Ultrastructural cytoplasmic characteristics of domestic cat (*Felis catus*) oocytes according to ovarian status and *in vitro* maturation.

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The present study describes ultrastructural cytoplasmic characteristics of non-matured oocytes (NMo) and *in vitro* matured oocytes (IVMo) recovered from queen ovaries of three distinct status - follicular, luteal or inactive – using transmission electronic microscopy (TEM). Oocytes harvested from ovaries of this species present some particular characteristics whose knowledge may be fundamental to improve some aspects of reproduction technologies. Cytoplasmic characteristics described includes mitochondrial distribution, lipid droplet size, Golgi complex development, cortical granules localization, the occurrence of gap junctions between cumulus cells and oocyte and, the width of perivitelline space and the presence of microvilli. Queen ovaries were obtained after ovariohysterectomy. Oocytes were harvested from ovaries and, NMo were immediately fixed in glutaraldehyde for transmission electronic microscopy (TEM). IVMo were matured and then fixed. Specimens were divided into NM/IVMo oocytes from inactive ovaries (NMI/IVMI); follicular ovaries (NMF/IVMF) and luteal ovaries (NML/IVML). NMI presented mitochondrial (M) clusters in the cortical zone of the ooplasm; NMI and NMF perivitelline spaces (PVS) were not well developed and their surface contained many erect microvilli (MV) extending into the zona pellucida (ZP). NMI lipid droplets (LD) and vesicles were evenly distributed in the ooplasm except for the cortical zone. Cortical granules (CG) were present only in the peripheral area of the ooplasm. NMF were characterized by evenly distributed mitochondria within the ooplasm. LD were smaller than those observed in NMI and NML. The density of CG in NMF was higher in the peripheral zone, although they could also be observed in other regions of the ooplasm. NML were characterized by peripheral M clusters, but greater clusters could also be observed in other regions of the cytoplasm. The peripheral region occupied by these clusters was narrower in NML than in NMI and NMF. LD were larger in NML compared to NMI and NMF. CG were present only in the peripheral area of the cytoplasm of NML and their density was smaller compared to NMI and NMF. MV were not so developed as in NMI and NMF. Cumulus cell projections penetrated ZP and formed gap junctions (GJ) with the oolemma and well developed Golgi complexes (GC) were observed peripherally in NMF, NML and NMI. IVMo M clusters were no more observed, they migrated centrally and CG were present in small number in the peripheral region of IVMI, IVMF and IVML, although they could be observed in central region of the ooplasm of IVMF. The PV was smaller in NMo than in IVMo. The number of MV of IVMI was similar to NMI. This finding could be applied to IVMI and NML. LD and vesicles of IVMI were not present at the peripheral region of the ooplasm as it could be observed in IVMF and IVML. IVMF presented numerous small vesicles in the cortical region and presented the largest PV compared to IVMI and IVML. MV and granulosa cell projections were almost absent and GJ were not observed. GC were observed peripherally, but they were not so developed as in NMo. These findings demonstrated that ultrastructural analysis of non-matured and in vitro matured oocytes of three different ovarian status is a valuable tool to evaluate oocyte cytoplasmic maturation, an important pre-requisite to the success of *in vitro* maturation protocol.

**Keywords** ultrastructure; oocyte; cat