

Structural changes in cattle immature oocytes subjected to slow freezing and vitrification.

ABSTRACT

This study was conducted to evaluate the effect of different cryopreservation methods (slow-freezing and vitrification) on structural changes of bovine immature oocytes. Bovine ovaries were collected from local abattoirs. Cumulus-oocyte complexes (COCs) were retrieved using aspiration method from 2-6 mm follicles. In Experiment 1, selected oocytes were randomly divided into 4 treatment groups namely freezing solution-exposed, frozen-thawed, vitrification solution-exposed and vitrified-thawed and then oocytes abnormalities were examined under a stereomicroscope. In Experiment 2, oocytes were randomly allocated to the same grouping as experiment 1 plus control group. Following freezing or vitrification, all oocytes were fixed in glutaraldehyde and processed for transmission electron microscopy. In experiment 1, there was a higher incidence of abnormalities in the frozen-thawed and vitrified-warmed oocytes compared to those in freezing solution and vitrification solution-exposed groups ($P < 0.05$). In experiment 2, there were marked alterations in the perivitelline space, microvilli and vesicles of frozenthawed and vitrified-warmed oocytes characterized by loss of elasticity and integrity of cytoplasmic processes and microvilli following cooling and warming. In conclusion, ethylene glycol-based freezing and vitrification solutions are suitable choices for cryopreservation of immature oocytes and most organelles are able to retain their normal morphology following cryopreservation and thawing processes

Keyword: Bovine; Cryopreservation; Oocyte; Ultrastructure; Vitrification