MITOPTOSIS CAN CONTRIBUTES TO THE BLASTOMERES FRAGMENTATION

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Mitochondria are the most abundant organelles in mammalian oocyte and directly involved at several levels in the reproductive process. The localization of mitochondria in the egg during maturation and their segregation to blastomeres in the cleaving embryos are strictly regulated. The adverse developmental consequences of a bioenergetic deficit that may be associated with a subnormal mitochondrial complement between blastomeres during early cleavage. Protection the cell from damage caused by malfunctioning mitochondria requires their proper and selective elimination. Although autophagy can be involved, the exact mechanism of mitochondrial sorting is still obscure. In this study, we examined mitochondrial population in the partially fragmented preimplantation human embryos. Mitochondrial presence and distribution was assessed with MitoTracker using confocal microscopy, while ultrastructural alteration evaluated by electron microscopy. Mito Tracker staining revealed mitochondrial presence in fragments but also their asymmetric distribution. Semi-fine sections of fragments showed mitochondrial gathering around vacuole while other organelles are absent. Ultrastructural study revealed that mitochondrial clusters (mitoptotic body) are very tightly connected with vacuolar membrane. The obtained results suggest that blastomeres of partially fragmented preimplantation human embryos are characterized by impaired mitochondrial distribution. Their unique spatial position is disrupted; they are spontaneously eliminated by fragmentation as a subject of disproportionate segregation between blastomeres. It seems that connection to vacuoles membrane assure their proper elimination. Still, the possible role of autophagy in some steps of mitoptosis cannot be excluded and will be a subject of future studies. (This work was supported by Serbian Ministry for Science and Technological Development, #173054).