

The functioning of the reproductive system of farm animals is closely related to their nutritional status. A depth knowledge about the mechanisms that control energy homeostasis and reproduction is needed in animal breeding practice. A growing body of evidence suggests that metabolism and reproductive system are controlled by a common endocrine system. Based on sparse literature data and findings from our preliminary studies, a hypothesis can be put forward that omentin, a hormone produced mainly by the adipose tissue, may belong to a group of factors involved in various physiological processes, including the regulation of energy balance and reproduction.

In the proposed project we plan to determine the omentin gene and protein expression and the adipokine cellular localisation in the porcine endometrium and myometrium during the oestrous cycle and early pregnancy, as well as in the trophoblasts and conceptuses. We intend also to evaluate the hormone concentrations in the porcine blood plasma and uterine luminal fluid. It is also planned to determine the effect of omentin on the transcriptomic and proteomic profile of endometrial luminal epithelial cells. Another objective of the project is to determine the effect of omentin on the secretion of steroid hormones, prostaglandins, and cytokines by the *in vitro* cultured endometrial explants. We would also like to clarify the influence of omentin on the processes of angiogenesis, apoptosis, and proliferation in the porcine endometrium during early pregnancy. It is also planned to determine the effect of omentin on the expression of adhesion-related proteins as well as production of progesterone and transcription factors by the co-cultured endometrial luminal epithelial cells and stromal cells, respectively. It is also planned to evaluate the effect of the hormone on the activation of various signalling pathways.

Findings from this research may allow to better understand the functioning of the mechanisms underlying the hormonal control of metabolism and reproduction in pigs, and in the future, facilitate the efficient modifications of these processes in animals. In addition, the domestic pig, which besides being an economically important species, is also a good experimental model for understanding human physiology.