

Jury Member Report – Doctor of Philosophy thesis.

Name of Candidate: Aleksandra Strotskaya

PhD Program: Life Sciences

Title of Thesis: Effects of Targeting by the *Escherichia coli* I-E CRISPR-Cas System on Infection by Various Phages.


Supervisor: Professor Konstantin Severinov

Chair of PhD defense Jury: Professor Yuri Kotelevtsev

Email: y.kotelevtsev@skoltech.ru

Date of Thesis Defense: October 24, 2017

Name of Reviewer:

I confirm the absence of any conflict of interest	Signature:
(Alternatively, Reviewer can formulate a possible conflict)	
	Date: 22-09-2017

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 forward a completed copy of this report to the Chair of the Jury 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 Thesis has a traditional structure. It contains 5 Chapters, including Introduction, Literature review, Materials and methods, Results and discussion, proportionally spread on 127 pages. It is well written with clear figures representing original data. The author has a nice crisp style and logical structured representation of experiments from ideas to the results. Evaluation of experimental data is in strict correspondence with the actual results.
- *The relevancy of the topic of dissertation work to its actual content*
The topic of the dissertation corresponds to its actual content. In fact it is expanded

description of the work published in two papers by A Strotskaya et al.

- *The relevancy of the methods used in the dissertation*

The success of the thesis is based on the method of primed acquisition of new protospacers developed in the laboratory of Konstantin Severinov earlier. Author accomplished a lot of cloning to generate E coli strains with spacers complementary to a various targets in 5 different phages. The readout system for quantification of efficacy of CRISPR/Cas mediated cell "immunity" to the phage infection and acquisition of new protospacers was developed and effectively used to the purposes of the author

- *The scientific significance of the results obtained and their compliance with the international level and current state of the art*

The results demonstrate for the first time the systemic comparison of E coli defense mechanisms against infection of four different phages with different strategies of proliferation and escape from CRISPR conferred immunity. The developed platform can be used for further investigation, particularly of the phages which have unknown yet mechanisms of escape.

- The relevance of the obtained results to applications (if applicable)
- *The quality of publications*

This was proven by acceptance and publication of two papers in international specialized journals : Methods in molecular biology and Nucleic Acid research (impact factor 9+). Author also made a significant contribution to PNAS (impact factor 10+)

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

From my point of view, the thesis will not pose any problem to defend. However, specialists remarks of external reviewers are possible. For instance, data showing the differences of targeting of phage lambda, T5, T7 and M13 has to be addressed in more detail and mechanistic explanation has to be provided, if possible.

Provisional Recommendation

X ☒ 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