

The impact of ethnic differences on embryo morphokinetics and clinical outcomes: the importance of racial admixture

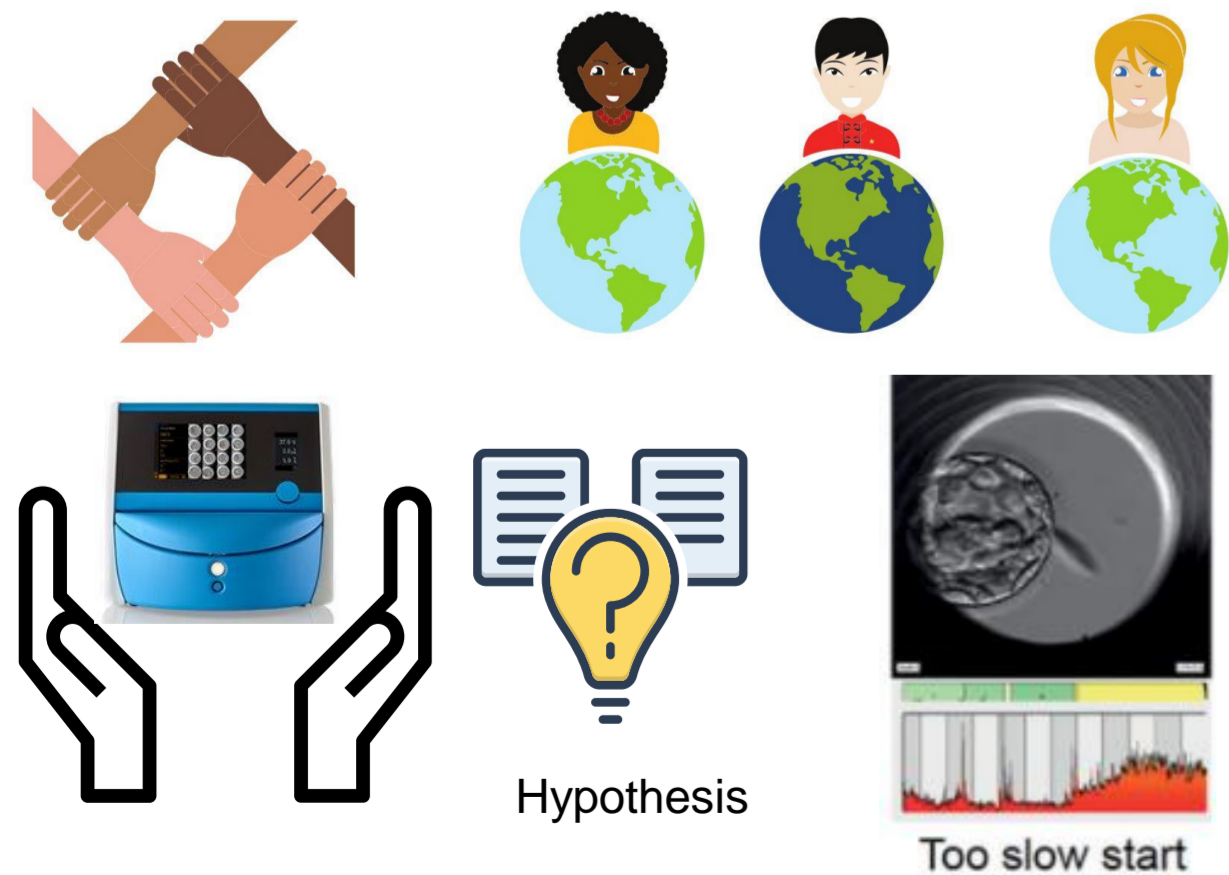


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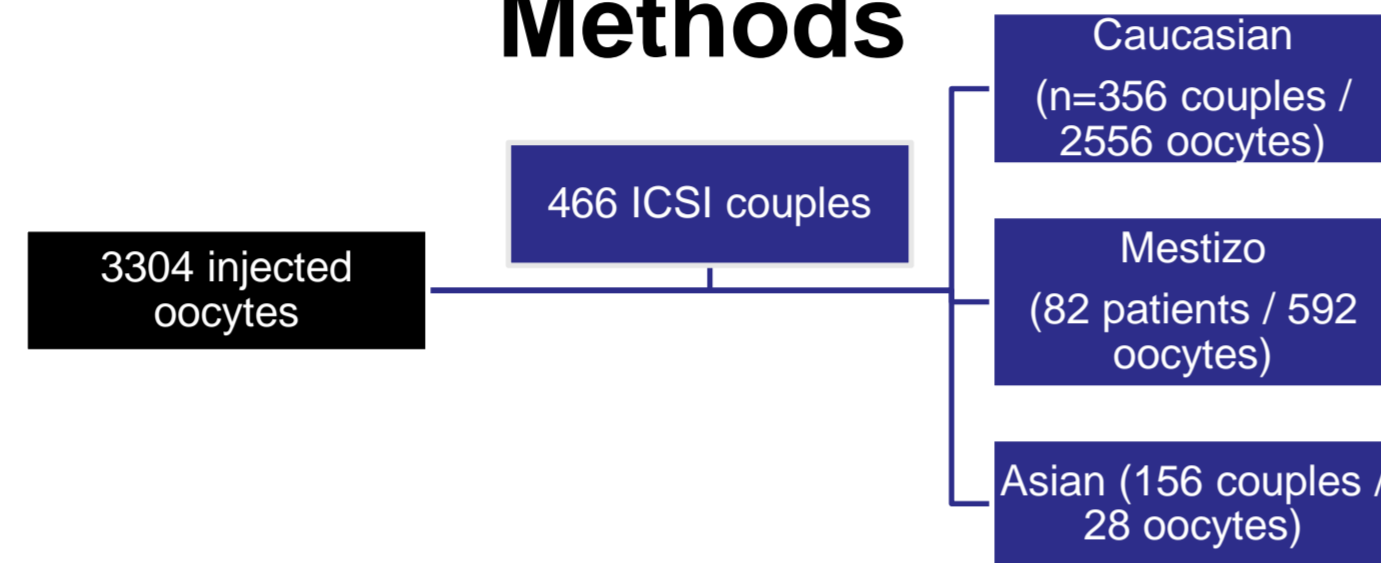
Introduction

Over the past decades, the use of assisted reproductive technology (ART) has made pregnancy possible for many infertile couples. However, certain infertile couples exhaust all forms of ART, without achieving success. Differences in treatment success have been described as varying by race and ethnicity. In fact, it has been reported that ethnicity is a major determinant of ART outcome as indicated by significantly lower live birth rates in some ethnic minority groups, however the precise reason for this fact remains unknown. TLI may allow the identification of morphokinetics events potentially affected by ethnicity, which may impact embryo development and implantation. The objective of this study was to investigate if ethnic differences affect embryo morphokinetics and clinical outcomes in a time-lapse imaging (TLI) embryo culture system.

