

## **Effects of Epidermal Growth Factor (EGF) and Anti-EGF on Early Embryonic Development in Mice**

Infertility Research Laboratory, Cheil Medical Research Institute, Samsung Cheil Hospital

**Hye-Kyung Byun and Ho-Joon Lee**

Growth factors have been known to regulate preimplantation embryonic development and differentiation in mammals. The present study was carried out to investigate the effects of EGF and anti-EGF on early embryonic development and hatching in mice.

Mouse early 2 cell embryos were cultured to blastocyst stage in Ham's F10 medium supplemented with EGF (1-1000 ng/ml) for 72 hrs. The embryos from 2 cell to morular stage were cultured in the medium supplemented with anti-EGF (whole serum diluted from 1:10 to 1:1000) for 48-72 hrs. Developmental and hatching rates of the embryos which were cultured with EGF or anti-EGF were compared to those of control.

The development was enhanced in over 10 ng/ml of EGF supplemented groups. Hatching rates in 1, 10, 100 and 1000 ng/ml groups (57.5, 62.5, 66.7 and 64.1%, respectively) were significantly ( $p < 0.01$ ) higher than that of control (35.0%). There was no significance in embryonic development between control and the anti-EGF supplemented group (1:1000) from 2 cell to morular stage. But when the embryos were cultured in the anti-EGF (1:100), in 2 and 4 cell stage groups, all embryos were blocked at the 4-8 cell stage and degeneration was observed; in 8 cell and morular stage groups, blastulation was delayed over 48 hrs and hatching was inhibited comparing with control (in 8-cell stage, 2.0% vs 44.0%; in morular stage, 6.2% vs 58.3%).

In these results, EGF enhanced blastulation and hatching of mouse embryos. On the other hand, anti-EGF inhibited development and

hatching of the embryos. Although the concentration of the anti-EGF was indeterminable, it is thought that anti-EGF in the culture medium bound EGF secreted from the embryo by itself and neutralized the EGF activity during embryonic development and hatching. But in the low concentration of anti-EGF supplemented group (1:1000), the endogenous EGF overcame the developmental blocking which was caused by anti-EGF. It is concluded that EGF is essential on development and hatching in mouse embryos and that anti-EGF inhibits EGF activity in the embryos. Therefore, it is suggested that EGF is one of the most important factors in the early embryonic development of mouse as autocrine and paracrine mechanism.

## **P-14**

### **Effect of Fetal Calf Serum, Amino Acids, Vitamins and Insulin on the Blastocoel Formation and Hatching of *In Vivo* and IVM/IVF Derived Porcine Embryos Developing *In Vitro***

Department of Animal Sciences, Kon-Kuk University

**D.B. Koo, J.Y. Ju, N.H. Kim, H.T. Lee and K.S. Chung**

The objective of this study is to determine the effects of fetal calf serum, nonessential MEM amino acids, MEM vitamins and insulin on the blastocoel formation, expansion and hatching in porcine embryos developing *in vitro*. Addition of 20% fetal calf serum to the NCSU 23 medium significantly decreased the compaction and blastocoel formation of 1- to 2-cell embryos developing *in vitro*. In contrast, more 1- to 2-cell embryos commenced blastocoel formation and hatching in the media containing amino acids than controls. When early compacted