

POSTER PRESENTATION

Open Access

It is all in your head: a model for cerebral malaria

Antoine Claessens^{1*}, Zbynek Bozdech², Alex Rowe¹

From Parasite to Prevention: Advances in the understanding of malaria
Edinburgh, UK. 20-22 October 2010

Cerebral malaria is characterised by an accumulation of infected erythrocytes in the microvasculature of the brain. *P. falciparum* infected erythrocytes have been shown to bind to a Human Brain Endothelial Cell line (HBEC-5i), however, the parasite adhesion ligands necessary to anchor the infected erythrocytes onto HBEC-5i have not been identified. We aimed to identify parasite variant surface antigens that are differentially transcribed after selection for cytoadherence to HBEC-5i.

The *P. falciparum* laboratory strains 3D7, HB3 and IT/FCR3 were selected using a panning assay for binding to HBEC-5i. In order to analyse their transcriptome using a microarray chip based on the 3D7 genome, variant surface antigens sequences (*var/PfEMP1*, *rif*, *stevor*) were extracted from the sequenced HB3 and IT genomes and added to the 3D7-based microarray chip.

Microarray analysis was carried out on selected and unselected parasites of all three strains. Transcriptome data clearly indicated that the most highly upregulated genes after selection were group A or group A-like *var* genes, showing 11 to over 100 fold upregulation in selected parasites. The *rif* gene located head-to-head to the upregulated *var* gene was also highly expressed. To a lesser extent some exported proteins like RESA-1, PfEMP3 or PHIST family members also showed increased transcription in HBEC-selected parasites (2-3 fold upregulation). Reverse transcriptase-PCR confirmed the upregulation of group A *var* genes in selected parasites, suggesting that the group A PfEMP1 variants are major candidate ligands for parasite binding to HBEC-5i. These findings are consistent with previous work showing an association between group A *var* genes and cerebral malaria.

The HBEC-5i receptors mediating this interaction with infected erythrocytes are currently under investigation.

Author details

¹IIIR, Ashworth Laboratories, University of Edinburgh, Edinburgh, EH9 3JT, UK.
²Nanyang Technological University, SBS, 60 Nanyang Drive, 637551, Singapore.

Published: 16 December 2010

doi:10.1186/1475-2875-9-S2-P63

Cite this article as: Claessens et al.: It is all in your head: a model for cerebral malaria. *Malaria Journal* 2010 **9**(Suppl 2):P63.

Submit your next manuscript to BioMed Central and take full advantage of:

- Convenient online submission
- Thorough peer review
- No space constraints or color figure charges
- Immediate publication on acceptance
- Inclusion in PubMed, CAS, Scopus and Google Scholar
- Research which is freely available for redistribution

Submit your manuscript at
www.biomedcentral.com/submit



¹IIIR, Ashworth Laboratories, University of Edinburgh, Edinburgh, EH9 3JT, UK
Full list of author information is available at the end of the article