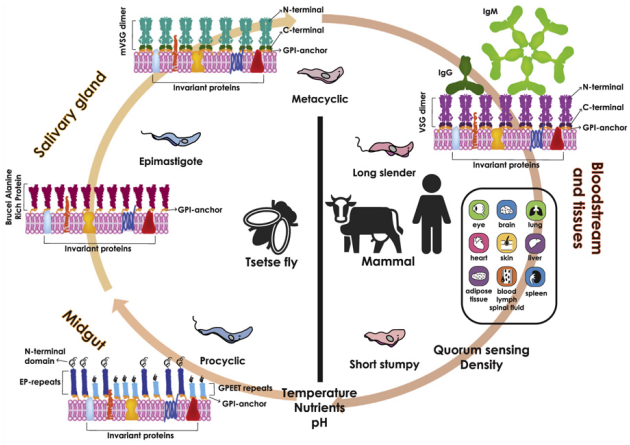
Discoba: *Trypanosoma brucei*

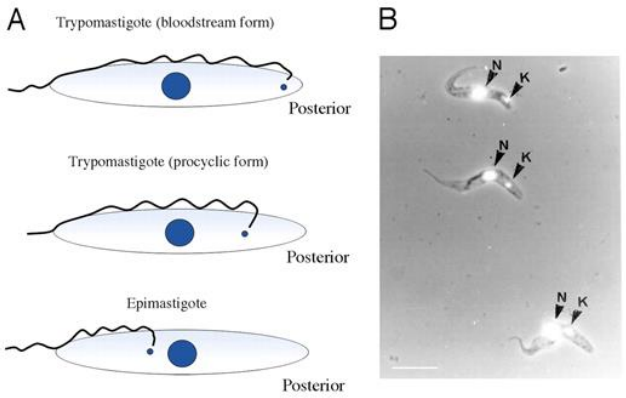
A parasite perfect for cell biology

In the clade Discoba we find many subgroups and species. Kinetoplastea is a subgroup known for its many pathogenic eukaryotes (Archibald et al., 2017). This paper's focus is going to be the protist *Trypanosoma brucei* within kinetoplastea. In the rual areas of sub-Saharan Africa sleeping sickness spreads among humans and causes nagana in domesticated animals. The cause is the vector-borne parasite *T. brucei* hitchhiking on the tsetse fly. It is entirely extracellular throughout its lifetime. When introduced by the fly into the dermis of the host, the metacyclic-form parasites enter the bloodstream and replicate to form long slender forms. (Romero-Meza & Mugnier, 2020)

The parasite is covered by Variant Surface Glycoproteins (VSG). Once the parasite has entered the human bloodstream the VSG triggers an immune response. To avoid such a response, *T. brucei* sheds the VSG to the surrounding environment periodically there by avoiding effects of the immune system. (Ponte-Sucre, 2016)



This image depicts the life cycle of T. brucei. On the right side of the image we have the mammalian stage of life while on the left we have the tsetse life stages. The image depicts both the morphology of the parasite as well as the VSG on the outer layer of the cell membrane.



The position change of the kinetoplast during the life cycle of T. brucei. (A) the relative position of the kinteoplast forms in respect to the nucleus and the posterior of the cell. (B) The nucleus (N) and the kinetiplast (K) in three stages of differentiation. The top cell is the earliest in the process while the bottom one is the latest.

T. brucei has a complex life cycle where it must adapt to the mammalian bloodstream and the different parts of the tsetse fly. These phases require stage specific adjustments to their cell biology and its processes. Some example of changes to reflect the environmental responses could be morphology, organelle positioning and cell divisions. These changes provide a description of the different life cycle stages of the parasite The overall picture, making this organism more favorable than yeast or mammalian cells, is the highly orgaised cell division and morphogenesis. Therefor understanding the developmental cell biology of this parasite gives insight into different aspects of eukaryotic cell organistaion. Although many stages of the life cycle of the parasite is unknown, such as the specifics of what occurs in the salivary glands in the tsetse fly, an understanding of *T. brucei* gives great potential into understanding cell biology. (Matthews, 2005)

References:

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