

New Trypanosome genomes demonstrate the co-evolutionary relationship between energy source and survival strategy

Trypanosomes are a group of important neglected tropical diseases of both humans and animals. They contribute to morbidity, mortality and economic repression of the regions it affects across Africa and South America where the insect vectors are endemic.

Transesterification of glycerol with fatty acids forms diacyl and triacylglycerides, such neutral lipids can be stored non-toxicly in eukaryotic cells as lipid droplets. As a rich and abundant source of energy, host triglycerides are frequently targeted by pathogenic microbes. However, the ability to access host triacylglycerides is non-trivial. There are 3 mechanisms by which single celled pathogens can achieve this: by lysing the cell and collecting the lipids, by inducing the cell to deliver the lipids across the intervening membrane or by entering the cytoplasm of the cell and scavenging them directly.

All of these mechanisms involve utilization of considerable specialist resources by the pathogen from an environment which is already metabolite rich in terms of soluble sugars, amino-acids and lipids. The major disadvantage associated with remaining extracellular in the blood and lymph is the exposure to the immune system, both innate and adaptive which makes a protracted parasitaemia problematic to maintain.