P-572 Purifying selection for aneuploidy cells in mosaicism embryo at post-implantation stage

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Study question: Why low ratio mosaicism embryos develop to normal karyotype babies?

Summary answer: Our in vitro implantation assay clarified purifying selection for aneuploid cells in post implantation embryos.

What is known already: There are some reports about healthy live birth after transfer of mosaic embryos, which was reported for the first time from Italy in 2015. It is also reported that the abnormal cell is screened with the mouse in the embryo development, and only a normal cell contributes to the development. But it has not been examined in human.

Study design, size, duration: To clarify the change of aneuploid cells and mitochondrial activity in human embryo, we biopsied several parts from one blastocyst and examined karyotype. After in vitro implantation assay for biopsied embryos, we compared the karyotype of biopsy sample with that of cultured cell mass.

Participants/materials, setting, methods: Under the ethical review of Yokohama City University and informed consent with patients, we collected human surplus blastocysts those are donated after successful clinical treatment or discarded because of poor development grade. We biopsied multiple parts from one blastocyst and cultured the biopsied embryos, and extracted whole DNA from the biopsy samples and cultured embryos. Karyotyping by next generation sequencing were performed.

Main results and the role of chance: We analyzed 34 samples from 11 embryos, including 25 biopsy sample from 11 embryos and 9 cell mass from 7 cultured embryos. In the karyotype tracking results, even though biopsy sample analysis before the culture were uniformed aneuploid or chromosome mosaic, the developing embryo cell mass had normal karyotype. In one embryo as an example, among the three biopsied extra trophectoderm samples from that, two of them were mosaic, and one of them had uniformed chromosome 21 trisomy and chromosome 16 mosaic monosomy. But the embryo formed multiple cell mass in implantation assay. We examined karyotype of three cell mass, and the result from all were normal karyotype. We suggested that the chromosome aberration cells were screened in the human embryo development, and when the function was not carried out the embryo stopped the development.

Limitations, reasons for caution: Because of small number of samples available, we need more samples for a more accurate evaluation. Furthermore, we cannot evaluate the absolute mechanism that cells with chromosome aberration decreases.

Wider implications of the findings: Conventional PGT-A techniques are based on uniformed embryos developing hypothesized past time. As showed in some clinical reports, PGT-A can reduce of spontaneous abortion and chance of embryo transfer. Thinking about aneuploid cell purifying system in embryo development, effectiveness of PGT-A should be more questionable for infertility treatment.

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