

P045

Influence of human follicular fluid and its components on the development of embryos

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INTRODUCTION: To investigate the effects of human follicular fluids and their components on the in vitro development of mouse embryos.

METHODS:

DESIGN: Prospective, controlled study

SETTING: Medical center laboratory

SUBJECTS: Two-cell embryos from ICR mouse

INTERVENTIONS: After hyper-stimulation, two-cell embryos were collected and treated with or without human follicular fluid (obtained during IVF treatment after controlled ovarian hyperstimulation) from follicles of different size and the fluid components separated by centrifugation.

MAIN OUTCOME MEASURES: The in vitro development of ICR mouse embryos from two-cell to blastocyst and hatching stage

RESULTS: The rates of two-cell mouse embryos developed to blastocyst after in vitro culture for 72 hours in HTF medium with human follicular fluid (hFF) from large follicles, small follicles and control were 88.2%, 90.4% and 75% ($p < 0.05$). After in vitro culture for 96 hours, the rates of development to hatching stage were 63.0%, 66.1% and 44.6% ($p < 0.05$). The embryonic developments were significantly enhanced by the hFF. With the addition of hFF containing only small molecules, hFF containing only large molecules and control medium, the blastocyst formation rates were 100%, 76.2% and 75% ($p < 0.05$). The hatching rates were 98.5%, 39.3% and 44.6% ($p < 0.05$). The embryonic developments were enhanced significantly only by hFF containing small molecules. These active components exert the same embryotrophic effect, no matter they come from small or large follicles.

CONCLUSIONS: Human follicular fluid contains active embryotrophic components that help the in vitro development of mouse embryos. These components are contained in the small molecule fraction of the follicular fluid. Identification and extraction of these components and further investigation for their effects on human embryos may be worthwhile.