

We want to live healthier!!! We are starting to notice the link between diet, lifestyle and good health. For this reason, there is a growing demand for probiotic products that can provide a beneficial effect to the consumers health. Probiotics are one of the most promising and trendy categories of so-called functional food. The number of commercially available probiotic products is steadily increasing. Most of them have the status of dietary supplements and only a small percentage of probiotics is registered as medicinal products. Although hundreds of dietary supplements labeled as probiotic products are available in Europe, many of the strains used as active ingredients have no properties that are documented by appropriate efficacy and safety studies. In addition, there are reasons to doubt the relevance of species identification, the number of microorganisms declared in a single dose, or the justification of their choice. Moreover, in the latest report of the polish Supreme Audit Office, we find information that 89% of the tested probiotics did not meet their requirements i.e additional microorganisms were present in the dose or pathogenic bacteria like *Enterococcus faecium*. In addition, clinical data exists pointing to the dangers posed by probiotics in the form of whole bacteria which indicates the need to seek new solutions. One of the solutions could be a strictly defined molecule that shows health benefits.

The aim of the project is to carry out basic research to determine the biological role of Bifidobacterium bacterial antigens in the prevention/treatment of allergic diseases. Surface antigens i.e surface polysaccharides, surface proteins, glycolipids, lipoteichoicacids and peptidoglycans for which their chemical structures and immunomodulatory properties will be determined will be isolated. Selected antigens will be suspended in a modern nanoadjuvant (nasal administration, antigen-enhancing properties). In vivo, the possibility of their use in preventing/ treating allergy will be determined using germ-free mice and mouse allergy models. The project is designed to obtain a new generation probiotic, consisting of a biologically active bacterial antigen suspended in an emulsion-based nanoadjuvant that will be administered intranasally. The proposed solution is unique. It should be emphasized that the proposed research project is innovative and resulting in products based on natural components that do not adversely affect the host organism but at the same time induce the desired health effect. What's more, the intranasal route of entry is one of the latest world trend. It is expected that in the near future the popularity of the so-called "on the run" products will peak.