Studies of host-specificity of recombinant EBA *Plasmodium* merozoite ligands

Malaria is a devastating disease caused by protozoans' parasites belonging to the *Plasmodium* genus. Among five *Plasmodium* species that can infect human, *Plasmodium falciparum* is considered as the deadliest one. The closest *P. falciparum* relatives are chimpanzee *P. reichenowi,* and recently identified – gorilla *P. praefalciparum.* Despite the evolutionary proximity, and high genetical and molecular similarity, all of these parasites are strictly host-specific and recognize human, chimpanzee and gorilla, respectively. During the blood stage of *Plasmodium* parasite development the specific recognition of host receptors on the red blood cells (RBCs) takes place and it enables further invasion. Numerous parasite ligands partake in receptor binding during RBCs invasion event. One of them, *P. falciparum* erythrocyte binding ligand 140 (EBA-140) is responsible for binding glycophorin C, and by doing so it mediates the alternative invasion pathway. Homologous ligand has been identified for chimpanzee *P. reichenowi,* although its receptor on chimpanzee RBCs has not been described so far.

The presented doctoral research aims for detailed characterization of *P. reichenowi* homologues EBA-140 ligands specificity by using recombinant protein produced in baculovirus expression system. Functional binding studies between recombinant protein and chimpanzee RBCs were performed using immunoblotting, flow cytometry and surface plasmon resonance. I confirmed that obtained recombinant protein specifically recognizes chimpanzee RBCs, but not human RBCs, and this binding is dependent on the presence of sialic acid. In order to identify the receptor for *P. reichenowi* EBA-140 ligand I used chimpanzee RBCs treated with neuraminidase (to remove sialic acid)- , trypsin- and chymotrypsin- treated RBCs. Obtained results indicated that the recombinant protein is functional and its interaction with chimpanzee erythrocytes is specific and sialic acid-dependent. Moreover, the observed enzymatic profile of Region II binding pointed to glycophorin D homolog, as a putative receptor for *P. reichenowi* ligand EBA-140 on chimpanzee erythrocytes.

Due to the close evolutionary proximity between human and chimpanzee and their malaria parasites - *P. falciparum* and *P. reichenowi*, respectively, the differences in invasion event described herein, allow for better understanding of *P. falciparum* host-specificity.