Animal Reproduction

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EMBRYOLOGY, DEVELOPMENTAL BIOLOGY, AND PHYSIOLOGY OF REPRODUCTION

Melatonin supplementation in pre-maturation media does not affect the bovine IVP outcome

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The use of meiotic resumption inhibitors such as natriuretic peptide type C (NPPC) during the pre-maturation period (pre-IVM) provides the oocyte additional time to undergo cytoplasmic changes which can improve oocyte quality. Melatonin (MTn), in turn, has been evaluated during IVM for its ability to reduce levels of oxidative stress due to its antioxidant action. To minimize the deleterious effects of oxidative stress and provide better conditions for the acquisition of oocyte competence, we evaluated the effect of MTn during pre-IVM. Grades I and II COCs (n=1752) were recovered from slaughterhouse ovaries (n=219) and, were randomly distributed into three groups: 1) Control IVM: COCs were IVM for 24h; 2) pre-IVM control: COCs were cultured for 6 h in the presence of 100 nM of NPPC, followed by 24 h of IVM and 3) pre-IVM + MTn: COCs were cultured for 6 h in the presence of 100 nM of NPPC and MTn [10-9 M], followed by 24 h of IVM. After maturation, the COCs were co-incubated with sperm cells for 18 h. Zygotes were then transferred to IVC medium, where they remained for seven days. Cleavage rate was assessed on day 2 after fertilization (D2) and the blastocyst rate on D6 and D7. For IVM, IVF and IVC the atmosphere was set at 5% of O2 and 5% CO2, at 38.5 °C. Data were analyzed by chi-square test (p≤ 0.05). The cleavage rate was higher (P≤ 0.05) in the groups pre-IVM control (n= 442/557; 79.4%) and pre-IVM + MTn (n= 451/601; 75%) in compared to IVM Control (n= 392/594; 66.0%). On D6, pre-IVM + MTn (n= 85/601; 14.1%) showed a lower rate of blastocysts (p≤ 0.05) compared to IVM Control (n= 110/594; 18.5%) and pre-IVM control (n= 113/557; 20.3%). However, on D7, the blastocyst rates of both pre-MIV groups, pre-IVM control (n= 200/557;35.9%) and pre-IVM + MTn (n= 185/601;30.8%) were higher than observed in the control IVM group (n= 153/594; 25.8%). In conclusion, a treatment of pre-maturation supplemented with MTn for 6 h has insufficient effect to increase the production of IVP bovine embryos. Research in our lab is in progress to assess the synergistic impact of MTn supplementation during pre-IVM and during IVM.