Modulatory Role of fibroblast Growth Factor (FGF) 2 on Ovine Trophoblast Functionality

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Modulatory Role of Fibroblast Growth Factor (FGF) 2 on Ovine Trophoblast Functionality

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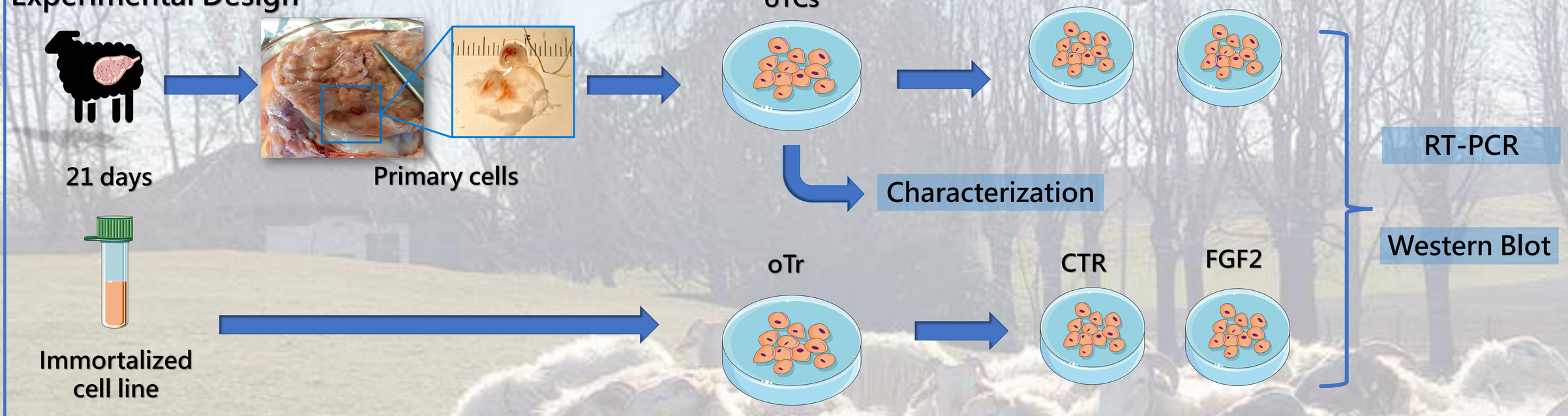
Background. During embryo implantation in sheep, trophoblast cells invade the endometrium to establish the fetal-maternal cross talk. Fibroblast growth factor-2 (FGF2) affects conceptus development by regulating trophoblast cells differentiation and function. Reduction of FGF2 release leads to impaired placentation associated with gestational complications, such as early pregnancy loss and intrauterine growth restriction.

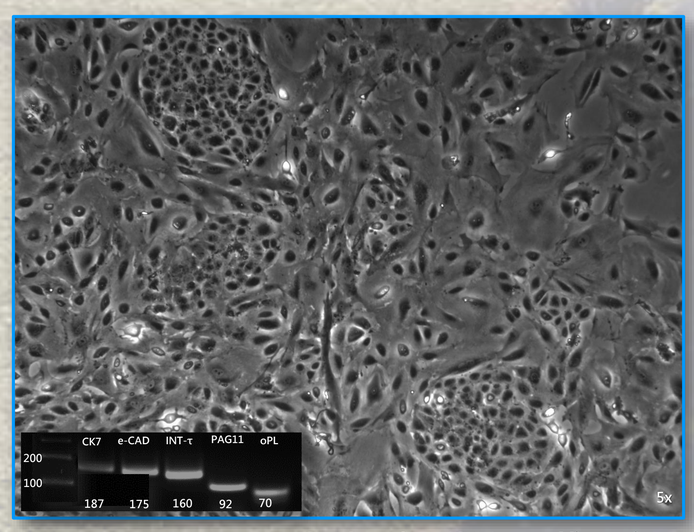
Goal. The aim was to examine the FGF2 intracellular pathway and activity on ovine trophoblast cells (oTCs) in the early stage of placentation.

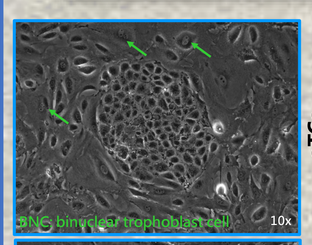
Experimental Design

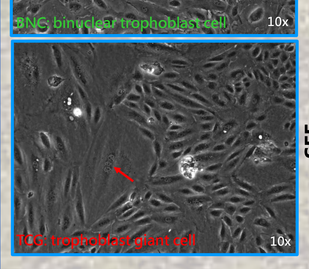


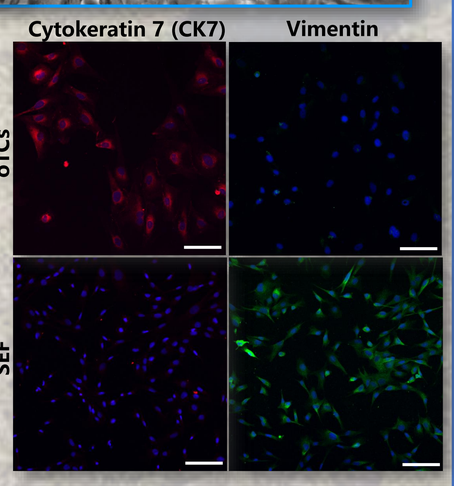
Sheep placenta was collected at the slaughterhouse on 21 days old. Primary cells were treated with 50 ng/ml FGF2 for 24 h to study its effects on cell functionality (proliferation and migration assay), gene expression profile and mTOR signalling pathway.

