



Review of the Ph.D. thesis submitted by Mgr. Roman Leontovyč

Molecular adaptations of neurotropic and visceral bird schistosomes during the infection of the avian definitive host.

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The Ph.D. thesis of Mgr. Roman Leontovyč focuses on large scale, transcriptomic profiling of cercarial and schistosomula stages of two bird's schistosomes *Trichobilharzia regenti* and *Trichobilharzia szidati*. The parasites differs in the way of invasion of definitive host. While *T. szidati* uses visceral form of invasion, *T. regenti* invades peripheral nerves and spinal cord. The aims of the thesis was to characterize and compare the transcripts of both parasitic species and to underpin the molecular mechanisms associated with different life strategies (visceral vs neurotropic). In general, the experiments were well designed, and performed in a rigorous manner. Obtained results are convincing and were published in three internationally recognized, peer-review journals.

The thesis has 42 pages and consists of five parts (abstract, aims of the thesis, introduction, concluding remarks and references). Published papers are attached and the applicant contribution to individual paper is outlined specifically. The thesis does not contain many typos or other formal problems and the English of the text seems good to me (as far as I can judge).

I have a few questions / comments to the applicant:

1 – on the page 10 you state that the affinity of *Trichobilharzia* sp. cercarie to human skin is higher than to the duck skin. How was this affinity measured and what could be the rationale behind?

2 – on page 18 you state that calpains were the most expressed group of peptidases in the cercarial stage. How many isoforms of calpains did you identified? It has been shown, that different calpain isoform can play opposite biological roles (Baudry, 2016 Trends Neurosci. 2016 Apr; 39(4)).

3 - Despite being predominantly intracellular, there is an evidence that *S. mekongi* calpains can also cleaved human complement C3 protein, thus indicating a role in host immune evasion (Chaimon et al 2019, . Parasites & Vectors volume 12). Would you expect similar role for *Trichobilharzia* sp. calpains?

4 – on page 5 you state that Micro exon genes (MEG) were described for the first time in *S. mansoni* and are specific for family schistosomatide. I do not agree with this statement,



because microexons have been described in 1985 in drosophila and since that time, they were found in many other species (Ustianenko, 2017 Wiley Interdiscip Rev RNA. 2017 Jul; 8(4)).

5 - In your 2nd publication (Figure 2 and 3) you compare enriched biological (KEGG) pathways common or specific to cercariae or schistosomules of *Trichobilharzia szidati* or *T. regenti*. While looking at the data I found a bit odd that some pathways eg cell growth and death, ion channels or transcription factors are unique only for one group. Can you comment on this?

6 - Have you done any "wet lab" experiment eg qPCR analysis to confirm the transcription profiling?

Despite all my comments, I believe that Mgr. Roman Leontovyč achieved a high level of scientific competence as evidenced by his three publications (two as a first author) and that the results gained during his Ph.D. studies are a valuable contribution to comparative studies of avian schistosomes.

Finally, I am glad to conclude that presented work meets all the criteria and I have no hesitation in recommending to **accept** the thesis of Mgr. Roman Leontovyč for Ph.D. defense.

In České Budějovice, 18.06.2020

Zdeněk Franta

