

## Mitochondrial DNA Increases Even in the Final Stretch of Human Oocyte Growth

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Mammalian oocytes accumulate a large amount of mitochondrial DNA (mtDNA). Although insufficiency of mtDNA seems to underlie the pathogenesis of cell arrest of developing oocytes, the mechanism that regulates the amounts and timing of mtDNA accumulation during oocyte growth remains unknown. To assess the relationships among the age of female donor, ovarian stimulation, cell cycle and diameter of oocytes and their mtDNA copies, we measured the number of mtDNA in immature oocytes obtained from Graafian (diameter of about 19 mm) and small follicles (diameter of about 10 mm). The number of mtDNA was measured using 89 immature oocytes obtained from Graafian follicles after ovarian stimulation or natural cycles and 55 immature cells from small follicles followed by maturation culture. This study was approved by the local IRB and data were analyzed using student t-test and ANOVA followed by Fisher's PLSD test. Regression analysis was also performed. The number of mtDNA copies increased with the increase in diameters of maturing oocytes from 90 to 125  $\mu\text{m}$  ( $r^2 = 0.08$ ;  $P < 0.03$ ). No significant relationship among the number of mtDNA copies and other variables except for cell diameters. Kinetic analysis revealed that the number of mtDNA increased with oocyte growth (increase in cell diameter) and remained unchanged during meiotic maturation. Pathophysiological significance of the number of mtDNA copies and oocyte maturation will be discussed in the conference.

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