Developing an Experimental Protocol for Purification of a Malaria Parasite *Plasmodium Yoelii* Hydrolase Protein

Malaria is a deadly parasitic disease caused by several species of *Plasmodium* and transmitted between mammalian hosts by mosquitoes. The life cycle of *Plasmodium* parasites consists of several distinct stages, in which the parasite assumes drastically different morphologies. However, the mechanisms by which each cell type develops are not fully understood. *Plasmodium* BEM46-Like Protein (PBLP) is a transmembrane enzyme with unknown structure and catalytic activity, with an observed effect on cell polarization during several stages of the *Plasmodium* life cycle. In this project, we detail a putative molecular structure for PBLP, develop an experimental protocol for expression and purification of PBLP in lab *E. coli,* and detail findings about activity toward different substrates using *p*-nitrophenyl ester assays. 3D structure predictions were generated using computational tools and showed similarity to other known alpha/beta hydrolase proteins. Possible lipid esterase activity was indicated. SDS-PAGE data from the expression stage showed successful cell transformation but low protein yield when expressed at 18℃ and room temperature and purified, suggesting sensitivity to other environmental factors during expression. When tested using enzyme activity assays, hydrolysis of *p*-nitrophenyl acetate was observed. These results indicate that production of PBLP was successful and confirmed esterase activity. Methods for producing this protein could be further improved and more testing could be done to identify biological substrates in future research. These findings may further our understanding about *Plasmodium* cell development and have applications in the development of treatments for malaria.