*Research article*

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# CHANGES OF MITOCHONDRIA IN THE CONTRACTILE CARDIOMYOCYTES DURING POSTNATAL RAT ONTOGENESIS

*The study was conducted as the part of research work "Structural rearrangements of components of the cardiovascular system under conditions of normal and abnormal histogenesis in human and experimental animals" (state registration 0111U006621).*

**ABSTRACT. Background.** CVDs are the number 1 cause of death globally: more people die annually from CVDs than from any other cause. An estimated 17.5 million people died from CVDs in 2012, representing 31% of all global deaths. Of these deaths, an estimated 7.4 million were due to coronary heart disease and 6.7 million were due to stroke. Over three quarters of CVD deaths take place in low- and middle-income countries. **Objective.** Ultrastructural analysis of mitochondria in the rat contractile cardiomyocytes during postnatal ontogenesis. **Methods.** As the object of the study were used neonatal rat hearts, on the $5^{th}$, $10^{th}$, $15^{th}$, $30^{th}$ days of life and mature animals. Hearts were investigated by the transmission electron microscopy. Volume density and numerical density of mitochondria were estimated. The Paired Student's t-test was applied. **Results.** Was conducted a comprehensive ultrastructural analysis of mitochondria contractile cardiomyocytes, which allowed us to determine changes in the qualitative and quantitative parameters of mitochondria during postnatal ontogenesis, and helps to explain the dynamics and the development of mitochondria heart muscles cells after birth. **Conclusion.** It was shown that from the $1^{st}$ to the $5^{th}$ day there was a significant increase in volume density of mitochondria, which was accompanied by the increasing complexity of the ultrastructural organization of organelles. Following $20^{th}$ day of postnatal ontogenesis mitochondrial structure was approaching the definitive condition and on the $30^{th}$ day was the same as the mature myocardium.



