

In reports from recent years, the role of the microflora of the human body and probiotic bacteria for health is emphasized. Importantly, also components or metabolites obtained from probiotics, referred to as postbiotics, retain their bioactivity and can potentially be used as supplements in the pharmaceutical industry or ingredients for the fortification of functional foods, although determining their health-promoting potential requires further research. Although the consumption of probiotics is generally considered safe, it has been found that in elderly and immunocompromised people, it may be associated with the occurrence of local inflammatory reactions, gastrointestinal disorders, or even the risk of bacteraemia or sepsis. Postbiotics can therefore be a safe alternative by eliminating the risk associated with the consumption of live probiotic bacteria. Postbiotics obtained from LAB bacteria (Lactic Acid Bacteria) show e.g. antioxidant or anti-inflammatory properties in relation to normal cells and antiproliferative or cytotoxic properties in relation to cancer cells. This selectivity of action makes postbiotics a promising strategy supporting cancer treatment, especially since in the case of some types of cancer (e.g. breast cancer and gynecological cancer) a relationship between microflora dysbiosis and the risk of disease has been found.

The aim of this project is to evaluate the anticancer potential of postbiotics obtained from LAB bacteria and the possibility of using them as adjuvants in standard chemotherapy for breast and gynecological cancers. The tests will be performed on in vitro models, used to conduct a comprehensive evaluation of the tested compounds, taking into account the following aspects related to the response of tumors to therapy: influence on the cell cycle, proliferative and invasive potential, and the ability to induce cancer cell death; analysis of molecular and cellular mechanisms determining the cytotoxicity of postbiotics; the influence of postbiotics on the effectiveness of standard anticancer chemotherapy in vitro; assessment of selectivity of action in relation to cancer cells.

The result of the project will be a comprehensive characterization of molecular and cellular mechanisms underlying the anticancer properties of postbiotics obtained from LAB bacteria. This may be the basis for further research, including in vivo experiments, aimed at the use of postbiotics as tools supporting conventional cancer therapy. Due to the fact that some of the most common cancers in women are cervical cancer, ovarian cancer, and breast cancer, further research is needed to find new forms of effective therapy.