

The scientific aim of the project is to determine expression and role of vaspin (VASP) in the endocrinological function and angiogenesis process in porcine corpus luteum (CL). One of the causes of infertility is malfunctioning the CL, which can be caused by abnormal angiogenesis and endocrinological disorder. Adipose tissue is not only an energy storage or thermoregulatory organ, but it is also capable of producing and secreting a number of hormones. Hormones secreted by adipose tissue are called adipokines. Adipokines can act locally or regulate the function of distant organs. Adipokines play pleiotropic functions in the organism, regulate energy balance, appetite and satiety balance, inflammatory reactions of the body as well as contractility of the heart. In addition, they have impact on reproductive processes by regulating cycle, embryo implantation and pregnancy maintenance or development. The level of adipokines in the blood increases in obese patients and patients with diagnosed ovarian pathology like polycystic ovarian syndrome (PCOS). VASP is an adipokine involved in the development of obesity and inflammatory reactions in the body, increased VASP level was observed in obese women and diagnosed PCOS, but its impact of this adipokines on reproduction is unknown. The VASP receptor is still unknown, but in endothelial cells VASP can act by GRP78 (78 kDa glucose-regulated protein). Due to the similarities in the anatomical structure and cycle, the pigs are a good model for studies the influence of adipokines on females reproduction. The research model will be porcine CL, which is formed after ovulation from ovarian follicles in the process of luteinization. The main function of CL is production of progesterone, which is a factor that prepares the uterus for implantation of the embryo and pregnancy maintaining. The factors, which regulate the formation and regression of CL are prostaglandins, prostaglandin E is luteotrophic factor, while prostaglandin F<sub>2</sub> participated in CL cells luteolysis. In addition to gonadotropins, locally produced hormones, proteins, growth factors and cytokines play crucial roles in regulating CL function like steroids and prostaglandins synthesis or angiogenesis. There is lack data about VASP expression and function in CL cells. Basic research carried out in the project will include determination of VASP and GRP78 gene and protein expression and their cellular localization in CL cells, determination of factors regulating ovarian VASP expression, examination of VASP influence on steroidogenesis and prostaglandin secretion and mechanism of observed changes, understanding of VASP influence on angiogenesis of CL cells and the molecular mechanism of the studied changes. The expected results will add new, extremely valuable information on porcine reproduction. Understanding the mechanisms controlling energy homeostasis and reproduction creates the foundation and opens a way towards future effective modification of these processes in farm animals. Moreover, the domestic pig is an economically important species, and is also a good experimental model, as it is much more similar to the human being than the more frequently used laboratory rodents. Thus, results from the research project will also significantly contribute to a better understanding of human physiology. Hence, understanding the underlying mechanisms of luteal development, including the endocrinology and angiogenesis process, can potentially lead to therapies that correct luteal deficiencies and ameliorate luteal infertility.