MOSAICISM DETERMINATION WITH NEXT-GENERATION SEQUENCING (NGS) BY REANALYSIS OF DNA SAMPLES FROM VITRIFIED EUPLOID BLASTOCYST TRANSFER (VFET) CYCLES.

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OBJECTIVE: Compare trophectoderm mosaicism rates in both successful and unsuccessful VFET cycles.

DESIGN: 101 DNA samples determined to be euploid were re-karyotyped using NGS (n=48 yielded confirmed deliveries).

MATERIALS & METHODS: Trophectoderm (TE) biopsies were performed on day 5 and 6 before microSecure vitrification (μS-VTF) in DMSO-free VTF solutions (ICE). Whole genome amplified DNA samples from TE biopsies previously determined to be euploid were analyzed by NGS for copy number variation (CNV) using the VeriSeq-PGS platform (Illumina). The CNV profiles obtained from sequencing were compared to the CNV profiles originally obtained using aCGH technology, using CAP validated calling protocols, to assess for the presence of mosaicism.

RESULTS: NGS detected TE mosaicism in 26% of the embryos retested ranging in value from 25-60% mosaic, of which 8% were reclassified either as duplication/deletion or aneuploid based on a level of ≥50% mosaicism detected in the TE biopsy. 50% (n=4) of those reclassified embryos delivered.

DISCUSSION: Since 2011, approximately 75% of our VFET/PGS cycles using aCGH determined euploid BL typically implant and maintain viable pregnancies. The increased coverage and sensitivity of NGS provides a good platform for detecting mosaicism, but further research is needed to determine the significance of mosaicism in the TE and its effect on successful pregnancies.