

## TGF-beta1, and TGF-beta Receptor Type I and Type II are present in Bovine Embryos

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Although effect of TGF  $\beta_1$  on preimplantation embryo development was reported at mice, little information relevant to this subject is known in bovine. The objectives of this study were to investigate TGF  $\beta_1$  and TGF  $\beta_1$  receptors type I and II expression, known as important factors in the embryo development, at unfertilized oocytes and fertilized embryos that will be used as basic data to be compared to NT embryos. We postulated that TGF  $\beta_1$  may have a beneficial effect on the preimplantation embryo and show different expression patterns as embryo stages change. We have used immunocytochemistry to investigate the presence in unfertilized oocytes and preimplantation embryos of TGF  $\beta_1$  and the essential components of the TGF  $\beta_1$  signalling pathway, TGF  $\beta_1$  receptors type I and II. We found that both receptors, as well as TGF  $\beta_1$ , were present in the unfertilized oocytes. This indicates that TGF  $\beta_1$  is a maternally expressed protein. At the morulae and blastocyst stages the TGF  $\beta_1$  receptor type II was not present, but the TGF  $\beta_1$  receptor type I was present at both stages and we can confirm the TGF  $\beta_1$  expression of high level at 8-cell stage. These findings support our hypothesis that the TGF  $\beta_1$  and TGF  $\beta_1$  receptors may interact with the oocyte and preimplantation embryo, and that TGF  $\beta_1$  signalling may be important for the development of the oocyte and the preimplantation embryo.

Key words) *Transforming growth factor-beta1(TGF  $\beta_1$ )*, *Nuclear transfer(NT)*, *Preimplantation embryo*