Vaccines and immunity

PO - (8439) - EFFECT OF PLASMODIUM FALCIPARUM EXPOSURE ON HUMAN URINARY METABOLOMICS PROFILING

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Abstract

Background: The immunity against malaria infection is being studied extensively but the underlying mechanisms of protection remain not fully understood. Metabolomics is a post-genomic technology enabling a minimally invasive monitoring of the physiological responses to external and internal stimuli. Here, we present a longitudinal study of the urinary metabolic profiles of healthy individuals before and after intravenous administration of P. falciparum sporozoites, aiming at deciphering the metabolic changes observed during the course of malaria infection.

Methods: 20 healthy Gabonese and 5 Europeans were voluntary challenged by live P.falciparum sporozoites (3200 PfSPZ) and followed up until they developed symptoms and became thick blood smear positive respectively. Urine samples was collected before and after challenge at several times points until treatment. Samples were analysed in an untargeted approach using state-of-the-art analytical platforms, namely hydrophilic interaction chromatography - mass spectrometry (HILIC-MS) and nuclear magnetic resonance (NMR) spectroscopy. A combination of the multivariate and univariate data analysis approaches was used for dissecting the metabolic effects of a host response to the infection.

Results

Unlike the Europeans participants, a part of the Gabonese volunteers did not become parasitemic. Unsupervised data analysis shows sample discrimination between Europeans and Gabonese at baseline, before and after challenge and between Gabonese who controlled their parasitemia and those who did not.

Conclusions

This metabolomics study highlighted the differences in the urinary metabolite profiles during the course of P. falciparum infection. These differences observed between parasitemic and non-parasitemic Gabonese after challenge with P. falciparum, may suggest an underlying metabolic mechanisms of protection against malaria infection which we will investigate in detail.