**Interrogating the role and regulatory functions of autophagy-related pathways during *Trypanosoma brucei* differentiation and host adaptation**

**A. Nugawela, N. Thompson, M. Cayla**

*Trypanosoma brucei* (*T. brucei*) is the causative agent of human African trypanosomiasis and the cattle wasting disease, Nagana. The spread of trypanosomiasis relies on successful transmission of parasites between the mammalian host and their *Tsetse* fly vector; a process which requires stage-specific pre-adaptation to the new host. In the mammalian bloodstream (BSF) parasites differentiate from the replicative "slender" to the quiescent "stumpy" forms, a differentiation event which is characterised by extensive morphological remodelling, which pre-adapts these parasites for survival in the insect host. Our work centres on understanding the regulatory role of autophagy-related pathways and differentiation.

The lysosome-dependent autophagy pathway in eukaryotic models is widely understood to facilitate the degradation and recycling of cellular components. Through the visualization autophagosomes and autolysosomes, we present preliminary data which links autophagy activation to a key point in the differentiation process. We also investigate the role of lysosome exocytosis in the release of parasite peptidases/proteases in initiating quorum-sensing dependent differentiation and their function in tissue invasion using *in vivo* and *in vitro* methodologies.

We outline our initial steps in the development of a novel high throughput (HTP) bioimaging system, optimised for prolonged visualisation of the highly motile BSF form *T. brucei*. This system aims to provide a resource for routine and prolonged live-cell visualisation and particle tracking across the time-course of differentiation *in vitro*. This HTP system will then be used in combination with a kinome-wide RNAi screen to identify the protein kinases regulating the autophagy and differentiation pathways in this pathogen.