

Progesterone (P4) is the main regulator of the duration of the oestrous cycle and is responsible for creation of suitable conditions for the embryo implantation and foetal development in many farm animals, including cattle. This hormone may act in a genomic way with nuclear receptors (PGR) but also in a non-genomic way with specific membrane receptors. In genomic action, P4 binds to the receptor and then binds to the promoter of a target gene and activates its transcription. The nuclear PGR occurs in two main isoforms: isoform A (PGRA) and isoform B (PGRB). Both isoforms are transcribed from the same gene, but under the influence of two different promoters. At the end of the PGR activation, to the receptor are recruited elements that regulate their action; these elements are called coactivators and corepressors and determine the activation or inhibition of transcription of the target genes dependent of P4. Both coactivators and corepressors may exhibit variable expression in the oestrous cycle. Thus, changes in the expression of coactivators and corepressors, at the mRNA and protein levels, are important factors in the regulation of PGR function during the oestrous cycle in both the CL and the uterus and thus regulate the effect of P4 on tissues of the reproductive system. Therefore, the aim of the project is to examine the participation of coactivators and corepressors of PGR in the functioning of CL and uterus in cows at the level of mRNA and protein regulation. The experimental material will be slices of the CL and uterus (the endometrium) collected from cows being in different days of the estrous cycle and enzymatically dispersed cells from CL and endometrium with the highest and lowest levels of PGR mRNA selected on the basis of the previous research. The next stages of the project will be involved determination the level of mRNA, protein expression and location of selected coactivators and corepressors of PGR and related acetyltransferase (HAT) and deacetylase (HDAC) activity during the oestrous cycle in the CL and endometrium. In the next stages will also be examined the influence of luteotropic, luteolytic factors and P4 and their antagonists on the levels of mRNA and protein expression of selected PGR coactivators and corepressors and HAT and HDAC activity and finally the effect of changes in HAT and HDAC activity on the level of apoptosis in cells of the reproductive system of the cow. Malfunction of CL and also reduced level of P4 and its receptor activity leads to inhibition of the PGR action and premature births and may be the result of abnormal level of PGR coactivators/corepressors. This effect in livestock may cause early embryo mortality which is up to 40%. Therefore, understanding the mechanisms regulating the expression of coactivators and corepressors of PGR is important in breeding and biotechnology of animal reproduction and the diagnosis and therapy of infertility in women.