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Veterinari Medicina

Genomic and non-genomic effects of progesterone and pregnenolone on the function of bovine endometrial cells

Kowalik M.K., Slonina D., Kotwica J.:

Veterinari Medicina, 54 (2009): 205-214

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Progesterone (P) decreases oxytocin (OT)-stimulated prostaglandin (PG)F_{2α}, but not PGE₂ secretion from bovine endometrial cells and this effect is partly elicited via a non-genomic route. The aim of this study was to determine whether P₄ and pregnenolone (P₅), in the presence or absence of OT, influence: (a) the gene expression of enzymes responsible for PG_s synthesis: cyclooxygenase-2 (COX-2), synthase of PGF_{2α} (PGFS) and PGE₂ (PGES), (b) protein expression of COX-2, PGFS and PGES, and (c) P₄ receptor membrane

component 1 (PGRMC1) gene expression in bovine endometrial cells. The epithelial endometrial cells ($2.5 \times 10^5/\text{ml}$) from Days 14–16 of the oestrous cycle were incubated for 72–96 h to attach the cells to the bottom of a well. Next, the cells were preincubated for 30 min with P_4 and P_5 (10^{-5}M each) and incubated for 4 h and 6 h alone or with OT (10^{-7}M). Thereafter, the medium was collected for PGE_2 and PGFM determination, while cells were harvested for gene and protein expression analysis. The used steroids: (a) inhibited OT-stimulated $\text{PGF}_{2\alpha}$, but not PGE_2 secretion from endometrial cells, (b) did not affect the expression of mRNA for COX-2, PGFS, PGES and PGRMC1 in endometrial cells after 4 and 6 h, (c) they decreased OT-stimulated COX-2 mRNA expression only after 6 h incubation, and (d) did not influence COX-2, PGFS and PGES protein expression after 6 h. These results indicate that P_4 and P_5 inhibit OT-stimulated secretion/production of luteolytic $\text{PGF}_{2\alpha}$ by a transcription-independent mechanism and partly by down-regulation of COX-2 mRNA.

Keywords:

non-genomic effect; progesterone; progesterone membrane receptor component 1; endometrium; bovine

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