**Citation:**
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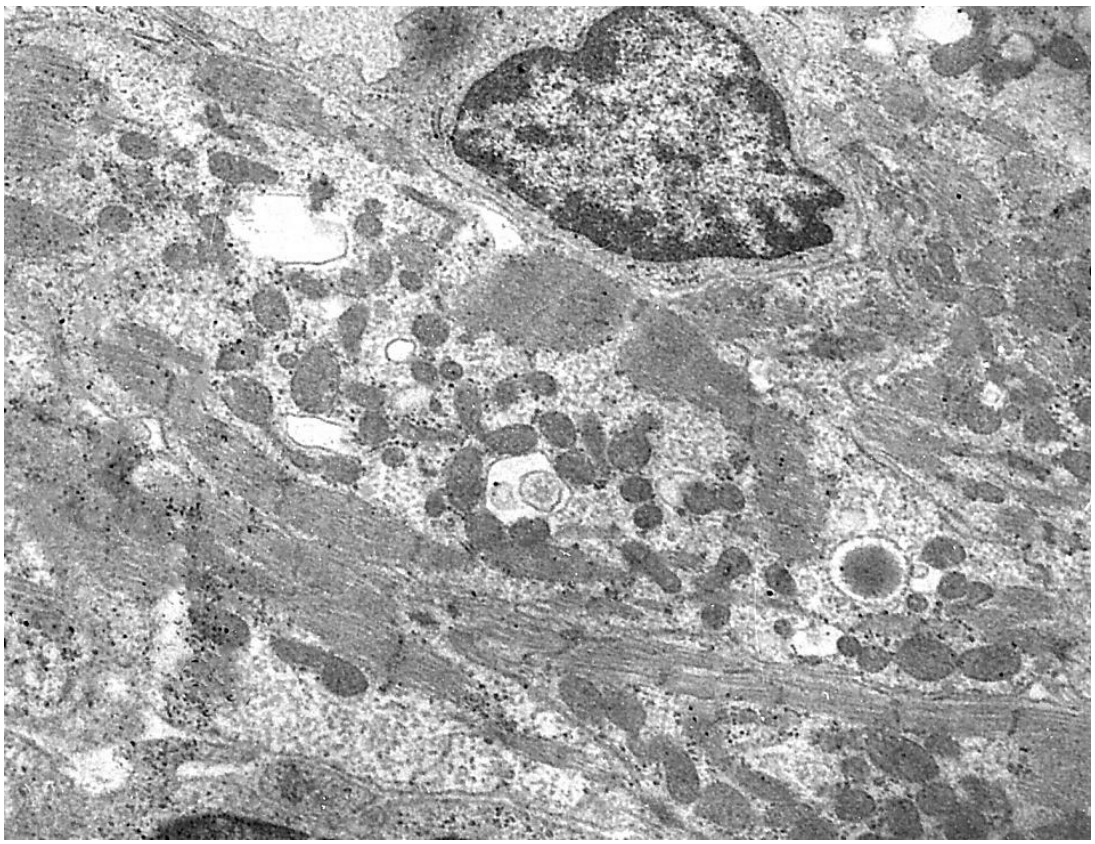

Fig. 1. Left ventricle myocardium of rat in norm on the 1st day of postnatal ontogenesis. Electron micrograph. ×5000.

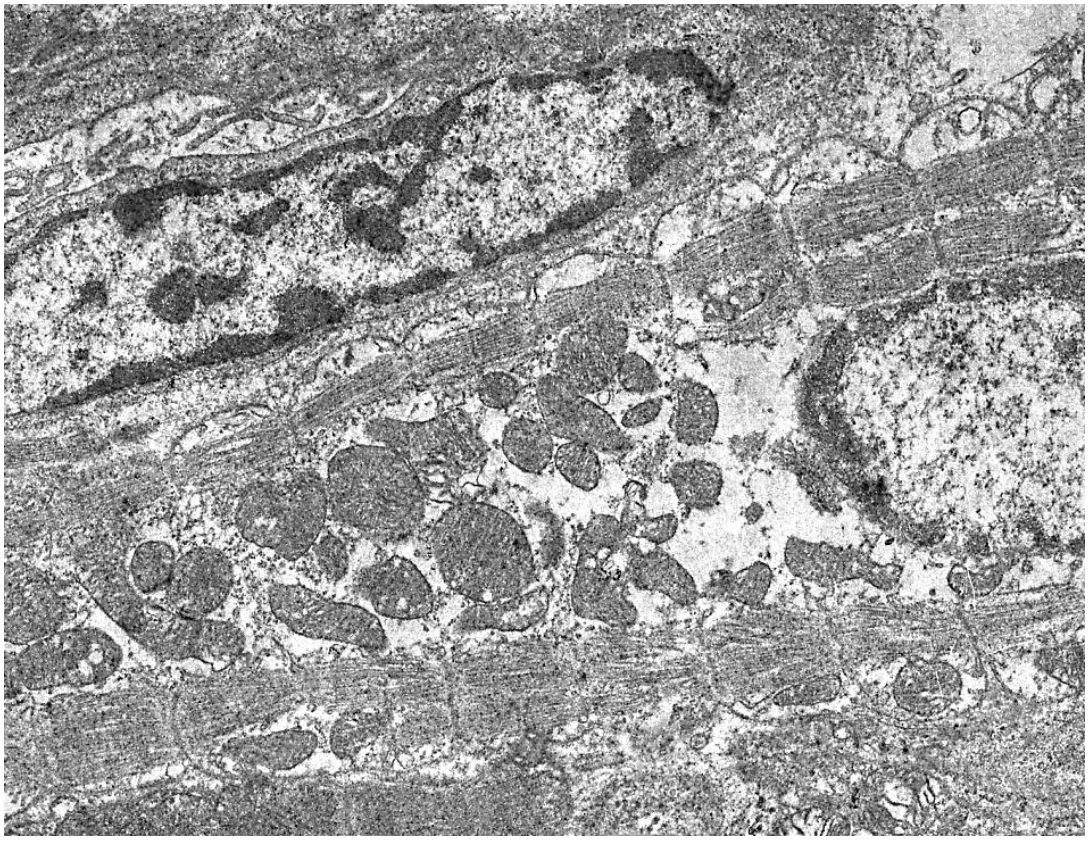

Fig. 3. Left ventricle myocardium of rat in norm on the 5th day of postnatal ontogenesis. Electron micrograph. ×7000.

