

Jury Member Report – Doctor of Philosophy thesis.

Name of Candidate: Aleksei Mikhailchenko

PhD Program: Life Sciences

Title of Thesis:

COMPARATIVE BIOLOGY OF AGING THROUGH THE LENS OF INDUCED PLURIPOTENT STEM CELLS

Supervisor: Prof. Philipp Khaitovich


Co-Supervisor: Prof. Vadim Gladyshev

Chair of PhD defense Jury: Prof. Olga Dontsova

Email: o.dontsova@skoltech.ru

Date of Thesis Defense: 23 October 2018

Name of the Reviewer: Brian Kennedy

<p>I confirm the absence of any conflict of interest</p> <p>No Conflict</p> <p>(Alternatively, Reviewer can formulate a possible conflict)</p>	<p>Signature:</p>  <p>Date: 18-10-2018</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

This is a thoroughly written thesis defense, describing the isolation and characterization of iPSCs from the naked mole rat (NMR) and their characterization. In addition, the study involves a comparison of iPSCs from NMR, rat and mice to glean knowledge about the aging process and the induction of inter-species chimeras.

There are two co-first author manuscripts published that describe properties of NMR iPSCs and their contribution to chimeras. While specific comments on the thesis are provided below, it is clear that Dr. Mikhailchenko has completed sufficient studies for a PhD. and generated a well-written thesis. The thesis is very well written. In particular, the Introduction is very thorough.

Chapter 2 is a thorough description of NMR iPSCs, involving descriptions of differences in their generation, behavior, differentiation potential and response to changes in environmental conditions. It also describes their contribution to chimeras. These studies set the stage for a range of follow-up studies to better understand a range of properties of NMR cells, including phenotypes related to aging.

The third chapter reports the generation of rat-mouse chimeras, showing that rat iPSCs contribute to mouse chimeras, but that they compete poorly in the mouse niche over time. Studies are performed on social interactions, which could be followed in more detail. Again, this manuscript generates useful strategies to study inter-species chimeras.

Chapter 4 examines thermogenesis and in particular UCP-1 function in NMRs. The results demonstrate a thermogenic response in BAT, with similarities and differences to other rodent species including a limited capacity of Bat to upregulate thermogenesis.

Provisional Recommendation

xxx 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