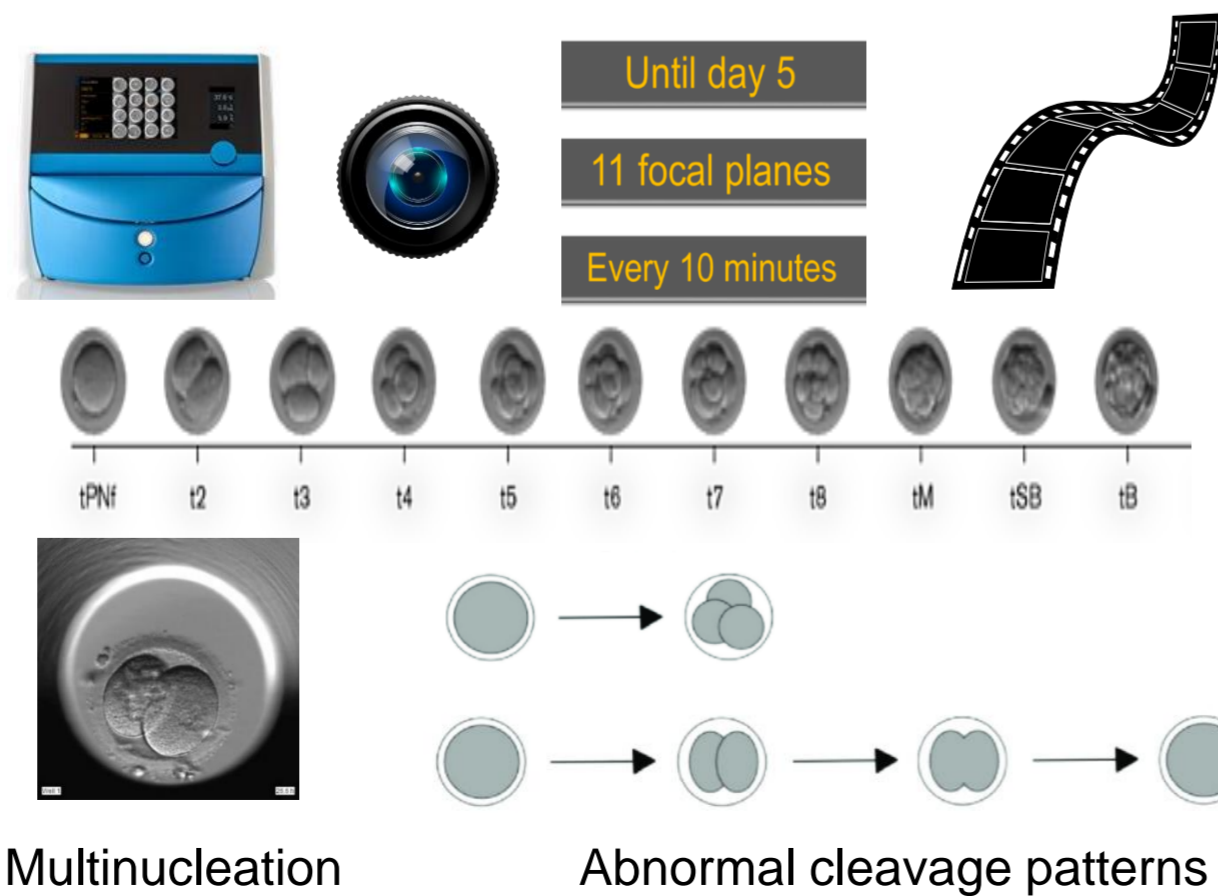


Ethnic differences interfere with speed and pattern of embryonic cell divisions

