IPD Project Details

Project ID: IPD1305

Project Title: Next-generation diagnostic biomarkers for vivax malaria

Description: The global impact of Plasmodium vivax has been largely underestimated for several decades due to lower mortality rates compared to P. falciparum. However, in recent times, the parasite has become a serious threat to public health due to its ability to cause severe malaria with fatal outcomes. Its unique biology makes it resilient to control measures and poses a challenge to available diagnostic methods. Diagnosis by RDTs is further restricted due to inadequate P. vivax specific antigens for species identification. Therefore, there is an urgent need to develop tests that employ antigens unique to the parasite. This study represents the first in-depth proteomics analysis of human plasma and parasite isolates to identify P. vivax protein biomarkers that can be tested for use in RDTs while developing diagnostics for malaria. Here we report 39 P. vivax proteins in human plasma and 103 highly expressed P. vivax proteins from parasite isolates with high confidence. Interestingly, five proteins, found to be unique to P. vivax were detected in both sources, representing the best candidates for evaluation as diagnostic markers. Moreover, targeted proteomics assays were used to validate some of these proteins. This study represents the first step in the development of new diagnostic assays for P. vivax malaria.

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Sample Preparation: Parasite isolation, Plasma depletion for top 12 human sera abundant proteins

Peptide Separation: In-gel digestion, peptide extraction, sample cleanup, liquid chromatography Mass spectrometry

Protein Characterization: Trans proteomic pipeline was used for analysing proteomics LFQ data, obtained from parasite pelle and plasma samples of infected patients. The targets obtained were then validated using multiple reaction monitroing baed assays and the data was analysed using skyline software (freely available for users)

Experiment Type: SRM/MRM, Shotgun proteomics

Species: Plasmodium vivax - 5855

Tissue: Blood (bto:0000089), Blood plasma (bto:0000131)

Cell Type: Blood cell (cl:0000081)

Disease: Plasmodium vivax malaria (doid:12978)

Instrument Details: Q Exactive (MS:1001911)

Protein Modifications: iodoacetamide derivatized residue

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