As the protozoan parasite *Plasmodium* is transmitted from humans to mosquitoes, it changes its cell morphology between developmental stages as well as its response to changes in its environment. To accomplish this the parasite must reorganize its cytoskeleton. Microtubules in *Plasmodium*, although structurally highly similar to human microtubules, perform highly specialized functions, specifically in generating and maintaining the highly polarized banana shape of the ookinete.

**Abstract**

As the protozoan parasite *Plasmodium* is transmitted from humans to mosquitoes, it changes its cell morphology between developmental stages as well as its response to changes in its environment. To accomplish this the parasite must reorganize its cytoskeleton. Microtubules in *Plasmodium*, although structurally highly similar to human microtubules, perform highly specialized functions, specifically in generating and maintaining the highly polarized banana shape of the ookinete.

**Background Information**

- *pbtrxl-1* is a single copy gene that is organized into three exons. The gene spans a length of 1021 bp and is located on chromosome 8 of *P. berghei* genome. Its open reading frame is comprised of 621 bp, which codes for a 206 AA protein with a calculated molecular weight of 23.4 kDa and an isoelectric point of 7.03.
- Investigations into the TrxL-1 protein of the related parasite *Toxoplasma* revealed that TrxL-1 does not bind to microtubules but potentially interacts with microtubule-associated proteins (MAPs) TLAP2 and SAXO1 (Liu, 2013).
- Previous work in our lab indicates that TrxL-1 is highly upregulated during the ookinete stage in the mosquito.
- Using the CRISPR system, a TrxL-1 KO parasite strain was generated, showing that the gene is not essential for parasite development in mice or mosquitoes. Initial analysis of the KO parasites did, however, detect a delay in parasite development during ookinete and maturation. Misshapen ookinetes were present in the TrxL-1 KO strain (Fig. 3).
- We hypothesize that TrxL-1 may play a role in microtubule regulation in *Plasmodium* ookinetes.

**Methods**

- Plasmid Preparation
- Cloning/Transformation
- Plates
- Polymerase Chain reaction
- Gel Electrophoresis
- Protein Purification
- SDS-PAGE
- Bradford Assay

**Results**

- Data base analysis shows upregulation of TrxL-1 in the ookinete stage.
- Cloning and transformation of pQEO30 TrxL-1 into M15 expression cells
- Successful expression and purification of TrxL-1
- Optimization of TrxL-1 purification scheme

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**References**


**Summary**

- Data base analysis shows upregulation of TrxL-1 in the ookinete stage.
- Cloning and transformation of pQEO30 TrxL-1 into M15 expression cells
- Successful expression and purification of TrxL-1
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**Ongoing**

- Send out purified TrxL-1 for antibody production
- Perform qPCR to analyze expression of TrxL-1 in mosquito life stages
- Visualize parasite development in wild type and KO parasites using x methods
- Immunofluorescence assay to visualize microtubules of wild type and KO parasites