Methods

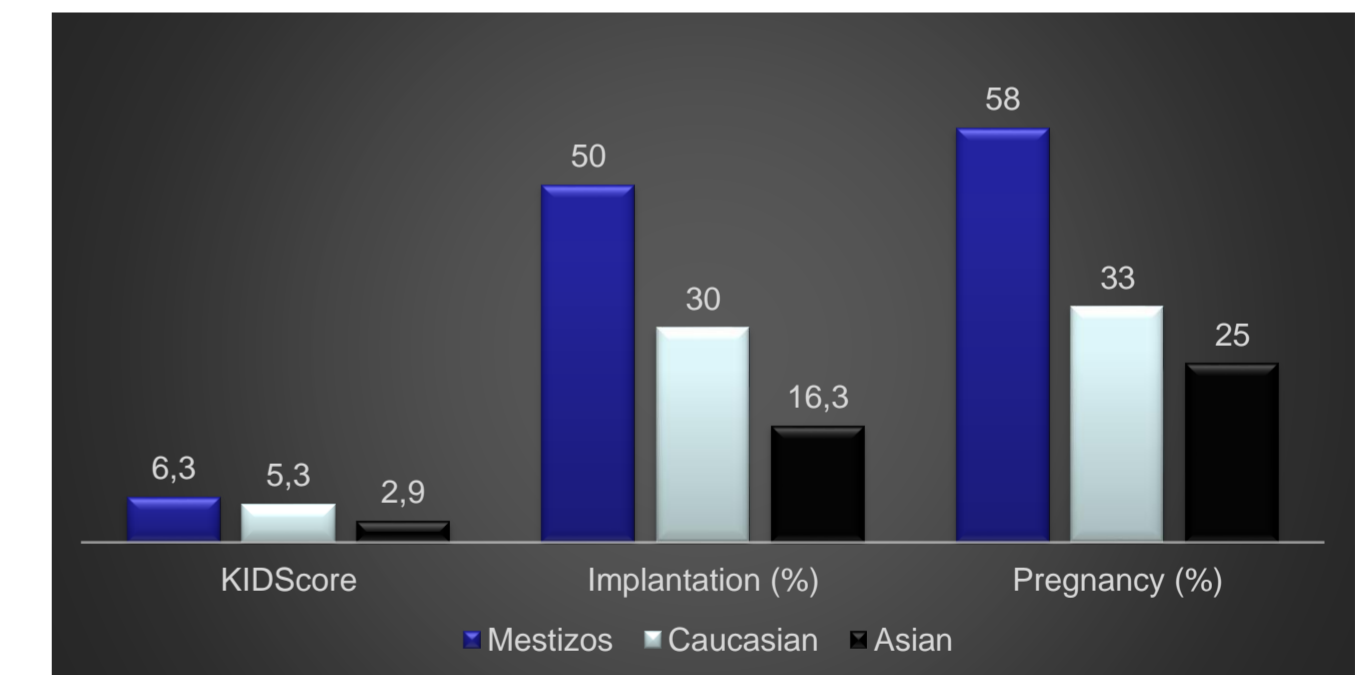
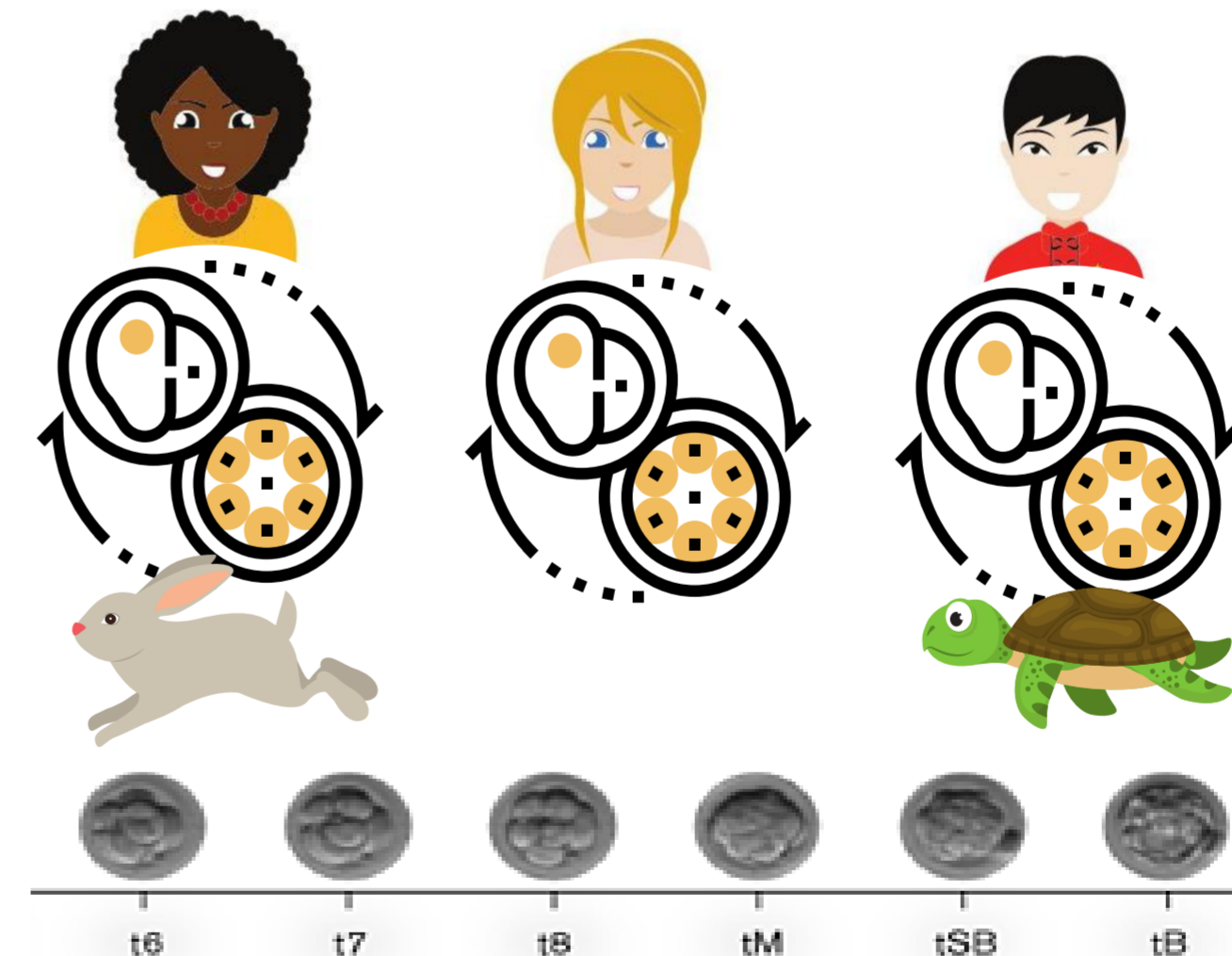


