Title: *Plasmodium Berghei* Subpellicular Microtubule Protein-1 (*Pb*SPM-1) Is A Microtubule-stabilizing Protein Playing a Role in Schizont Development

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The malaria parasite *Plasmodium* invades red blood cells and multiplies by undergoing a process called schizogony. During this process, the parasite undergoes significant morphological changes that are supported by subpellicular microtubules underneath its plasma membrane. In eukaryotes, microtubules (MTs) are regulated by microtubule-associated proteins (MAP), only a few of which have been characterized in the malaria parasite. Here, I present the functional characterization of *Subpellicular Microtubule Stabilizing Protein 1* (SPM1) of the rodent parasite *Plasmodium berghei.* The gene is expressed the highest at the end of schizogony when the new merozoites develop. The 35 kDa soluble *Pb*SPM1 protein contains seven identical repeats and exhibits no secondary or tertiary structure. It binds directly to microtubules. Our lab has recently generated an SPM1-KO parasite line demonstrating that the protein is not essential for *Plasmodium*. However, Giemsa staining shows that *Pb*SPM1-KO parasites exhibit disorganized, asynchronous development of merozoites and plasma membranes during the schizont stage. My Immunofluorescence Assays (IFA) showed a pronounced disorganization of the microtubule in the schizont stage of SPM1-KO parasite. This suggests a role of SPM1 in the microtubules of the subpellicle, a structure that supports the parasites' plasma membrane and guides the maturation process of the merozoite stage. To investigate the ultrastructure of the SPM1-KO parasites, I developed a protocol for transmission electron microscopy (TEM) of *Plasmodium* blood stages. My high-resolution images revealed asynchronous segmentation of *Pb*SPM1-KO parasites compared to their parental wild type (WT). My data suggests that SPM1 plays a role in stabilizing subpellicular microtubules, which in turn support the parasite's inner membrane

complex (IMC) and facilitate synchronous segmentation of the new daughter merozoites. This is the first time a specific role has been assigned to SPM1 in the malaria parasite.