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Effect of histone deacetylase inhibitor during pre-maturation and/or *in vitro* maturation of bovine oocytes on embryonic development

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The mRNAs stocks present in the oocyte at the time of its removal from the follicle is associated with its developmental competence. Considering that high acetylation allows gene transcription, we hypothesized that the presence of a deacetylase inhibitor prior to IVM would allow a greater accumulation of RNA improving oocyte competence. The objective of this study was to evaluate the effect of Scriptaid, a histone deacetylase inhibitor, during pre-IVM (PMIV) and/or IVM in the *in vitro* embryos development in bovine. Cumulus-oocyte complex (COC's) were obtained from slaughterhouse ovaries and were submitted to PIVM for 6 h using 100nM of C-type natriuretic peptide (NPPC), in the presence or absence of 500nM of Scriptaid. COCs were divided into 5 groups: T1-IVM for 22h; T2-PIVM for 6 h and IVM for 22 h; PIVM with Scriptaid for 6 h and IVM for 22 h; T4-PIVM for 6 h and IVM with Scriptaid for 22 h; and T5-PIVM with Scriptaid for 6 h and IVM with Scriptaid for 22 h. Nuclear maturation, cumulus cell expansion, embryo development and embryo quality (differential cell staining) were evaluated. Data from nuclear maturation and embryonic development were evaluated by Chi-Square ($P<0.05$). Differential staining and cumulus cell expansion data were evaluated by ANOVA and, when non-parametric by Kruskal-Wallis ($P<0.05$). All treatments submitted to PMIV, when evaluated at the beginning of maturation (0 hours), presented the majority of their oocytes at germinal vesicle stage (T2= 87%, 47/54, T3= 85%, 41/48) 0.05) which was similar to the control group (T1= 96%, 66/69). After 22 hours of IVM, all groups had the majority of oocytes at metaphase II (T1= 94%, 56/57, T2= 96%, 46/48, T3= 92%, 48/52, T4= 96% 52/54 ($P> 0.05$), except for T5 (88%, 47/56), which presented a lower rate than the T1 ($P<0.05$). Cumulus cell expansion was similar between groups, with the exception of T5 which had a lower ($P <0.05$) expansion than T2. Regarding to embryo development at D7, T3 (32%, 65/203) had a lower rate than T2 (37%, 71/190) but was similar to control (35%, 82/236). The groups receiving Scriptaid in IVM (T4 = 23%, 47/207 and T5= 18%, 32/177) had lower rates of blastocysts ($P <0.05$) then the other treatments (T1 = 35%, T2 = 37% and T3 = 32%). Embryos from T5 (165, n= 30) presented lower amounts of cells ($p <0.05$) in comparison to T1 (192.59, n = 39) and T3 (189.53, n = 32). In relation to the proportion of internal cell mass and total cells, the T5 group also presented lower ($p <0.05$) the number of embryos with a proportion of 20-40% of internal cell mass (T5 = 67%, 20/30) in relation to the T1 group (87%, 34/39). It can be concluded that the presence of Scriptaid in PMIV and IVM simultaneously affects nuclear maturation, cumulus cell expansion, embryo development and embryo quality.

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