SOD1 Expression in blastocoel fluid-conditioned media from IVF generated embryos may serve as a biomarker for pregnancy outcomes

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INTRODUCTION

- National success rate for first attempt egg retrieval for IVF among women <35 years of age is 55%, but this rate drops as age increases.
- Preimplantation genetic testing for aneuploidy (PGT-A) of IVF-embryos has been developed to improve IVF success rates.
- PGT-A assesses trophectodermal cells from day 5 embryos but is problematic due to growing evidence of placental mosaicism.
- Previous studies have outlined the relationship between SOD1 release and implantation potential. 1
- SOD1 is known to have antioxidant capabilities—helping combat ROS. 2

METHODS

SOD1 expression in blastocoel fluid

53 blastocoel fluid-conditioned media samples with know PGT-A status and/or pregnancy outcomes were obtained. cDNA was synthesized from individual samples, then SOD1 expression was assessed with RT-qPCR (TaqMan Gene Expression Assay). GAPDH was also assessed as a housekeeping gene in each sample.

$\text{H}_2\text{O}_2$ levels in media samples

$\text{H}_2\text{O}_2$ levels were also measured using individual blastocoel fluid-conditioned media samples using a $\text{H}_2\text{O}_2$ fluorescence assay (Abcam) with a Tecan fluorescent plate reader.

RESULTS

- **Figure 1:** Expression levels of SOD1 among 53 blastocoel fluid-conditioned media samples. SOD1 expression was higher in positive implantation embryos compared to negative implantation embryos ($p=0.064$)

DISCUSSION

- This study reveals a positive correlation between SOD1 levels and positive pregnancy outcomes
- Blastocoel fluid conditioned media contains varying levels of ROS (hydrogen peroxide) that can be detected in individual media samples.
- We hypothesize SOD1 expression in preimplantation embryo could serve as a means for combatting ROS during preimplantation embryo development
- Further research is required to elucidate the specific mechanism behind SOD1 action in the preimplantation embryo.

REFERENCES


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