



Přírodovědecká
fakulta
Faculty
of Science

Jihočeská univerzita
v Českých Budějovicích
University of South Bohemia
in České Budějovice

OPPONENT'S REVIEW ON BACHELOR THESIS

Name of the student: Tereza Kulhánková

Thesis title: Ultrastructural features of SARS-CoV-2 infection in the lungs

Supervisor: Marie Vancová, Ph.D.

Referee: RNDr. Veronika Urbanová, Ph.D

Referee's affiliation: Biology Centre, CAS, Institute of Parasitology

	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	2
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	3
Graphic layout of the text and of the figures/tables	0-3	2
Quality of the annotation	0-3	2
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	3
Formal requirements – points in total		17
(2) PRACTICAL REQUIREMENTS		
Clarity and fulfillment of the aims	0-3	2
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	2
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	2

¹ 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	2
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		19
POINTS IN TOTAL (MAX/AWARDED)	48	36

Comments of the reviewer on the student and the thesis:

The bachelor thesis of Tereza Kulhánková describes the effects of SARS-CoV-2 infection on ultrastructural changes in the lungs of mice using transmission electron microscopy. The thesis consists of 7 chapters (introduction, aim of the work, materials and methods, results, discussion, conclusion, and references) and has a good quality of English language with a minimum of typing errors.

The introduction is written quite clearly. In my opinion, some chapters on immunity and immune response to microbes (viruses) could be included in the introduction. Aims of the work are stated. The materials and methods chapter is quite brief, as are the results.

The obtained results are discussed in the Discussion chapter, but some parts should be in the Introduction (classification and description of macrophages).

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 mice in the experimental and control groups were used for sample preparation? How many samples were evaluated/observed in a given time interval?
- 2) Did the author do all the chemical preparation of the sample herself, i.e., without the help of technicians?
- 3) Why did the author fix the samples with both 2% paraformaldehyde and 2.5% glutaraldehyde? What was the advantage of using two fixatives?
- 4) Did you use the VERO cell line only to train the use of the transmission electron microscope or did you also observe the course of the infection? Do you have additional data on SARS-CoV-2 virus infection in the VERO cell line?
- 5) Upon examination of the tissue, many necrotic cells were found. How long after infection with the virus did you observe the presence of necrotic cells in the lungs? Can the origin of these cells be determined (macrophages, pneumocytes, endothelial cells)? How did the author recognize that it was a necrotic cell? What are the most important characteristics?
- 6) Page 19: “Swelling and damage of pneumocyte type I was also observed, with abnormal swollen mitochondria (Figure 11)”. Which cell is the pneumocyte I in Figure 11? It would be good if you also marked it with an arrow.
- 7) In the Materials and Methods chapter, the author mentions that she has lung samples from mice 2 and 5 days after infection. The results from 5 days after infection are missing, why?
- 8) What do you think of the fact that you have not found the site of replication of the virus in

the lung tissue? What is the characteristic of such a site? Did you find virus particles anywhere in the samples you examined?

Conclusion:

In conclusion, I

r e c o m m e n d

the thesis for the defense and I suggest the grade .

In České Budějovice

date 11.9.2023

Veronika Urbanová