

Jury Member Report – Doctor of Philosophy thesis.

Name of Candidate: Aleksandra Bezmenova


PhD Program: Life Sciences

Title of Thesis: Evolutionary processes in hypervariable fungus *Schizophyllum commune*

Supervisor: Professor Georgii Bazykin

Co-supervisor: Professor Alexey Kondrashov, University of Michigan, USA

Name of the Reviewer:

<p>I confirm the absence of any conflict of interest</p> <p>Prof. Dmitry Ivankov</p> <p>(Alternatively, Reviewer can formulate a possible conflict)</p>	 <p>Date: 16-11-2021</p>
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The purpose of this report is to obtain an independent review from the members of PhD defense Jury before the thesis defense. The members of PhD defense Jury are asked to submit signed copy of the report at least 30 days prior the thesis defense. The Reviewers are asked to bring a copy of the completed report to the thesis defense and to discuss the contents of each report with each other before the thesis defense.

If the reviewers have any queries about the thesis which they wish to raise in advance, please contact the Chair of the Jury.

Reviewer's Report

Reviewers report should contain the following items:

- Brief evaluation of the thesis quality and overall structure of the dissertation.
- The relevance of the topic of dissertation work to its actual content
- The relevance of the methods used in the dissertation
- The scientific significance of the results obtained and their compliance with the international level and current state of the art
- The relevance of the obtained results to applications (if applicable)
- The quality of publications

The summary of issues to be addressed before/during the thesis defense

In the presented PhD thesis “Evolutionary processes in hypervariable fungus *Schizophyllum commune*” Aleksandra Bezmenova measured mutation rates in *S. commune* both *in vitro* and *in vivo* and explored evolutionary factors associated with high mutation rate in *S. commune*.

The title of the thesis perfectly reflects its actual content. The thesis is organized in seven chapters: “Introduction” (Chapter 1), “Review of the literature” (Chapter 2), four chapters describing the obtained results (Chapters 3-6), and “Conclusions” (Chapter 7). The thesis has a clear structure. The organization of Chapters 3-6 is typical for a publication: the chapters have “Introduction”, “Experimental layout”, “Materials & Methods”, “Results”, and “Discussion” subsections.

Chapter 3 is devoted to the analysis of somatic mutations arising *in vitro* in mononuclear haploid state of *S. commune*. Aleksandra showed that mutations accumulate linearly with the number of cell divisions, i.e., number of mutations is proportional to the mycelium length. The mutation rate itself was consistent with the previous estimate.

Chapter 4 is devoted to the analysis of somatic mutations arising *in vivo* in dikaryon state of *S. commune*. The mutation rate was found to be the second highest among species, after the values for *Neurospora crassa*.

In Chapter 5 Aleksandra analyzed generational *de novo* mutations in *S. commune in vitro*.

In Chapter 6 Aleksandra explored relationship between heterozygosity and homologous recombination rate. She found that high heterozygosity decreases the homologous recombination rate.

I would like to note that some overlap exists between “Materials & Methods” sections of different chapters. However, this is inevitable for this structure of thesis. The results of the presented theses and corresponding publications are scientifically significant and comply with the international level and current state of the art. The work is perspective for fundamental research and may be potentially useful for protein engineering. The publications are of high quality, the number of publications suits the requirements for a PhD thesis.

Overall, I rate the PhD thesis of Aleksandra Bezmenova as a high-quality, important, and scientifically significant work.

Provisional Recommendation

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

I recommend that the candidate should defend the thesis by means of a formal thesis defense only after appropriate changes would be introduced in candidate’s thesis according to the recommendations of the present report

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