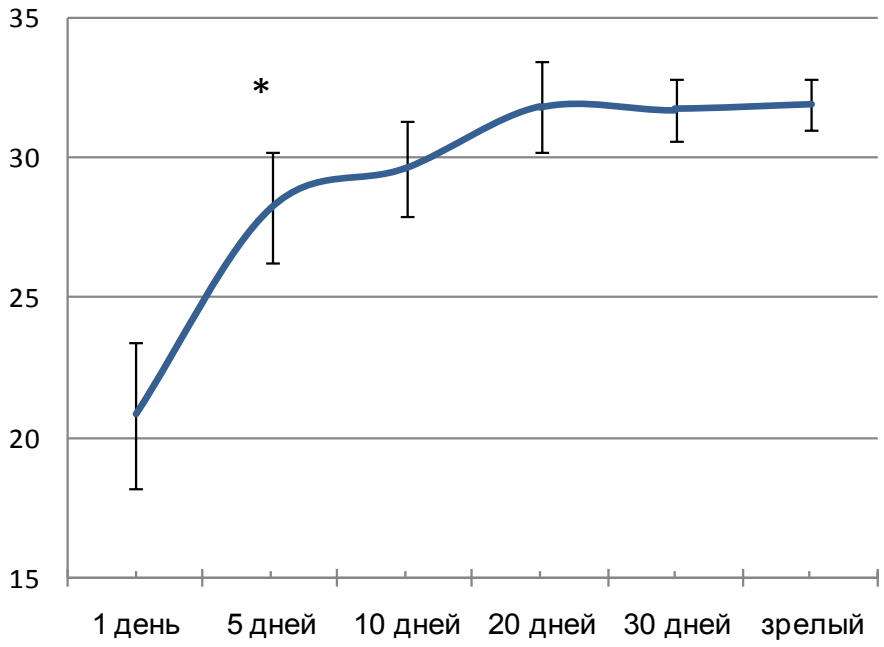


Fig. 2. Dynamics of changes of the specific volume (%) of mitochondria in the left ventricle cardiomyocytes. Postnatal ontogenesis. Asterisk indicates the reliable difference comparing to the previous studied term of development (p <0,05).

