



## OPPONENT'S REVIEW ON BACHELOR THESIS

Name of the student: Jakob Samek

Thesis title: Sialic acid as a recognition motif for host-originated glycoproteins in *Ixodes ricinus*

Supervisor: RNDr. Ján Štěrba, Ph.D.

Referee: Mgr. Lenka Malinová, Ph.D.

Referee's affiliation: CEITEC Masaryk University

	Point scale <sup>1</sup>	Points
<b>(1) FORMAL REQUIREMENTS</b>		
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	2
Accuracy in citing of the references (presence of uncited sources, uniform style of the references, use of correct journal titles and abbreviations)	0-3	1
Graphic layout of the text and of the figures/tables	0-3	1
Quality of the annotation	0-3	1
Language and stylistics, complying with the valid terminology	0-3	2
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		12
<b>(2) PRACTICAL REQUIREMENTS</b>		
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	2
Discussion quality – interpretation of the results and their discussion with the literature (absence of discussion with the literature is not acceptable)	0-3	0
Logic in the course of the experimental work	0-3	3
Completeness of the description of the used techniques	0-3	2
Experimental difficulty of the thesis, independence in experimental work	0-3	3

<sup>1</sup> Mark as: 0-unsatisfactory, 1-satisfactory, 2-average, 3-excellent.

Quality of experimental data presentation	0-3	2
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	2
Practical requirements – points in total		20

POINTS IN TOTAL (MAX/AWARDED)	48	32
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### Comments of the reviewer on the student and the thesis:

The bachelor thesis by Jakob Samek focuses on the very ingesting topic – the origin of sialylated glycoproteins in the tick, which could help to clarify the complicated host-parasite interactions. The theoretical part of the thesis is of good quality and serves as a sufficient introduction to the topic. The number of typos and grammatical errors is low. However, some mistakes in terminology appears and some statements are inaccurate (I would not describe glycocalyx as a polysaccharide but rather as *comprised of polysaccharides*, the prefix *N-* should be written in italics, the abbreviation of asparagine is not Asp, and almost all statements in the Table 1 are too strict. For example, deoxyhexose is defined as a “hexose without the hydroxyl group at the 6-position”.) There are missing references in the chapters 1. Introduction, 2.1. Nomenclature, and 5. Goals. Also, if figures 2, 3, and 4 are not made by the author, they should be cited.

There are some obviously wrong references (ref. 24 - R. Schauer, C. Kiel, R. Schauer, and D.-Kiel, “Achievements and Challenges of Sialic Acid Achievements and challenges of sialic acid research,” no. October, 2015) but the most absurd mistakes are probably results of using the citation manager without sufficient control (ref. 25 - E. Müller, C. Schröder, R. Schauer, B. Institut, and U. Kiel – the authors B. Institute and U. Kiel stand for Biochemisches Institut and Universität Kiel. This also explains the huge dedication of Kiel family to sialic acid research).

The goals of the thesis are clearly defined and description of the used techniques is sufficient. There are some Ctrl+C/Ctrl+V errors in legends of Figures 12, 13 and 14 (contradictory numbers of incubation days) and the figures and their legends are generally too small to be examined and read comfortably.

The number of experiments is more than sufficient for the bachelor thesis and interesting results were obtained, therefore the quality of the discussion is actually a disappointment. The discussion contains mainly repeating of the theory and description of results not actually appearing in the thesis. Sadly, the insufficient discussion of results greatly affected otherwise satisfactory work.

### Suggestions and questions, to which the student has to answer during the defense.

#### Mistakes, which the students should avoid in the future:

##### Suggestions:

- 1) Student should pay more attention to proofreading, especially of references.
- 2) The captions of tables should be situated above the tables.

Questions:

- 1) Who is the author of reference 1? Is it really G. Book?
- 2) What was actually the control (F-C, FS-C) mentioned in chapter 6.1.2.?
- 3) There are no results on the gels for FITC treated control and for the control containing a mixture of unlabeled proteins. Why not? Could you discuss the results for the controls?
- 4) Page 31 – *“It is also possible that by its overall size in comparison to the other three proteins it (fibrinogen) will contain orders of magnitude more sialic acid on its surface so a higher unspecific signal is expected.”* Could you really directly correlate the size of the proteins with number of their glycosylations? Is it actually known how many glycosylation sites are on the glycoproteins you are using?
- 5) As I understand, by using anti-fluorescein antibody, you detect the presence of a dye in the cell lysate. Therefore, the immunoblot signal actually depends on number of dye molecules attached to the glycoproteins. If sialic acid is not properly masked, the difference between FITC/FTSC samples could actually originate from the different amount of dye molecules. Is it the number of dye molecules attached to the protein part comparable to the number of molecules attached to the glycosylations of used glycoproteins? Did you calculate the labeling efficiency (i.e. the number of dye molecules conjugated to the protein)?
- 6) Why did you choose the utilization of fluorescent dyes for the experiment? Did you consider the usage of deglycosylated forms of proteins?

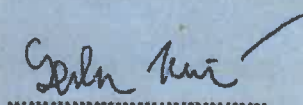
**Conclusion:**

In conclusion, I

recommend / do not recommend\*

the thesis for the defense and I suggest the grade **Good (3)**.<sup>2</sup>

In Brno      date 12.9.2019



signature

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<sup>2</sup> 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).

**Od:** Lenka Malinovska malinovska@mail.muni.cz  
**Predmet:** RE: Thesis review questions  
**Dátum:** 16. septembra 2019, 13:05  
**Pre:** Jakob Samek jakobsamek@gmail.com, Jan Sterba sterbaj@prf.jcu.cz

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Dear Jakob,

Thank you for the answers to the questions, they are satisfactory. Considering the controls confusion, it was not clear that the control mentioned in the chapter 6.1.2. is actually the control mixture of 4 unlabelled proteins and not some other control. Especially when abbreviated as F-C and FS-C. It looked like something labelled by dyes to actually evaluate the uptake of dyes themselves into the tick cells (which is quite logical step).

Good luck with your defence,  
Lenka Malinovská

P.S. Next time, try not to devaluate your results by poor discussion.  
P.P.S. And do not trust citation manager too much...☺

**Mgr. Lenka Malinovská, Ph.D.**  
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**Předmět:** Thesis review questions

Dear Mgr. Lenka Malinovská, Ph.D.

attached you will find the answers to your questions, please let me know if they are satisfactory.

Kind regards,  
Jakob Samek