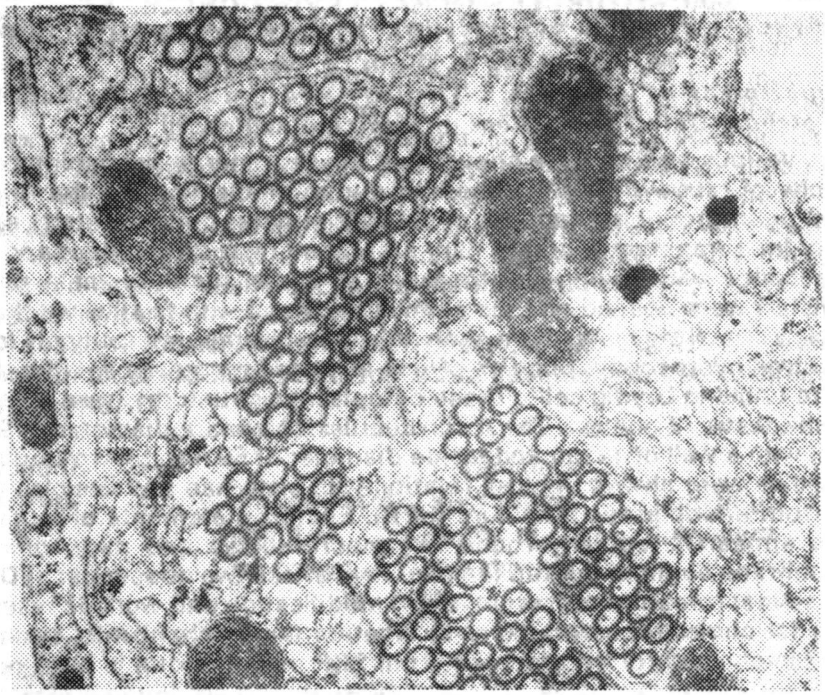

Fig. 1. Marcotubules in close relation with elements of SER. Parts of SER membranes begin to thicken (arrow) x 20 000

In conclusion, the macrotubules in Leydig cells are an unusual form of SER. Its walls may contain cholesterol or its derivatives which are a result of unknown physiopathological states of disrupting cholesterol translocation. Further studies are now reguired to understand the relationship between tubulin, microtubule assembly, macrotubules and steroidogenesis.

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