

The ovary is a complex endocrine gland responsible for production of steroid sex hormones and maturation of the oocytes. In the pig and other species progesterone is a key steroid hormone in the regulation of many reproductive processes. Disorders in its synthesis lead to the development of various types of abnormalities. The process of steroidogenesis, where the synthesis of progesterone takes place, is very complicated. Numerous biologically active factors properly coordinate the pathway function at the gene and protein levels. One of the regulating mechanisms may take place with the participation of short, non-coding miRNAs, involved in the negative regulation of gene expression. Another important limiting factor in the amount of progesterone produced in cells could be vimentin. It is a cytoskeleton protein that binds to proteins with motor-like properties and sterol binding properties. Excess ovarian steroid secretion can lead to significant ovarian pathology e.g. the high production of progesterone in the preovulatory follicles and high progesterone to estradiol ratio promotes cyst formation. Therefore, expanding knowledge of the physiological processes involved in progesterone synthesis is key to understanding the proper development of ovarian follicles.

The overall aim of the project is to expand knowledge of the steroidogenesis process in ovarian cells. Basic research carried out in the project will include: (i) determine of the effect of vimentin on progesterone synthesis in granulosa cells by silencing vimentin through the gene expression and culturing the cells in the presence of extracellular vimentin, (ii) examine of the effect of selected miRNA in expression of genes involved in progesterone production in granulosa cells of porcine preovulatory follicle in *in vitro* model. Additionally, during *in vitro* culturing granulosa cells will be treated with luteinizing hormone to stimulate expression of enzymes and factors regulating steroidogenesis.

The obtained results will be the first report of vimentin effect on progesterone synthesis and the role of selected miRNAs in the regulation of genes involved in progesterone synthesis in granulosa cells of porcine preovulatory follicle. Understanding steroidogenesis pathway will contribute to broadening the knowledge of proper development of ovarian follicles and finding an effective method of therapy or preventing pathological states in the ovaries, which are an essential problem in livestock reproduction. The obtained research results will be submitted for publication in the reproductive biology foreign journals.