

33: ELUCIDATING APOPTIC GENE EXPRESSION SIGNATURES IN BLASTOCOEL FLUID FROM EUPLOID BLASTOCYSTS THAT ARE ASSOCIATED WITH PREGNANCY OUTCOMES

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Objective

Uncovering the molecular mechanisms that regulate early development is crucial to understanding why the transfer of euploid embryos does not always result in a live birth. Apoptosis occurs during pre-implantation embryo development and possibly serves as a corrective mechanism to sacrifice cells for overall embryo competence. Remnants of early apoptosis can be detected in blastocoel fluid. Not all euploid embryos successfully implant which may be due in part to altered apoptosis during preimplantation development. This study compared apoptotic gene expression in an embryo that resulted in a live birth, with other euploid (3 leading to pregnancy and 3 resulting in loss of pregnancy) and aneuploid embryos using blastocoel fluid from each day-5 embryo.

Design

Retrospective analysis of day-5 euploid blastocoel apoptotic gene expression and implantation outcome.

Material and Methods

Following laser-assisted trophoctoderm biopsy of ICSI-generated day-5 blastocysts, each individual blastocoel fluid-conditioned medium (25µL) was saved. Biopsied cells were assessed for ploidy status via next-generation sequencing. Gene expression in blastocoel fluid was assessed by RT-PCR utilizing TaqMan arrays for human apoptosis genes (92 genes total).

Results

Increased gene expression of caspase-7, an executioner caspase, was observed in pregnancy positive blastocoel fluid samples, but was not detected in pregnancy negative samples (or in aneuploidy samples). Increased gene expression of Bcl-2-like protein 13 (Bcl2-L-13) was detected in embryos that did not implant.

Conclusions

This study provides preliminary evidence that apoptotic gene expression in blastocoel fluid from day-5 euploid embryos differs between embryos that successfully implant versus those that do not. Successfully implanted embryos (one yielding live birth) exhibited increased expression of an apoptosis activator, caspase-7. Bcl2-L-13 gene expression was detected to a higher degree in embryos that failed to implant. This mitochondrial gene plays a role in mitophagy as well as inhibiting apoptosis in some cancer cells.

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