

DESCRIPTION FOR THE GENERAL PUBLIC

Anaerobic bacteria of the genus *Bacteroides* constitute the predominant gut microbiota in mammals. Together with other symbiotic bacteria in the digestive tract, *Bacteroides* spp. contribute to healthy bodily function. Selected *Bacteroides* spp. are potential human pathogens that can cause infections. Furthermore, *Bacteroides* spp. are becoming increasingly resistant to many classes of antibiotics, what may pose a threat to human health. Bacteria of the genus *Bacteroides* are excreted with feces to household wastewater which is treated in a sewage treatment plant, from where, are evacuated to the environment with treated wastewater.

The main objective of the proposed project will be to characterize *Bacteroides fragilis* group from various environmental samples. This goal will be achieved by verifying four research hypotheses: (i) the antibiotic resistance and virulence profiles of *Bacteroides fragilis* group isolated from various samples remain unchanged, (ii) *Bacteroides fragilis* group act as vectors of environmental dissemination of antibiotic resistance genes, (iii) antibiotic resistance and virulence genes characteristic of *Bacteroides fragilis* group are effectively removed by wastewater treatment plants with the activated sludge process, (iv) *Bacteroides fragilis* group can be used as an alternative indicator of the sanitary quality of surface water.

In this project will be analyzed bacteria of the *Bacteroides fragilis* group isolated from sewage of hospital and wastewater treatment plant (WWTP) in Olsztyn, from human and animal faeces as well as water from receiver of treated wastewater. Antibiotic resistance and virulence profiles will be determined by molecular methods. For this purpose, DNA from the cultured bacteria and environmental samples will be extracted. The presence of genes specific to the *Bacteroides fragilis* group will be determined by the use standard polymerase chain reaction (PCR) and quantitative PCR (qPCR). Furthermore, the usefulness of the *Bacteroides fragilis* group as sanitary indicator of water will be checked by analysis of co-occurrence of these microorganisms, *Escherichia coli* and *Enterococcus faecalis*.

Study a environmental anaerobic bacteria of the *Bacteroides fragilis* group is important, but also difficult. It requires the use of complex methods and specific laboratory equipment. Therefore, the environmental bacteria of the *Bacteroides fragilis* group have never been fully described yet.