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# Gene Expression of Cox5a, 5b or 6b1 and their Roles in Preimplantation Mouse Embryos

**최향순**, 이성우, 김남형

*충북대학교 축산학과 동물분자발생연구실 (국가지정연구실)*

To investigate the role of nuclear encoded genes in mitochondrial function during oocyte maturation and early embryogenesis we examined the expression pattern and function of the cytochrome oxidase (Cox) subunits, Cox5a, 5b or 6b1,during oocyte maturation and early embryo development. Transcription of Cox5a, 5b or 6b1 was observed in oocytes and during early development their expression levels were abundant in mature oocytes (MII) and zygotes (1C), and the lowest at the 2-cell stage (2C), but gradually increased from 4-cell to blastocyst stage. Immunocytochemical studies revealed that COX5A, or proteins were expressed in all blastomeres of the blastocyst. Silencing of mRNA expression by RNA interference (siRNA) did not inhibit oocyte maturation nor developmental events up to the morula and blastocyst stages, but disrupted mitochondrial distribution. Significantly higher apoptosis, and lower cell numbers were observed in siRNA treated blastocysts. Real time RT PCR revealed that silencing of Cox5a, 5b or 6b1 did not alter mRNA levels of Bcl-xL, but increased transcription levels of proapoptotic genes, Bax and caspase3. Furthermore, mRNA and protein levels of E-cadherin were decreased in siRNA microinjected blastocysts. These results suggest that gene expression of the Cox subunits, Cox5a, 5b or 6b1, are not required for embryo developmental events up to blastocyst stage. The loss of these genes leads to mitochondrial dysfunction that results in apoptosis of the blastocyst stage embryos.

Keywords: ***Cox, mitochondria, knock down, mouse embryo***