Přírodovědecká   Jihočeská univerzita
fakulta   v Českých Budějovicích
Faculty   University of South Bohemia
of Science   in České Budějovice

OPPONENT'S REVIEW ON BACHELOR/DIPLOMA[*] THESIS

Name of the student: Matilda Freytag

Thesis title: Telomerase activity pattern in somatic tissues of the bumblebee (*B. terrestris*)
Supervisor: RNDr. Radmila Čapková Frydrychová, Ph.D.

Referee: Vratislav Peška, PhD
Referee`s affiliation: Institute of Biophysics of the CAS

	Point scale[1]	Points
(1) FORMAL REQUIREMENTS		
Extent of the thesis (for bachelor theses min. 18 pages, for masters theses min. 25 pages), **balanced length of the thesis parts** (recommended length of the theoretical part is max. 1/3 of the total length), **logical structure of the thesis**	0-3	3
Quality of the theoretical part (review) (number and relevancy of the references, recency of the references)	0-3	3
Accuracy in citing of the references (presence of uncited sources, uniform style of the references, use of correct journal titles and abbreviations)	0-3	2
Graphic layout of the text and of the figures/tables	0-3	3
Quality of the annotation	0-3	3
Language and stylistics, complying with the valid terminology	0-3	3
Accuracy and completeness of figures/tables legends (clarity without reading the rest of the text, explanation of the symbols and labeling, indication of the units)	0-3	2
Formal requirements – points in total		19

(2) PRACTICAL REQUIREMENTS		
Clarity and fulfillment of the aims	0-3	3
Ability to understand the results, their interpretation, and clarity of the results, discussion, and conclusions	0-3	3
Discussion quality – interpretation of the results and their discussion with the literature (absence of discussion with the literature is not acceptable)	0-3	3
Logic in the course of the experimental work	0-3	3
Completeness of the description of the used techniques	0-3	3

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[*]   Choose one

[1]   Mark as: 0-unsatisfactory, 1-satisfactory, 2-average, 3-excellent.

Experimental difficulty of the thesis, independence in experimental work	0-3	3
Quality of experimental data presentation	0-3	3
The use of up-to-date techniques	0-3	3
Contribution of the thesis to the knowledge in the field and possibility to publish the results (after eventual supplementary experiments)	0-3	3
Practical requirements – points in total		27

POINTS IN TOTAL (MAX/AWARDED)	**46**	**(0-48)[2]**

Comments of the reviewer on the student and the thesis:

The thesis is focused on topical research in the field of telomere biology and ageing. It presents and discusses the results obtained from *Bombus terrestris* using classical Telomeric repeat amplification protocol (TRAP), the modified version which includes real-time PCR, and cloning of obtained TRAP products. The discussion of the thesis concludes the results very well. In brief, a hypothesis based on the work is that telomerase pattern in primitive and advanced eusocial species is different. While e.g., in honeybee queens the telomerase activity is elevated in most somatic tissues, in bumblebee queens the only telomerase activity elevated somatic tissue was the fat body of young pre-diapause queens. The author suggests a hypothesis, that the phenomenon is connected to fat body metabolic changes prior to diapause. Possible connections between the telomerase activity and either the endocrine system or mating are also discussed with respect to previous results of the supervisor´s laboratory and literature.

I have to admit, that sometimes, during the reading of this work, I forgot I was reading bachelor study, not diploma thesis or manuscript for a small publication, how good it was. However, my role as a referee is to find weak points of it, so here is a list of them.

1. The abstract and presentation of the work concept would need a bit more assurance. Sentences like, "...this feature is likely linked to..." and "..the telomerase activity pattern...might resemble the one in..." weaken the good concept significantly.
2. There is only a minimum of formal mistakes. The missing chapter 1.3 in the Table of contents is the one I found.
3. I found several misleading inaccuracies in the citations e.g., Hayflick and Moorhead, 1961 refers to limited cell proliferation of somatic cells, not to DNA polymerase inability to process telomeres. I missed the citation for *Drosophila* telomeric retroelements. Several recent publications focused on the telomere attrition and lifespan could have been mentioned e.g., Tricola et al., 2018 (doi: 10.1098/rstb.2016.0445) and Whittemore et al., 2019 (doi: 10.1073/pnas.1902452116).

4. I like the thesis is written in English with a minimum of language issues. As far as my English skills allow me to judge, I think definite articles are missing several times in the aims, "The aims of my/this/the thesis..."

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[2] Enter the number of points awarded.

5. I think the most problematic is the chapter 4.1. It is a chapter consisting of three sentences, which two of them repeat methods in 3.4. The crucial control result is not declared in any way. It is only stated, "TRAP reactions was confirmed". I think, more details should be presented here. How many clones were obtained? How many repeats was detected in them? How was the chromatogram like? Do the clones contain sequences of primers?

As I mentioned above, my concerns as a referee are to point out weaknesses of the work. Nevertheless, I think, the clear style of the text, quality of the results, and the logic conclusions conclusively prevail any of the issues I listed here.

Suggestions and questions, to which the student has to answer during the defense. Mistakes, which the students should avoid in the future:

1) How many telomere repeat units did you obtain in the cloned products?
2) Is it possible to clone and get a sequence of TRAP products from real-time PCR (from the Xceed qPCR)?
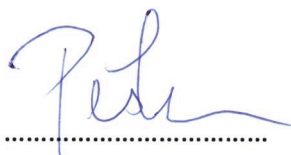3) In what phase of the cell cycle is the telomerase most active/inactive?

Conclusion:

In conclusion, I

r e c o m m e n d

the thesis for the defense and I suggest the grade   excellent (1)   .[3]

In **Brno**   date 29 – Jan - 2020

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signature

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[3] You can suggest a grade, which can be modified during the defense based on the presentation. However, if the reviewer is not present at the defense, the grade will not be counted. Grades: excellent (1). Very good (2), Good (3), Unsatisfactory/failed (4).