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Ultrastructural and morphometric evaluation of aged cumulus-oocyte-complexes

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Maternal age is one of the most significant factors influencing oocyte quality (1). 35 years of age seems to be a watershed in reproductive potential. The aim of this study was to reveal the amount and distribution of specific ultrastructural organelles in human mature cumulus-oocyte-complexes belonging to women of different ages (<35 years old; ≥35 years old/ reproductive aging) and to evaluate their different response during 24 hours prolonged culture (defined as in vitro aging) (1). The samples were studied by light and transmission electron microscopy; a morphometric analysis of TEM data was performed (2). In all aged samples, the amount of mitochondria-smooth endoplasmic reticulum aggregates, cortical granules and microvilli decreased ($p<0,05$), while the amount of mitochondria-vesicle complexes increased up ($p<0,05$). Occasional vacuoles were found in oocytes from older women after in vitro aging. A significant ($p<0,05$) increase of zona pellucida thickness was linked to the donor age but not to in vitro aging. A re-compaction of cumulus cells was seen in in vitro aged samples. Morphometric data strongly confirmed our preliminary results (3) revealing that: i) reproductive aging and in vitro aging share specific ultrastructural features ii) In vitro aging can be consider a model for reproductive aging iii) young oocytes seem to be less sensitive to in vitro aging than older ones. The above results may represent a reliable background for further multidisciplinary studies regarding aged oocytes and may be also useful in clinical settings.

References

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Key words
Ultrastructure, human oocyte, aging, morphometry.