題名:Calcium-dependent up-regulation of mitochondrial electron transfer chain gene expressions in human luteinized granulosa cells.

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摘要:OBJECTIVE: To evaluate the transcription and translation ability of mitochondria in terminally differentiated granulosa cells, these cells were incubated with ionic calcium. DESIGN: Prospective laboratory research. SETTING: In vitro fertilization laboratory in a university hospital. PATIENT(S): Granulosa cells were harvested from 50 female patients undergoing IVF. INTERVENTION(S): Analysis of mitochondrial gene expression by semiquantitative reverse transcription-polymerase chain reaction (RT-PCR) and of mitochondrial-encoded proteins by Western blot. MAIN OUTCOME MEASURE(S): Comparison of the RNA expression levels of genes including cytochrome c oxidase subunit I (COX I), adenosine triphosphate synthase 6 (ATPase 6), flavoprotein, and succinate-ubiquinone oxidoreductase, and protein levels of COX I and flavoprotein in different calcium ion treatment groups. RESULT(S): There were dose-dependent increases in RNA expressions of the four genes analyzed from granulosa cells cultured in a serial concentration of calcium ions. This effect was abolished when cells were preincubated with the extracellular calcium-chelating agent, Ethylene glycol-bis (2-aminoethylether)-N,N,N',N'-tetraacetic acid (EGTA). The effect of ionic calcium on both the nuclear- and mitochondrial-encoded subunits also was determined. Expression levels of mitochondrial transcription factor A in RNA significantly increased in granulosa cells that were exposed for 24 and 48 hours to 0.5 and 1 microM A23187. CONCLUSION(S): The present study is the first

report to present calcium-dependent increases in the transcription and translation levels of both nuclear-encoded and mitochondrial-encoded mitochondrial respiratory enzyme subunits and also indicates that mitochondrial transcription factor A is involved in mitochondrial biogenesis.