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Electron Microscopy Studies on the Ultrastructure of the Myocardium in Spontaneously Hypertensive Rats

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A number of morphological studies on the ultrastructure of the myocardium show that myocardial hypertrophy is associated with hypertrophy of the individual cardiomyocytes, as well as an increase in their number (hyperplasia), hyperplasia of the cellular organelles, alterations in cell nuclei and interstitial proliferation. The various subcellular components increase or decrease disproportionally, i.e. can be regulated individually and different patterns may be formed depending on the factor initiating cardiac hypertrophy. Electron microscopy studies of the left ventricle of spontaneously hypertensive rats at the age of 1 month do not show significant differences between them and normotensive control animals. Adult (6-month old) spontaneously hypertensive rats, however, exhibit significant differences, including a higher number of nucleoli, fragmentation of mitochondrial cristae, increase in the myofibril/mitochondria volume ratio, proliferation of rough endoplasmic reticulum and rearrangement of the myofribrils, among others. With the progress of hypertension, the myocardial ultrastructure exhibits signs of hypertrophy, as well as initial degeneration.

Key words: myocardium, electron microscopy, ultrastructure, spontaneously hypertensive rat (SHR)