Abstract

Genus *Schistosoma* is one the most studied group of helminths due to the importance of several representatives in terms of veterinary and human health. The advent of the modern sequencing technologies, as well as the increasing computational capacities, enabled large-scale screening of nucleic acids and thus deep exploration of complex transcriptome and genome information.

To date the main attention of leading molecular parasitological "Schistosoma" research teams was focused on serious human pathogens *Schistosoma mansoni*, *Schistosoma japonicum* and *Schistosoma haematobium*. In the term of molecular/biochemical research, the other schistosomatids were mostly neglected and general knowledge was limited to characterization of particular genes/proteins without further link to biological functional complex.

Presented thesis summarises the first large-scale insights into the molecular basis of biological principles of two bird schistosomes *Trichobilharzia regenti* and *Trichobilharzia szidati* during their invasion of the definitive avian host. While *T. szidati* uses the "classical" visceral way of migration - bloodstream and lungs (same as human schistosomes), *T. regenti*, migrates trough the peripheral nerves and spinal cord. Neurotropic migration is unique among schistosomes and it is also extremely rare within helminths. We aimed to determine the molecular mechanisms linked with visceral and neurotropic life strategy of both *Trichobilharzia* species using transcriptomic profiling of two consecutive developmental stages – cercariae (free living stage) and schistosomula (tissues migrating stage).

Our work started with the transcriptomic analysis of cercariae and schistosomula of neurotropic *T. regenti* leading to the identification of protein classes and biological

pathways related to important physiological processes (publication No 1). In order to more accurate identification of the molecular mechanisms linked to neurotropism of *T. regenti* schistosomula, we sequenced and reconstruct transcriptome of visceral *T. szidati* and performed comparative analysis. The numerous links to particular visceral or neurotropic strategies of these two schistosomes were identified (publication No 2). Our further research was related to functional characterisation of the important proteolytic enzyme cathepsin B - peptidase of *T. regenti*, including also a detailed analysis of expression of different isoforms (publication No 3).