The uterus, a part of the female reproductive system, is responsible for a formation of environment for a new organism development. In turn, the myometrium is one of the uterine layer with the ability to stretch the uterus during pregnancy and its contractility, which is especially important during labor. The myometrium is also important in non-pregnant uterus and participates in supporting the transport of sperm into the fallopian tube, preventing the penetration of microorganisms and removing infection factors. Recently, it has been reported that this tissue can synthetize steroids and prostaglandins (E_2 and $F_2\alpha$), which are responsible for lifespan of the corpus luteum during different physiological mellitus. Besides these factors, mentioned above, the myometrium is also able to produce other proteins, including cytokines.

Cytokines are mediators of the immune response. They are involved in the regulation of female reproductive processes during the estrous/menstrual cycle and pregnancy. The role of cytokines was highlighted in the embryo implantation – a crucial process in maintenance and normal course of pregnancy in all mammals. In the absence of pregnancy, cytokines participate in periodic changes of endometrial tissue. There is evidence indicating a relation between cytokines and ligand-dependent transcription factors called peroxisome proliferator activated receptors (PPARs). PPARs are distinguished in three isoforms: -α, -β and -γ. Some of PPAR ligands (fibrates and thiazolidinediones) are commonly used as treatments for metabolic disorders including type 2 diabetes. An interaction between PPARs and cytokines was demonstrated in non-reproductive tissues/cells (adipocytes, macrophages). Our previous results indicate that interleukin 6 (IL-6) and interferon γ (IFNγ) change the expression of PPARs mRNA in the porcine endometrium during periimplantation.

My preliminary studies indicate the presence of the PPARγ mRNA in the porcine myometrium during early pregnancy (maternal recognition of pregnancy and early implantation), and the estrous cycle (middle and late luteal phase). Furthermore, the expression of PPARγ was higher during early pregnancy (days 14-16 represent an initial phase of implantation, full activity of the corpus luteum, high level of progesterone, P_4) compared with a corresponding period of the estrous cycle (days 14-16 represent degradation the corpus luteum and a decline in production P_4). Only one scientific report confirms that there is a possible interaction between PPARs and cytokines in the human myometrium during perinatal period. Taking into consideration the above observation I hypothesized that PPARγ participates in the synthesis of cytokines in the porcine myometrium. This hypothesis will be verified in a series of *in vitro* experiments. **The aim of the study will be analysis of PPARγ ligands (natural/synthetic agonists and antagonist) impact on mRNA expression and protein concentration of pro- and anti-inflammatory cytokines in the myometrium of gilts during late luteal phase of the estrous cycle (days 14-15) and periimplantation (days 14-15 of pregnancy).**

The research will be conducted on the porcine myometrial slices in *in vitro* conditions. It should be emphasized that the pig is an excellent experimental model to study various physiological/pathological processes due to a high similarity with human in terms of number of anatomical features and the regulation of various physiological processes. For ethical reasons, it is often not possible to conduct experiments in humans and in such circumstances the use of pig model is reasonable and good choice.

The planned experiments will provide a new and valuable information (basic research) concerning the role of PPARγ in porcine myometrium. The results will contribute to a better understanding of the mechanisms regulating reproductive processes during the late luteal phase of the estrous cycle and during periimplantation period. It is still scientific area worthy of attention, because of the existing possibility of clinical use of PPAR ligands.