THE EFFECTS OF RECOMBINANT HUMAN GONADOTROPINS ON IN VITRO MEIOTIC COMPETENCE OF DOG OOCYTES

Mithat Evецен¹*, Kamber Demir¹, Ramazan Arıcı¹, Selin Yaşgıcıoğlu¹, Nur Ersoy¹, Nilhan Çoşkun¹, Hatem Atalla¹, Kemal Ak¹, Sema Birler¹, Serhat Pabuccuoğlu¹

¹Department of Reproduction and Artificial Insemination, Faculty of Veterinary Medicine, Istanbul University-Cerrahapaşa, TR-34320 Avcilar, Istanbul, Turkey
²Translational Medicine Research Center, Animal Research Facility, Koç University-Zeytinburnu, Istanbul, Turkey
³Faculty of Veterinary Medicine, An Najah National University, Nablus, Palestine

Because of reproductive physiology of domestic dog is different from the most other mammalian species; despite many attempts to improve the in vitro maturation (IVM) rate of canine oocytes using various procedures, the in vitro maturation rates still very low compared with other domestic animals. Hormone expenditure is the most expensive part in vitro studies. This situation makes an obstacle of in vitro studies in dogs that already have low success rates. In this study, recombinant human gonadotropins which are much cheaper than those of pituitary originated ones and have been successfully used for other mammal have been used. Ovaries were collected from 20 dogs and maintained in physiological saline at 4°C until oocyte recovery for 2-3 hours. After rearming, the ovaries were sliced and rinsed by washing medium (heparin supplemented HEPES modified TCM 199) to obtain cumulus oocytes complexes (COCs). A total of 845 COCs were selected and cultured for IVM. In vitro maturation (IVM) of oocytes was performed in Synthetic Oviduct Fluid (mSOF) at 38°C in a humidified atmosphere with 5% CO₂ for 72 h. In order to determine the effects of human recombinant gonadotropins, maturation medium was supplemented with two different concentrations (0.5 IU/mL and 1.0 IU/mL) of pituitary (pFSH, pLH) and human recombinant (rhFSH and rhLH) gonadotropins. At the end of IVM period, the nuclear maturation rates were investigated under a fluorescent microscope after 20 min Hoechst (33342) staining. Finally, the recombinant gonadotrophin results were found superior than the pituitary ones. The highest IVM (MI+MII) rates were found in 0.5 and 1.0 IU pituitary gonadotrophin groups (52.41% and 49.73% respectively) and the lowest maturation rate (34.57%) was found in 1.0 IU human recombinant gonadotrophin group. In conclusion of this study, in which recombinant human gonadotropins were used for the first time in vitro maturation of dog oocytes; it can be said that the biologically derived hormones, rather than the recombinant human gonadotropins, are beneficial for in vitro maturation of canine oocytes.

Key words: dog, oocyte, in vitro maturation, recombinant, gonadotrophin

The present work was supported by the Research Fund of Istanbul University (Project No: 2016-21108)