

Patient age related morphological changes in the mitochondria of human pronuclear

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Introduction Mitochondrion is a dynamic organelle and its form changes through fission and fusion. Progression of mitochondrial fission is accompanied with apoptosis and changes its form more rounded. Involvement of apoptosis on female age related deterioration of embryos quality has been widely discussed. In the present study, mitochondrial morphology of human pronuclear stage oocytes (2PNs) was analyzed by transmission electron microscopy (TEM) to investigate if patient age related changes are detectable at ultrastructural level. **Materials and Methods** Twenty donated frozen-thawed 2PNs, 10 from the patients under 34 y.o. (group A) and 10 from over 40 y.o. (group B), were analyzed by TEM. One hundred mitochondria in each oocyte were evaluated by measuring sectional area, length of major axis and circularity. Their averages were compared between the 2 groups. **Results** Average sectional area, length of major axis and circularity of group A vs. B were $0.151 \pm 0.108 \mu\text{m}^2$ vs. $0.148 \pm 0.125 \mu\text{m}^2$, $0.524 \pm 0.188 \mu\text{m}$ vs. $0.489 \pm 0.207 \mu\text{m}$ ($p < 0.01$), and 0.857 ± 0.091 vs. 0.900 ± 0.089 ($p < 0.01$), respectively. **Conclusions** Major axis of mitochondria in younger patient 2PNs was significantly longer than older group. But, there was no significant difference in sectional area. Mitochondria of the older females were circular compared to oval in younger group. The present study may suggest that more apoptotic changes take place in 2PNs from older females because of more rounded mitochondria observed in the older group. Mitochondrial morphometrics could be used for evaluation of embryonic quality.