

Epidermal growth factor has different action pathway with follicular stimulating hormone during nuclear maturation of mouse oocytes

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OBJECTIVE: The stimulatory effects of EGF and FSH on oocyte maturation have been reported in various mammalian species. And some reports presented FSH enhanced the effect of EGF on oocyte maturation. However, the mechanism of the interaction between EGF and FSH on nuclear maturation of mammalian oocytes is not fully understood. Therefore, we examined the interaction between EGF and FSH on nuclear maturation of mouse oocytes using the EGFR inhibitor.

DESIGNS: The maturation rates of cumulus oocyte complex (COC) were examined in medium supplemented with or without EGF, FSH or EGFR inhibitor.

MATERIALS AND METHODS: Germinal vesicle (GV) stage oocytes were obtained from 3-4weeks PMSG primed BCF1 hybrid mice and cultured in TCM-199 medium with 0.4%PVP supplemented with/without EGF (1ng/ml), FSH (1ng/ml) or EGFR specific tyrosine kinase inhibitors: Tyrphostin AG 1478 (500nM) for 14-15hr. Rapid staining method were used for the assessment of nuclear maturation

RESULTS: The nuclear maturation rates (MII %) of EGF, FSH and FSH/EGF combination group (83.3% and 88.1% and 96.4%) were significantly higher than that of control group (50.9%; $P < 0.05$.) The effect on nuclear maturation of EGF was significantly blocked by EGFR inhibitor (tyrphostin AG 1478), however the effect of FSH was not blocked by tyrphostin AG1478. The results showed the effects of EGF, FSH and EGFR inhibitor on nuclear maturation of cumulus-intact mouse oocytes.

CONCLUSION: These results show that EGF has a stimulatory effect as well as different action pathway with FSH on maturation of mouse oocyte in vitro. Therefore further studies will be needed to find the signaling pathway of EGF associated with maturation.