

EUPLOIDY RATES AT ONE IVF CENTER CAN SIGNIFICANTLY VARY BETWEEN TWO GENETIC TESTING LABORATORIES PERFORMING PGT-A WITH NGS

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Objective: Variability in euploidy rates have been seen by fertility centers screening embryos for preimplantation genetic testing for aneuploidy (PGT-A) using next-generation sequencing (NGS). This variability is also seen among oocyte donor cycles (1). A number of differences can attribute to the observed variability; different patient populations, clinic-related variables, different laboratory techniques and/or criteria used for detecting/classifying mosaic embryos. The objective of this study was to determine whether euploidy rates differ among two NGS laboratories analyzing trophectoderm samples from the same IVF center. **Design:** Retrospective analysis **Materials and Methods:** Percentages of euploid and mosaic embryos were analyzed for each of the two NGS laboratories (3,908 embryos at Laboratory A and 327 embryos at Laboratory B). Chi-squared test was used for statistical analysis. Both laboratories use high resolution NGS platforms with similar protocols and analysis algorithms. Including sequencing across short (30-60 BP) reads, alignment across the genome into approximately 1 MB bins equally distributed along the length of each chromosome, and proprietary smoothing and normalization protocols. Both labs use systems internally validated and approved by the New York State Department of Health. The resolution level for each system is approximately 10 MB. **Results:** Euploidy rates were significantly higher for Laboratory B compared to Laboratory A (Table 1). Percentage of mosaic reported embryos were significantly lower for Laboratory B, compared to Laboratory A (Table 1). **Conclusion:** Two PGT-A laboratories using NGS technology, analyzing trophectoderm biopsies from the same IVF center, had significantly different reported euploidy rates. Lack of standardization in the diagnosis of mosaicism may lead to some of the observed differences in the rate of reported euploid embryos. This poses a significant challenge in the clinical management of patients with PGT-A tested embryos. It will be important to compare the clinical outcomes of euploid embryo transfer cycles between genetic testing laboratories.

Table 1: Euploidy and mosaicism rates for Laboratories A and B

	Genetics Laboratory A	Genetics Laboratory B
Total embryos analyzed	3908	327
<u>Euploid embryos (%)</u>	1552 (40.4%)*	172 (52.6%)*
Mosaic embryos (%)	659 (16.9%)*	7 (2.1%)*

*: Statistically significant differences, p<0.0001

Reference:

1. Munné S, Alikani M, Ribustello L, Colls P, Martínez-Ortiz PA, McCulloh DH; Referring Physician Group. Euploidy rates in donor egg cycles significantly differ between fertility centers. Hum Reprod. 2017 Apr 1;32(4):743-749.