

## SUMMARY FOR GENERAL PUBLIC

Crohn's disease, one of the most common gastrointestinal diseases in developed countries, affects mainly the very young and children. It is a very troublesome disease for patients and, apart from the autoimmune background, disorders in the composition and metabolism of intestinal microbiota play an important role in its development. The quantitative and qualitative composition of the food consumed has a significant impact on the number and mutual quantitative ratio of individual types of bacteria colonising the human gastrointestinal tract. Pharmacological therapy of Crohn's disease is very invasive for the organism and inconvenient for patients, therefore, effective nutritional therapies based on biologically active components of plant origin are sought, which would effectively reduce clinical symptoms of the disease, as well as accelerate the onset of remission and prolong its duration.

Previous research results indicate that such plant components may be polysaccharides isolated from oat grains, included in the soluble fibre fraction - low molar mass beta-glucans. The results of studies on animal models of various diseases of the human gastrointestinal tract, as well as on cell lines, including cancer cells, have shown many health-promoting effects of these compounds. These include immune-stimulating effects, as well as anticancer and prebiotic effects, i.e. stimulating gastrointestinal bacteria.

The aim of the present project is to study the therapeutic effect of beta-glucan from oats of low molar mass on two Crohn's disease models: a domestic pig, in which the disease will be induced by a chemical agent (in vivo model), and on a culture composed of three types of human colonic epithelial cells, in which changes characteristic of the disease will be induced by one of the main inflammatory factors in Crohn's disease (in vitro model). The results obtained on the pig model will have the value of preclinical studies of the therapeutic effect of low molar mass oat beta-glucans in Crohn's disease, because the anatomy, physiology and microbiology of the gastrointestinal tract of this animal is very similar to those attributes of the human gastrointestinal tract. The results of this cell model study will provide insight into the molecular mechanisms of the therapeutic effects of low molar mass oat beta-glucan in Crohn's disease.

Analysis of the biological material obtained both in vivo and in vitro will be conducted using novel methods, including next-generation sequencing (NGS) to determine very precisely changes in the composition and abundance of intestinal bacteria at the genus and species level, as well as immunohistochemical localization in intestinal cells of proteins responsible for their apoptosis and proliferation and tight junctions between intestinal epithelial cells. Inflammatory markers, expression of their genes and neurotransmitters will also be determined, which will allow to determine the extent of involvement of the regulatory gut-brain axis in the mechanisms of therapeutic action in Crohn's disease of oat beta-glucans.