The main goal of the project is more profound understand the ability of human α1,4-galactosyltransferase to heterodimerization, meaning the formation of complexes between the proteins. This enzyme synthesizes Gb3, a receptor for pathogens and toxins, posing a severe healthy problem in the world. Glycolipid-derived Gb3 is a major receptor for Shiga toxins (by binding the terminal Galα1→4Gal moiety), while P1 glycotope (another product of human α1,4-galactosyltransferase) occurs on proteins (with terminal Galα1→4Galβ1→4GlcNAc moiety) and also binds Shiga toxins, but with less affinity. According with previous reports, the presence of this epitope on different acceptors (glycolipid or glycoprotein) may affects the cytotoxicity effects of Shiga toxins. In this project, it is plan to evaluate the ability of α1,4-galactosyltransferase to interaction with other enzymes transferring carbohydrates, varying in acceptor specificity against glycolipids and glycoproteins, as well as examination the impact of these complexes on P1 glycotope distribution on specific type of acceptor molecules. In addition, analysis of susceptibility of modified CHO-Lec2 cells on Shiga toxins will be performed.

Gb3 and P1 glycotope bind Shiga toxins, which are produced by *Shigella dysenteriae* serotype 1 and Shiga toxin-producing *Escherishia coli* (STEC), posing an increasing threat to humans, because these toxins are responsible for hemorrhagic collitis and severe hemolytic-uremic syndrome, which may lead to death. Every year STEC cause an estimated 2.8 million of acute illnesses worldwide. The main origin of STEC infections are intake of contaminated food and water, person-to-person transmission or contact with animal carriers of these bacteria. STEC lead to hemolytic uremic syndrome, a severe complication characterized by anemia, thrombocytopenia and acute kidney failure.

This project may expand our knowledge about the pathomechanism of Shiga toxins-related diseases, and be a basis of development new threatment methods. The presence findings suggest that the type of acceptor molecules containing P1 glycotope may be crucial for the cells susceptibility on Shiga toxins. In the future, the proposed experiments may be a root of improved the therapeutical strategy reffered as “decoy receptor”, in which the ligands (i.e. toxins, pathogens) are bound by them and eliminated, without any pathogenic effects.