Maturation of preovulatory ovarian follicles until the oocyte release during ovulation is under the control gonadotropins released from the pituitary. Small non-coding RNAs, microRNAs (miRNAs) are also involved in this process. our recent results have indicated that the exogenous gonadotropins treatment combined with altrenogest cause the occurrence of a large number of ovarian follicular cysts in sexually immature gilts compared to mature ones. Interestingly, the presence of ovarian cysts in both gilts and sows reduce the number of ovulations, which directly limits the size of the litter in a pig. Synchronization methods based on exogenous gonadotropins applied in pig breeding seems to be not the best choice for farmers and can cause measurable material losses. Therefore, the aim of the project is to examine the mechanism of negative influence of exogenous gonadotrophins on the development of ovarian follicles in gilts.

Until now the mechanism of action of exogenous gonadotropins on the follicular development and diversity of follicles, especially in prepubertal gilts and the timing and cell type-specificity of the beginning of follicles transformation into the cysts was is not known. Thus, we hypothesized that: *Abnormal follicular development is caused by: a) the inhibiting action of progestagen on growth of follicles during puberty and b) adverse effect of exogenous gonadotropins on the steroidogenesis and ovulation of preovulatory follicles, which are caused by disturbed transcription and translation processes, governed by both transcription factors and miRNAs.*

Identification of reasons of the negative effect of exogenous gonadotropins on the development of ovarian follicles in gilts requires: 1) determination of molecular mechanism of exogenous gonadotropins action on the steroidogenesis (production of steroid hormones, expression of cholesterol transporters and enzymes involved in steroidogenesis, miRNAs and transcription factors) in ovarian follicles; 2) determination of the novel markers of physiological and disturbed development of ovarian follicles.

The results of the research proposed in this proposal will contribute to the identification of new mechanisms of ovarian follicle development and ovarian follicular cyst formation and will provide the opportunity to improve ovulation induction/synchronization protocols, as well as to develop a new functional classification of ovarian follicles cyst based on the presence of miRNA and steroid hormones levels.