SUMMARY

Cytokines are hormone-like protein mediators of the immune response that play a key role in immunoregulatory processes. Man studies emphasize the close link between cytokine activity and reproductive system function. During the estrous cycle, they are involved in the control of ovarian steroidogenesis, folliculogenesis, and endometrial tissue remodeling. They are also important in embryo implantation, a key process for the proper progression and maintenance of pregnancy. Disruptions in the amount of cytokines secreted significantly impair female reproductive function.

Our previous research has shown that there is a potential link between the expression of cytokines in the endometrium of pigs and the activity of peroxisome proliferator-activated receptors (PPARs). PPARs occur in three isoforms (α, β/δ, and γ) and belong to the ligand-dependent family of nuclear receptors that act as transcription factors. Available literature indicates the involvement of PPAR ligands (α, β/δ, γ) in the regulation of cytokine synthesis in the porcine endometrium during the mid- and late-luteal phase of the estrous cycle and in early pregnancy (during maternal recognition of pregnancy and beginning of implantation). The results of *in vitro* studies showed that in the endometrium, ligands of all PPAR isoforms inhibited the expression of nuclear factor NF-κB mRNA and stimulated the expression of the anti-inflammatory cytokine LIF in the late-luteal phase of the estrous cycle and during maternal recognition of pregnancy. The greatest changes in the expression of IL-6 were detected at day 10-12 of the estrous cycle – the activation of PPARα and -γ decreased and PPARβ/δ stimulated its expression. During the studied stage of pregnancy, ligands of all PPAR isoforms mainly stimulated the expression of IL-1β protein, whereas their effect during the estrous cycle was heterogeneous. The greatest effect of PPAR ligands on IL-4 expression was noted on days 14-16 of the estrous cycle (inhibition) and on days 10-12 of pregnancy (stimulation). Activation of PPAR receptors generally inhibited the expression of IL-8 mRNA at both phases of the estrous cycle and at the beginning of implantation that were examined, but had no effect on expression in the stage of maternal recognition of pregnancy.

In conclusion, peroxisome proliferator-activated receptors (PPARs), present in three isoforms -α, -β / δ and -γ, are involved in the regulation of the synthesis of immune response mediators – nuclear factor NF-κB, IL-1β, IL-6, IL-8, LIF, IL-4 – in the endometrium of gilts in the luteal phase of the estrous cycle and early pregnancy.

The diverse effect of PPAR ligands (-α, -β / δ and -γ) on the expression of the tested mediators of the immune response may be due to differential receptivity of the tissue depending on the physiological state of the tested animals.