Characterization

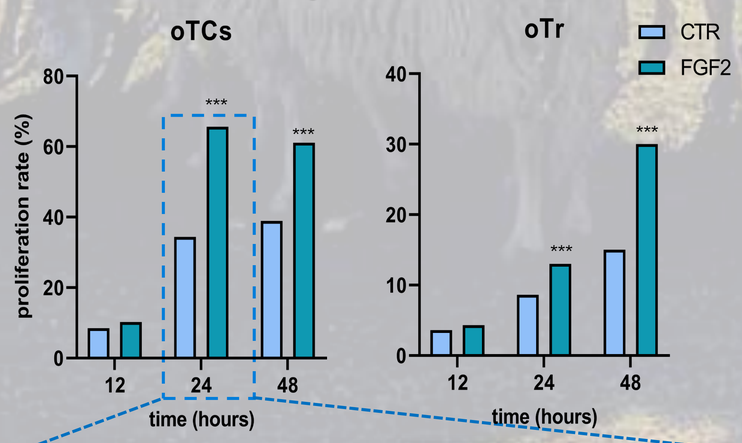


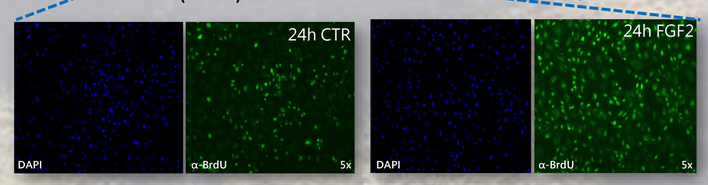


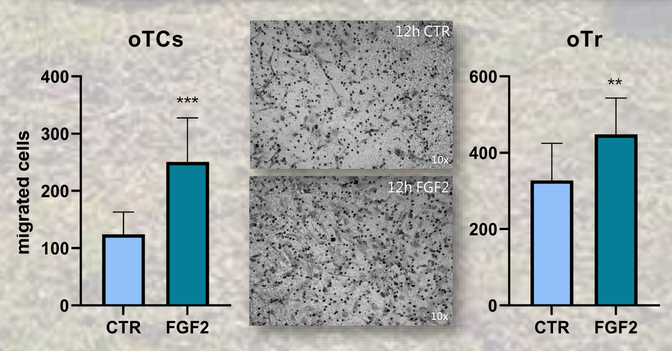




Cell functionality

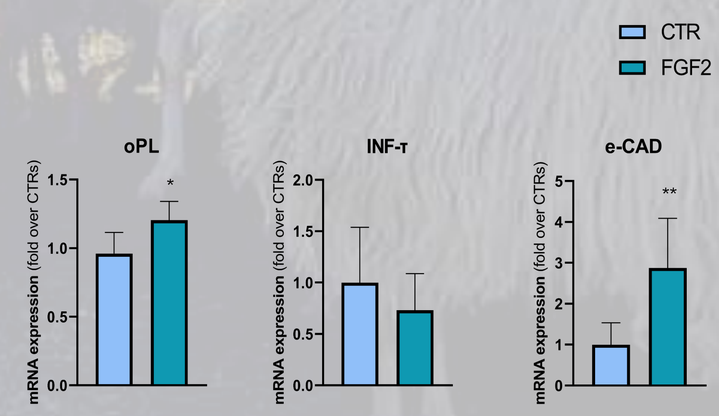


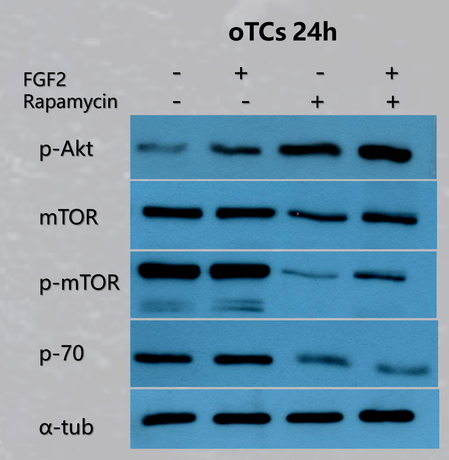




*p < 0.01; ** p < 0.001, *** p < 0.0001

Gene and protein expression





*p < 0.05; **p < 0.01

oTCs showed placental morphological properties, such as binucleate cells and multinucleated syncytium-plaques expressing peculiar trophoblast markers.

FGF2 effect on cell functionality response was confirmed by oTr cell line. Proliferation rate and migration activity significantly increased in FGF2-treated oTCs.

FGF2 up-regulated e-CAD and oPL gene expression.
FGF2 effect was mediated by Akt/mTOR signalling pathway activation in oTCs.

Conclusion. These findings support that FGF2 directly affects trophoblast cell functionality during the early stage of placentation in sheep by modulation of mTOR signalling pathway.

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