GENE EXPRESSION STUDIES IN ENDOMETRIAL-DERIVED STROMAL CELLS

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Infertility is a disease of the reproductive system defined by the failure to achieve a pregnancy after 12 months or more of regular unprotected sexual intercourse [1]. According to statistics, 10 - 15 % of couples in the world face this problem, of which 20 % are diagnosed with unexplained infertility. Unexplained infertility is a condition in which no reproductive system pathology is detected, but pregnancy still fails. The main treatments include intrauterine insemination with ovarian hyperstimulation and *in vitro* fertilization. The effectiveness of the procedures is 18 % and 40 % respectively [2]. Therefore, there is a demand for new diagnostic and therapeutic methods. Studies show that endometrial dysfunction can lead to failed implantation and early pregnancy loss making endometrial cellular changes an attractive target for studies of unexplained infertility [3].

In the present study, we aimed to investigate the expression of pluripotency markers (*OCT4, SOX2, NANOG, NOTCH1, LIN28*), genes related to aging and epigenetic regulation (*CCNA2, HMGA2, TOP2A, TERF1, HDAC1, DNMT1, DNMT3A, DNMT3B*) and proliferation and regeneration related genes (*PDGFB, PDGFRB, P53, VIMENTIN, VEGFR2, E-CADHERIN*) *ex vivo* in cells of patients who conceived or did not conceive after *in vitro* fertilization procedures. Gene expression changes were evaluated by using RT-qPCR. Our study revealed that expression of pluripotency markers during cell cultivation increased in cells of patients who conceived, while decreased or remained unchanged in cells of patients who did not conceive. Expression of aging-related genes changed only in cells of patients who did not conceive, whilst expression of epigenetic regulation related genes changed in both cells of patients who conceived and patients who did not. Expression of proliferation and regeneration related genes showed similar changes in cells of patients who conceived and who did not conceive (Fig. 1).

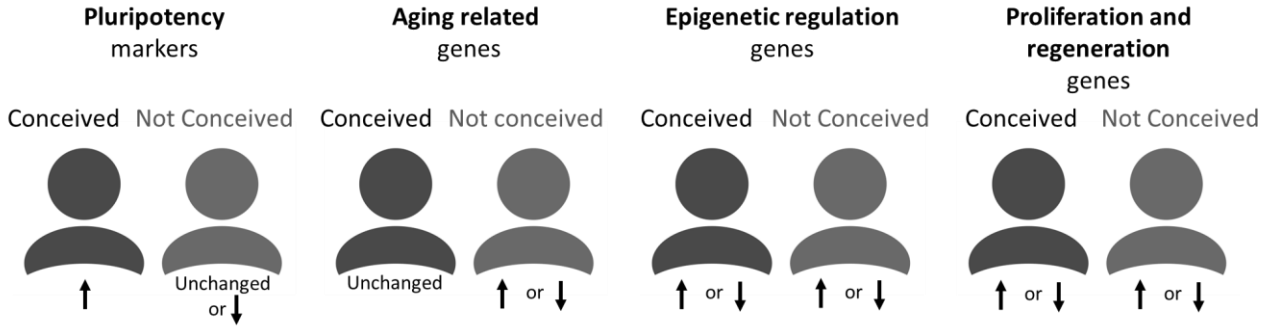

Fig. 1. Relative gene expression changes in after *in vitro* fertilization conceived and not conceived patient endometrial-derived stromal cells *ex vivo*

Consequently, we suggest that the differences in pluripotency markers' gene expression could be important for diagnostics of unexplained infertility.

[1] World Health Organization (2019). Infertility definitions and terminology. (2016, October 21). Retrieved from https://www.who.int/reproductivehealth/topics/infertility/definitions/en/.
[2] A. Quaas and A. Dokras, Diagnosis and Treatment of Unexplained Infertility, Reviews in Obstetrics and Gynecology **1** (2), 69–76 (2008).
[3] S. Morelli, P. Yi, L.T. Goldsmith, Endometrial Stem Cells and Repoduction, Obstetrics and Gynecology International **2012**, 851367, (2012).