Hematopoietic stem cell transplantation is one of the standard treatment options for hematological malignancies and many other diseases. This procedure is based on the high dose chemotherapy and transfusion of hematopoietic cells obtained from the appropriate donor. Unfortunately, this treatment is associated with high (up to 40%) risk of death due to severe complications, especially infections and so-called graft-versus-host disease (GvHD), which is an „attack" of the donor lymphocytes T on the host tissue recognized as foreign. Increased risk of infections results from impaired immunity after transplantation, but also from the damage to natural barriers protecting from infections such as intestinal barrier. It is a complex structure that consists of intestinal microflora, intestinal epithelium and cells of immune, nervous and circulatory system. Under normal conditions, this barrier is impermeable to gut bacteria and particles of digested food. Most infections in the post-transplantation period have endogenous etiology, meaning that they are caused by bacteria already present in the patient's body. It is due to the translocation of intestinal flora to the body fluids. Previous studies indicate that intestinal barrier integrity is maintained by interaction between intestinal epithelium with physiological intestinal flora and its metabolites. If the composition of this flora is altered by antibiotics or chemotherapy, there is an increased susceptibility to the damage during transplantation, resulting in increased permeability, and hence intestinal microbial translocation into the bloodstream and systemic infections. In addition it is believed that antigens and metabolites of microflora have a major impact on the development of immune responses after transplantation and can aggravate or inhibit GvHD.

The aim of this study is to verify this hypothesis. The project will demonstrate the intestinal barrier leakage and the changes in intestinal microflora metabolites after the transplantation.

In this study we will investigate patients with hematological malignancies undergoing hematopoietic stem cell transplantation. Clinical data will be collected (diet analysis, history of intestinal disease, history of antibiotic therapy, type of conditioning, transplantation characteristics, drugs administered) and additional analysis will be performed. The latter includes intestinal epithelium damage biomarkers (zonulin, B-defensin, calprotein) in the stool, disaccharide absorption functional test (lactulose-mannitol), assessment of bacterial metabolites (short chain fatty acids and indoxyl sulphate) in feces and serum.

This study will allow the analysis of the data obtained in order to correlate with GvHD, infectious complications frequency and treatment-related mortality.

New information will later help us to design strategies leading to better intestinal damage monitoring, gut barrier and intestinal microflora preservation and improvement of the patients outcome after transplantation.