

Erythrophagocytosis of desialylated red blood cells is responsible for anaemia during *Trypanosoma vivax* infection.

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Trypanosomal infection-induced anaemia is a devastating scourge for cattle in widespread regions. Although *Trypanosoma vivax* is considered as one of the most important parasites regarding economic impact in Africa and South America, very few in-depth studies have been conducted due to the difficulty of manipulating this parasite. Several hypotheses were proposed to explain trypanosome induced-anaemia but mechanisms have not yet been elucidated. Here, we characterized a multigenic family of trans-sialidases in *T. vivax*, some of which are released into the host serum during infection. These enzymes are able to trigger erythrophagocytosis by desialylating the major surface erythrocytes sialoglycoproteins, the glycophorins. Using an ex vivo assay to quantify erythrophagocytosis throughout infection, we showed that erythrocyte desialylation alone results in significant levels of anaemia during the acute phase of the disease. Characterization of virulence factors such as the trans sialidases is vital to develop a control strategy against the disease or parasite.

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