

Jury Member Report – Doctor of Philosophy thesis.

Name of Candidate: Evgeniia Alekseeva

PhD Program: Life Sciences

Title of Thesis: Evolutionary analysis of intrahost interaction between pathogens and adaptive immunity

Supervisor: Professor Georgii Bazykin

Name of the Reviewer: Mikhail Gelfand

I confirm the absence of any conflict of interest

Date: 06-06-2023

Reviewer's Report

This is a very strong thesis reporting a solid piece of work. It integrates two lines of research - the evolution of the host-pathogen interactions seen from both sides of the conflict. Both the immunology part, evolution of B-cell repertoires and the virology part, evolution of SARS-CoV-2 under pressure of the host immunity system are of major importance, and the author has made important contribution to both fields. The B-cell part is somewhat descriptive, not surprisingly, given that it is one of the first studies in the area. Nevertheless, it demonstrates differences in the mode of selection acting on persistence memory and antigen-producing B-cell lineages. The virus study has allowed the author to make an important conclusion about a major role of T-cell immunity on the virus evolution.

The literature review (chapter 2) is logical and generally well-written. It introduces the essential context by covering all essential biological topics and describing both the experimental approaches and the bioinformatic state of art. Most figures are not original (the references are provided), but selected well. More detailed introductions to the studied problems, as well as descriptions of the methods, are provided in the chapters describing the results.

The reported results are important and of high quality, as they are novel and interesting. Chapters 3 and 4 follow the published papers, hence the quality of writing in these chapters is of sufficient quality. The methods are adequate and described in sufficient detail. The conclusions are solid.

The candidate is a co-first author in two papers in high-impact journals and a co-author of two more good papers; hence, the Skoltech publication requirements are completely satisfied.

That said, I have no major questions or comments.

It might be a good idea to proofread the text prior to the final submission, as it contains a considerable number of misprints, grammar and spelling errors, and incorrect choice of words e.g. in the Abstract: "immune repertoires sequencing technologies", "intrahost evolution of pathogens or pathological processes such as viruses or tumor cell lines are more frequently studied", "all these together", or, in the Acknowledgements, "approved my computational conclusions by lab experiments", or, in the Introduction, "the first part of the thesis (Chapter 2)" (should be "Chapter 3"), or (page 25) "cells, who does not get survival signal" and "sum diversity", or (page 30) "criterias".

More information about conferences should be provided (location, dates, form of presentation); "Moscow Conference of Computational Biology" in in fact "International Moscow Conference on Computational Molecular Biology".

Provisional Recommendation

I recommend that the candidate should defend the thesis by means of a formal thesis defense

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The thesis is not acceptable and I recommend that the candidate be exempt from the formal thesis defense