Embryos were cultured in a TLI incubation system and morphokinetics factors and clinical outcomes were compared between the groups using generalized linear models followed by Bonferroni post-hoc. Recorded kinetic markers were timing to pronuclei appearance and fading (tPNa and tPNf), timing to two (t2), three (t3), four (t4), five (t5), six (t6), seven (t7), and eight cells (t8), and timing to morulae (tM), start of blastulation (tSB) and blastulation (tB). Durations of second and third cell cycles (cc2 and cc3) and timing to complete synchronous divisions s1, s2, and s3 were calculated and the known implantation data score (KIDScore) day-5 was recorded.



Results

Embryos derived from Mestizo patients completed several key-point stages faster, followed by Caucasians, while Asiatic embryos were the slower ones. Mestizo presented shorter t6 (54.8 ± 0.92 , 52.6 ± 0.20 , 51.0 ± 0.42 , for Asians, Caucasians, and Mestizos respectively, $p < 0.001$), t7 (58.4 ± 1.05 , 55.4 ± 0.22 , 54.1 ± 0.45 , for Asians, Caucasians, and Mestizos respectively, $p < 0.001$), t8 (59.3 ± 1.2 , 58.7 ± 0.24 , 57.3 ± 0.49 , for Asians, Caucasians, and Mestizos respectively, $p = 0.019$), tM (99.3 ± 2.1 , 90.8 ± 0.37 , 87.5 ± 0.79 , for Asians, Caucasians, and Mestizos respectively, $p < 0.001$), tsB (106.4 ± 1.9 , 101.4 ± 0.54 , 98.0 ± 1.4 , for Asians, Caucasians, and Mestizos respectively, $p < 0.001$), and tB (109.1 ± 0.31 , 116.2 ± 2.0 , 106.0 ± 0.64 , for Asians, Caucasians, and Mestizos respectively, $p < 0.001$).



Conclusions

Embryos from Mestizos develop faster and have a higher implantation rate than those from Caucasian and Asian patients. Despite the increasing number of studies investigating the effect of ethnicity on ART outcomes, most of the literature has focused on White, Black and Asians. However, racial admixture has markedly increased, making attempts at strict racial categorization confusing and outdated. Apparently, miscegenation benefits embryonic development, which may impact clinical outcomes.