

Abstract

Unfertilized or parthenogenetically non-activated porcine oocytes matured *in vitro* conditions are subjected to a process known as aging. During such development, porcine oocytes undergo the complex of the structural and functional changes, which can result in spontaneous parthenogenetic activation, fragmentation or lysis. After three days of culture in our condition, 23% of oocytes remained at the stage of metaphase II, 48% of oocytes were spontaneously parthenogenetically activated, 26% of oocytes were subjected to fragmentation and 3% of oocytes were lysed. The complete suppression of porcine oocyte fragmentation during the process of aging occurred during oocytes cultured in medium with sulphide donor Na₂S in concentrations 150 µM and 300 µM. Inhibition of enzymes catalyzing the synthesis of hydrogen sulfide in the oocytes during the process of aging (cystathionine-gamma-lyase and cystathionine beta-synthase), initiates earlier onset of oocytes fragmentation. The effect of both inhibitors could be completely reversed by using sulphide donor Na₂S.

The process of aging in porcine oocytes significantly reduces the success of the activation processes. Parthenogenetic activation occurred in 94% of pig oocytes, which were not subjected to aging. The proportion of activated oocytes after exposure to 24 hours of aging decreased to 80%. 24 hours aging exposure of pig oocytes in the presence of hydrogen sulphide donor led to a further decline of the proportion of activated oocytes (68%), however such treatment has showed significantly better subsequent early embryonic development compared to oocytes cultured without the presence of hydrogen sulphide donor. Proportion of embryos that reached after 7 days of culture the blastocyst stage was in the group of oocytes treated during aging by hydrogen sulfide donor significantly higher (16%) than in those without exposure to sulphide donor (2%).

Keywords: oocyte, pig, aging, sulphide