

## DOKTORSKÝ STUDIJNÍ PROGRAM

### NÁVRH TÉMATU/PROPOSAL OF THEME

Studijní program/*Study Program*: **Applied Zoology**

Katedra/*Department of*: **Zoology and Fisheries**

Školitel (včetně titulů), email/*Supervisor, email*: Jan Dvořák Ph.D., [dvorak19@af.czu.cz](mailto:dvorak19@af.czu.cz)

Konzultant (včetně titulů)/*Co-supervisor*:

Forma studia/*Form of Study*: **Full\_time**

Typ tématu/*Type of Theme*: **Framework**

#### **Téma/Theme:**

**Identification of secreted proteins from fluke *Schistosoma mansoni* and their role in different pathogenicity of individual strains.**

This topic is also available to students from other study programs.

#### **Hypotéza/Hypothesis:**

Secreted proteins from blood flukes - schistosomes specifically modulate their hosts, and their detailed study will contribute to elucidate the processes during infection course and to understand host-parasite interactions at the molecular level.

#### **Anotace/Annotation:**

Schistosomiasis (bilharziosis) is a chronic infectious disease caused by blood flukes of the genus *Schistosoma* (Platyhelminthes, Trematoda). The disease is a global problem and around 230 million people are infected and another 600 million people are at risk. Bioactive molecules secreted by parasites are critical for their survival in mammalian hosts. In the case of schistosome eggs, their migration in tissues depends on the secretion of their E/S products stimulating host physiological processes. Several mechanisms are known to allow mature eggs to pass from the blood vessels through the intestinal wall, such as angiogenesis, endothelial activation, interaction with coagulation processes, and a variety of immunomodulatory processes promoting the formation of granulomatous tissue around the eggs. These host-pathological reactions caused by mature eggs are responsible for the typical manifestations of schistosomiasis. In addition to the adaptive immune mechanisms involved in granulomatous formations, innate immunity is also central to establishing a corresponding Th2 response. In this project, we want to identify key molecules from schistosome E/S products, which are responsible for different host tissue damage and inflammatory processes. Eggs of three isolates (strains) of the species *Schistosoma mansoni* with different intensity of pathological manifestation: Puerto Rico - LSTHM isolate; Liberian strain - Grevelding 1995 isolate; and Brazilian strain - Belo Horizonte isolate will be compared at the level of gene expression by RNAseq analysis as well as by mass spectrometry methods. Identified molecules with different expression will be compared with immunopathological manifestations and further tested in cooperation with University Medical Center Rostock, Institute of Organic Chemistry and Biochemistry ASCR and Masaryk University in Brno. Project details can be discussed with group leader.

Datum/*Date*: 26.10.2020

Podpis/*Signature*: