The landscape of a parasite surface: Characterisation of the exposed invariant epitopes on the surface of African trypanosomes as putative targets of novel immunotherapeutics

Supervisory team:
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**Project description:**
Several trypanosome species are pathogens of humans and livestock in sub-Saharan Africa. Successful infection and transmission rely on the ability of the trypanosome to detect, interact with, and adapt to its environment. As extracellular parasites, the trypanosome cell surface acts as the molecular interface between the parasite and its external environment and functions in nutrient acquisition, signalling, and countering host innate and adaptive immune attack. The major surface protein, the Variant Surface Glycoprotein (VSG), has been well characterised and is known to play important roles in host immune evasion. The non-variant surface proteins are largely protected from detection by the host immune system through shielding by the VSG. However, the functions of some of these proteins, such as those required for macromolecular nutrient acquisition, necessitate that they protrude out of the VSG layer. This requirement provides a potential weakness in the parasite’s armoury. We have recently shown that antibody-drug conjugates can be targeted to the trypanosome cell surface through a non-variant surface protein and lead to efficient killing of the parasite in vitro and in vivo. This PhD project will predict then map the exposed non-variant epitopes of the parasite cell surface of two African trypanosome species to (i) provide a comprehensive analysis of the parasite cell surface landscape and (ii) identify putative targets for the development of immunotherapeutics. An interest in computational biology would be advantageous.

**Key references:**