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**UTILIZING MULTI-ETHNIC DISEASE MODELING TO UNDERSTAND THE BIOLOGICAL PROCESSES OF EMBRYONIC MOSAICISM**

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**OBJECTIVE:**

While disparities in Assisted Reproductive Technology outcomes have been correlated with race and ethnicity, it has not been determined whether this disparity extends to the incidence of embryo mosaicism. The aim of this study is to analyze the mosaic status of embryos using preimplantation genetic testing for aneuploidy (PGT-A) among various racial groups.

**MATERIALS AND METHODS:**

This retrospective study included all IVF cycles in a single academic institution in which PGT-A was performed using Next Generation Sequencing from January 2020 to February 2022. Our primary outcome was embryo mosaicism status; secondary outcome was the level of mosaicism. Embryos were classified as euploid if the trophoctoderm (TE) biopsy result contained <20% mosaicism; low level mosaic with 20-40%; high level mosaic with 41-80%; and aneuploid with >80%. Baseline demographics including age, BMI, AMH, baseline FSH, baseline antral follicle count, infertility diagnosis and gravidity, cycle characteristics and embryologic data were collected. ANOVA, Kruskal-Wallis, chi-square, and multivariate logistic regression were used for statistical analysis.

**RESULTS:**

A total of 1583 women that underwent an IVF cycle with ICSI/ PGT-A had mosaic embryos: Of these women, 786 self-reported as White (49.6%), 92 as Black (5.8%), 389 as Asian (24.5%), 185 as Hispanic (11.6%), 47 as other (2.9%), and 84 (5.3%) did not specify their race. Black women were significantly older ( $38.0 \pm 3.1$  yrs,  $p=0.006$ ), had a higher BMI ( $28.1$  kg/m<sup>2</sup>,  $p=0.001$ ) and a higher prevalence of tubal and uterine factor infertility (14.5%,  $p<0.0001$ ; 9.4%,  $p<0.0001$  respectively). Asian women had the highest fertilization rate ( $79.7 \pm 16.3\%$ ,  $p<0.0001$ ), however, Black women had the highest rate of biopsied blastocyst (70.6%,  $p=0.0001$ ) compared



to other groups. All other cycle characteristics were similar among groups. A total of 10650 embryos were analyzed, 5052 were reported as euploid (47.5%), 3040 as aneuploid (28.5%), 2256 as mosaic (21.1%) and 302 as indeterminate (2.9%). After re-biopsing the indeterminate embryos, a total of 2362 mosaic embryos were included in the analysis. The rate of embryonic mosaicism was similar among all groups (22.3%,  $p=0.6$ ), however, Black women had on average more high-level mosaic embryos (68.5%) when compared to their counterparts (White 48.1%, Asian 49.4%, Hispanic 52.3%, other 50.1%, non-specified 53.5%,  $p=0.02$ ). After adjusting for age, BMI, infertility etiology, fertilization rate and number of biopsied embryos there was no association between race and higher odds of mosaicism (aOR 0.96, CI 95% 0.6-1.3,  $p=0.85$ ) nor higher odds of high-level mosaic embryos (aOR=1.01, 95% CI 0.9-1.08,  $p=0.51$ ).

### **CONCLUSIONS:**

The rate of embryos identified as mosaic was comparable among women of different racial backgrounds. These results suggest that the occurrence of mitotic errors involved in mosaicism is neither influenced by self-reported race nor ethnicity.

### **IMPACT STATEMENT:**

With the increasing availability of large-scale multi-ethnic disease modeling, we are able to provide a better insight to biological processes of embryonic mosaicism.

### **REFERENCES:**

N/A