Summary of the dissertation entitled: **"Expression of selected genes related to intercellular signaling and granulosa cell structure of the ovarian follicle in the pig during short-term primary in vitro culture".**

Summary

The extracellular matrix (ECM) is an extremely important structure present in all tissues of the animal body. It is involved in many physiological processes, including those occurring in the ovary. The ECM has been shown to significantly affect folliculogenesis, ovulation and corpus luteum formation. The cytoskeleton, like the ECM, is a dynamic structure, constantly modifying its composition. Through its involvement in cell division, it influences the proliferation of granulosa cells in the ovarian follicle. The cytoskeleton, along with trans-membrane proteins (integrins and cadherins) and also the extracellular matrix, is closely involved in cell signaling. Recently, the role of extracellular vesicles (EVs) in intercellular signaling has focused much attention. Among these nanoparticles are exosomes, which, being carriers of proteins, lipids or DNA or RNA molecules, are intimately involved in the regulation of cellular processes such as adhesion, proliferation and migration. A thorough understanding of the interactions between the ECM, cytoskeleton and EVs in the microenvironment of the ovarian follicle will allow us to better understand the molecular basis of physiological as well as pathological processes of the ovary.

In the research performed in the dissertation, we used granulosa cells of the domestic pig ovary, which constitute the most abundant population of cells forming the ovarian follicle. They have been shown to be intimately involved in the processes of folliculogenesis and oogenesis, and are also responsible for steroidogenesis. In addition, through their constant dialogue with the ovum, they actively participate in the Oocyte's acquisition of competence for fertilization. The research methodology of the dissertation was based on conducting primary in vitro culture of granulosa cells of the domestic pig ovary and determining the expression profile of genes regulating the formation of the extracellular matrix, cytoskeleton and participating in cell division and intercellular signaling, specifically based on extracellular vesicles. The use of the expression microarray method allowed the determination of the transcriptomic profile of cells from specific time intervals (0 h, 48 h, 96 h and 144 h), and the validation of the obtained results was carried out using the RT-qPCR procedure.

The published results of the first stage of the study showed increased expression of genes encoding cadherins and collagen, as well as those involved in extracellular matrix (ECM) formation, in porcine granulosa cells cultured in vitro. The results of the second stage of the study present the expression profile of genes that can be considered new molecular markers of cellular processes involved in the organization of the cytoskeleton and its participation in intercellular signaling. The third stage of the conducted research presents the expression analysis of genes involved in cell adhesion, proliferation, migration and production of extracellular vesicles (EVs). The presented expression profile of selected

genes brings new insights into the regulation of physiological processes, especially intercellular signaling in granulosa cells of the porcine ovarian follicle. This research can therefore be used in assisted reproduction techniques (ART) conducted in vitro and provide new data on the pathophysiology of ovarian disorders.