

## **Analysis of the influence of microplastic (polyethylene terephthalate, PET) on transcriptomic profile of liver and intestine in immature gilts - *in vivo* studies**

Increasing plastic pollution is a growing problem due to rising plastic production. Special attention should be paid to microplastics (MPs), which penetrate various organs due to their small size. Microplastics can enter the environment as primary MPs (tiny plastic particles intended for commercial use) or are created by fragmentation of larger plastic parts – secondary MPs. The MPs particles can enter organisms through many ways, but ingestion is the most common. It has been found that they can accumulate in various tissues, leading to adverse effects. From the available studies, we can conclude that exposure to MPs leads to inflammation, oxidative stress, tissue damage, metabolic disorders, and changes at the transcriptome level. MPs have previously been shown to affect digestive system tissues after oral exposure, but these studies were mainly conducted in aquatic animals and rodents. Special attention is being paid to the potential effects of MPs on human health, but there is still little research on large mammals, including humans.

One of the most commonly used polymers in the food industry is polyethylene terephthalate (PET). This polymer is one of the most abundant in human blood and stool, suggesting that it is actively transferred through the digestive system. It was also the most commonly identified polymer in drinking water and was frequently found in other food products such as seafood or salts. **Despite the widespread use of PET in the food packaging industry, its high content in food and its potential accumulation in the organism, the effects of PET on human and animal health have not yet been fully described.** The potential disorders following exposure to PET include liver dysfunction, microbiota dysbiosis, and inflammation throughout the digestive tract. Based on the wide use of PET, the potential adverse health effects of MPs, and considering literature data in other animal species, *in proposed project we plan to examine the effect of polyethylene terephthalate (PET) on changes in the global transcriptomic profile of the liver, duodenum and distal colon.* The experiment will be conducted on approximately 8-week-old immature gilts, divided into three groups: 1) control group; 2) experimental group receiving orally a low dose of PET microplastic; 3) experimental group receiving orally high dose of PET microplastic.

It should be clearly emphasized that the proposed project is submitted in a basic research category. The pig is a good research model because of its close similarity in gastrointestinal anatomy and digestive physiology. These animals are also a good candidate for research on human nutrition and the pharmacokinetics of orally administered drugs. The proposed research will provide a lot of new data on the potential effects of microplastics on human health. Exploration of molecular mechanisms related to transcriptomic changes in selected parts of the digestive system will provide relevant information on the potential toxicity of MPs in the organism. The obtained research results will form the basis for further experiments aimed at determining the acceptable level of microplastics in food.