Effect of trans10, cis12 conjugated linoleic acid on bovine and porcine oocyte prostaglandins (PG) and lipid content during maturation

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The negative effect of an excessive intracellular lipid content of oocytes and embryos on cryosurvival has been extensively reported. However, little is known about the function of the numerous intracytoplasmatic lipid droplets (LD) characteristic of bovine and porcine female gametes. We intended to study the effect of the lipid modulator trans10, cis12 conjugated linoleic acid (10t, 12c CLA) on bovine and porcine oocyte maturation, its lipid content and prostaglandin (PG) concentrations. Abattoir derived porcine oocytes (n = 1770) were incubated in NCSU23 + 10% follicular fluid for 44 h while bovine oocytes (n = 709) were incubated in TCM199 + 10% serum for 22 h. For each species, three groups were constituted: immature, mature without supplementation (control) and mature supplemented with 100 µM 10t, 12c CLA. After in vitro maturation (IVM), oocytes were used for fat area or nuclear maturation evaluation. All media were collected for PG analysis. 10t, 12c CLA did not affect oocyte nuclear maturation. When compared to control, bovine CLA oocytes had smaller (<0.001) fat areas while porcine CLA oocytes presented a more peripheral distribution of LD. PG2 and PGE2 concentrations were higher (p ≤ 0.03) in porcine control medium than in pre-IVM and CLA media. PGF concentration was higher (p < 0.03) in control and CLA media than in pre-IVM medium in bovine. In conclusion 10t, 12c CLA did not affect bovine and bovine oocyte nuclear maturation but reduced its lipid content and interfered with PG synthesis.

Characterization of the MUC1 mucin promoter activity in bovine oviduct epithelial cells

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Anti-adhesion MUC1 mucin appears to be an important factor in determining endometrial receptivity to embryo implantation. This is facilitated in some species by progesterone down-regulation of endometrial MUC1 to coincide with the implantation phase of the reproductive cycle but it remains unknown what happens in the bovine. Our main goal is to clarify the unidentified mechanisms of transcriptional regulation of MUC1 gene in bovine endometrium vs. bovine oviduct, where implantation is not supposed to occur. To this end, we have started by transiently transflecting primary cultures of bovine oviduct epithelial cells (BOEC) with a panel of six pGL3 deletion constructs covering 1.7 kb of the bovine MUC1 promoter, enabling us to identify the relevant regions for MUC1 transcription in BOEC. The deletion of the −1428 to −672 region of MUC1 promoter gene (relative to initiation codon) led to a significant increase in promoter activity (p < 0.05) considering data from at least four different cows at days 1–3 of the oestrous cycle, accurately determined by the presence of a corpus hemorrhagicum. In conclusion, these results suggest that essential positive regulatory elements for MUC1 promoter activity in bovine oviduct cells are present within this region, which should be further studied in near future. (Funded by FCT project PTDC/CVT/101586/2008.)