

Master's Thesis

Drug Discovery for Neglected Tropical Helminth Infections

Helminth Drug Development Unit, Swiss Tropical and Public Health Institute

Schistosomiasis and soil-transmitted helminthiasis (STH) are neglected tropical helminth infections that are widely distributed in tropical and subtropical areas. These diseases affect hundreds of million people worldwide causing a major public health burden. Treatment and control relies on a few drugs that are abundantly used in preventive chemotherapy campaigns. Considering the threat of emerging drug resistance, there is a need to identify and develop novel treatment options. The causative helminth parasites feature complex life cycles that offer multiple avenues of drug action against distinct life stages.

This master projects aims at enabling the discovery of compounds targeting helminth eggs by developing a drug sensitivity assay with *Schistosoma* and nematode eggs. This newly developed technique will be employed in a drug activity screen to discover compounds that can kill helminth eggs.

The MSc candidate will be guided through the early drug discovery process and learn new tools and techniques to:

- identify optimal culturing conditions for *Schistosoma* and nematode eggs
- develop a drug sensitivity assay with *Schistosoma* and nematode eggs using an optimal readout method
- conduct primary and secondary screenings and evaluate a compounds activity profile between eggs, larvae and adult worms
- assess compound activity in presence of additional blood derived material such as complement system, haemoglobin and plasma proteins.
- select the most promising compound and visualise its effect on parasite eggs and adult worms under the fluorescence microscope.

By the end of the project the MSc candidate will have gained insights into drug discovery for neglected parasitic diseases in addition to a detailed knowledge of parasite biology, including parasite culture, small molecule handling, data analysis and presentation skills. For further reading / references see:

- Colley et al., The Lancet **2014**, 383, 2253-64. doi.org/10.1016/s0140-6736(13)61949-2.
- Karpstein et al., Parasites Vectors **2019**, 12, 226. doi.org/10.1186/s13071-019-3476-x.

Supervision:

Prof. Dr. Jennifer Keiser, <mailto:jennifer.keiser@swisstph.ch>

Stefan Biendl, <mailto:stefan.biendl@swisstph.ch>