

Effect of ethylene glycol (EG) and 1,2-propanediol (PROH) on mouse and human embryos during slow freezing protocol

¹Kim T.H, Cha S.K, ¹Chung M.K, ²Kim T.J, ¹Ko J.J, ²Hong S.W, ¹, Cha K.Y.

¹Infertility Medical Center of CHA General Hospital, Pochon CHA University College of Medicine,
Seoul, 135-081, Korea

²CHA Fertility Center, Los Angeles, CA, USA

OBJECTIVE: There were controversial reports on result of cryopreservation using the EG or PROH as a cryoprotectant. Recently, EG has been introduced in mammals as a cryoprotectant for freezing of oocytes and embryos because of low toxicity and rapid permeation into the cells. Therefore, this study was conducted to compare the effects of EG and PROH on cryopreservation of mouse and human embryos.

DESIGN: In experiment 1, mouse intact 6, 8-cell embryos were collected from ICR mouse and divided into two groups: group1; EG, $n = 347$, group 2; PROH, $n = 319$. In experiment 2, human cleaving embryos derived from fertilized eggs showing 3 pronuclei were obtained from patients undergoing IVF and divided into two groups: group 1; freezing with EG, $n = 39$; group 2; freezing with PROH, $n = 36$. Embryos with at least more than one of intact blastomere after thawing were included as a survived one and their development were examined after culturing.

MATERIALS AND METHODS: Mouse and human embryos were cryopreserved with 1.5 M EG + 0.2 M sucrose and 1.5 M PROH + 0.2 M sucrose using the slow freezing method. The embryos survived after thawing in all groups were cultured in Preimplantation-1 (P-1) medium with 10% SSS. Survival and development up to blastocyst of embryos was examined under a stereomicroscope after culture. Statistical analysis was carried out by use of an X^2 test.

RESULTS: In experiment1, the rates of survival were 80.4% (279) in group1 and 79.3% (253) in group2. The developmental rates to blastocyst were 44.1% (123) in group1 and 45.1% (114) in group2, respectively. In experiment 2, rates of survival were 94.9% (37) in group1 and 97.2 (35) in group2.

CONCLUSION: Cryopreservation of mouse and human embryos by using EG or PROH had no statistical difference in survival and development. Further study is requested for correlation between the penetration time and the concentration of cryoprotectant.