Effects of the Supplementation of *in Vitro* Maturation Media with Fatty Acid Binding Protein on the *in Vitro* Developmental Rates of Bovine Embryos

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Despite the growing popularity of *in vitro* embryo production in the cattle industry, there is significant potential for further improvement of the *in vitro* process to enhance blastocyst development, which is crucial for cattle producers to increase the number of offspring produced, ultimately making the production system more efficient. Maturation of recovered oocytes is the first, crucial stage of *in vitro* embryo production and requires meiotic and cytoplasmic changes to be completed at the proper time, sequence, and rate. Previous research indicates that *in vitro* matured oocytes typically contain a higher lipid content. Fatty acid binding protein (FABP) may play a role in effective maturation and development by facilitating lipid movement within the cells and across the plasma membrane which is supported by results indicating that FABP-3 was higher in embryos that reached the blastocyst stage compared to those that arrested at the 8-16 cell stage, from the same culture. The aim of this study was to investigate whether there was a difference in the cleavage and blastocyst developmental rates of embryos from oocytes matured with varying concentrations of FABP-3. Follicles were aspirated from slaughterhouse ovaries. Selected oocytes were randomly placed in either control drops or drops supplemented with FABP-3 at concentrations of 1, 10, or 20 μg/ml (10 oocytes per 50 μl drop). Matured oocytes were fertilized (50 oocytes per 500 μl well), vortexed to remove cumulus, and placed into culture (10 presumptive zygotes per 50 μl drop). After maturation, ova in one randomly selected drop per group were stripped of cumulus cells and evaluated for the presence of a polar body. *In vitro* maturation (18-20 hours), fertilization (18-20 hours), and culture were performed under an oil overlay at 38.5°C in a fully humidified 5% CO2, 5% O2, 90% N environment. On the 7th day of culture, the cleavage (≥ 2 cells) and blastocyst rates were evaluated and analysed via Chi Square. Results collected over 3 replicates indicated that cleavage was significantly higher ($P<0.05$) in the group of 20 μg/ml (74.1% ± 6.0) compared to control and 10 μg/ml (55.9% ± 5.1, 51.7% ± 4.6; respectively). There was no significant difference between 20 and 1 μg/ml (63.7% ± 4.8), 10 and 1 μg/ml, Control and 1 μg/ml, or 10 μg/ml and Control. There was no difference in blastocyst development among the groups (1; 16.7% ± 3.7, 10; 17.5% ± 3.5, 20; 22.2% ± 5.7, Control; 21.5% ± 4.3). Polar body extrusion was similar among the groups (1; 63.0% ± 9.3, 10; 78.6% ± 7.8, 20; 61.5% ± 9.5, Control; 69.2% ± 9.1). Supplementation with 20 μg/ml of FABP enhanced cleavage rates but did not have a significant impact on blastocyst development. Perhaps, lipids play a role in the cleavage process; however, research has demonstrated that cleavage is not a reliable predictor of blastocyst development. Further research is needed to expand the range of FABP concentrations beyond 20 μg/ml in the maturation media and to evaluate the lipidomic profile and the relationship with FABP to gain further insights into lipid management mechanisms and their effect on *in vitro* embryo development.