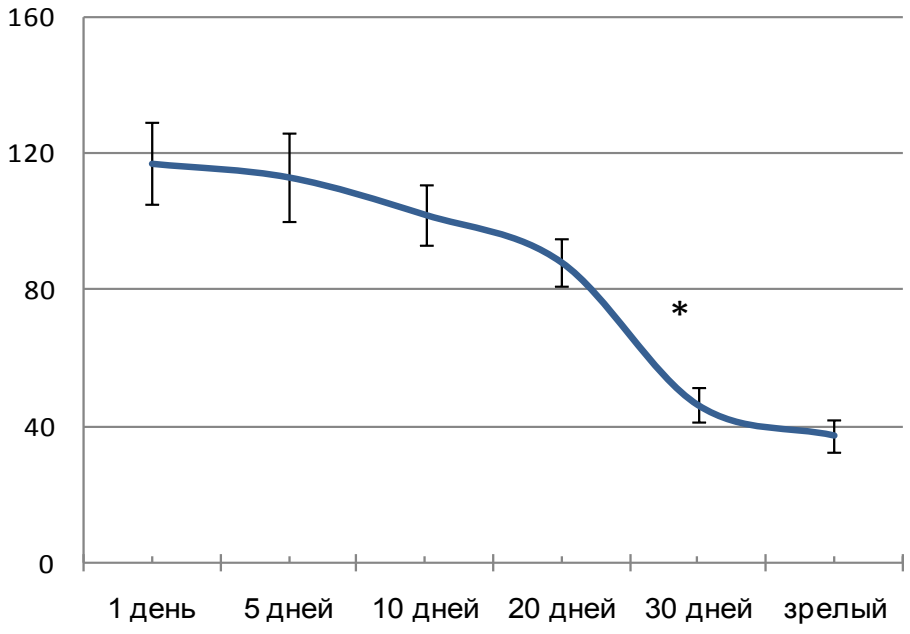


Fig. 4. Dynamics of changes of the specific amount (%) of mitochondria in the left ventricle cardiomyocytes (×10-2 /мкм3). Postnatal ontogenesis. Asterisk indicates the reliable difference comparing to the previous studied term of development (p <0,05).

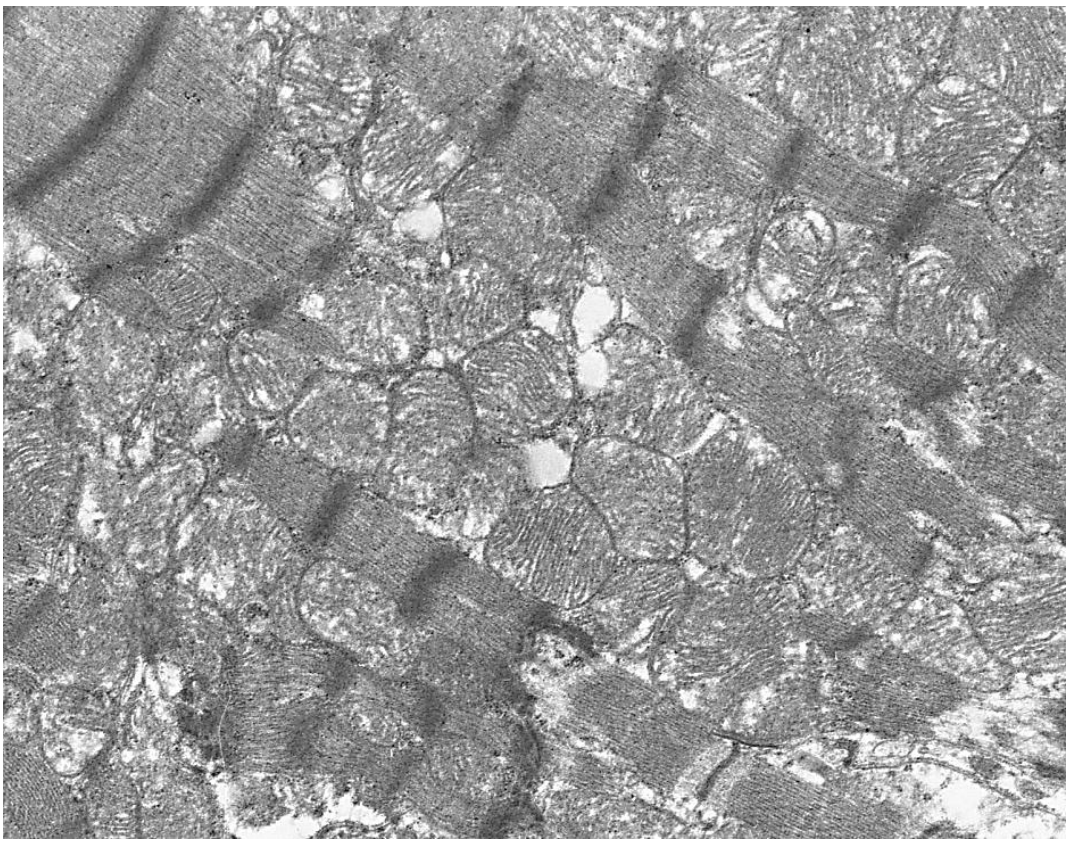

Fig. 5. Left ventricle myocardium of rat in norm on the 30th day of postnatal ontogenesis. Electron micrograph. ×10000.

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