

## Decision on research misconduct

### Decision

The Swedish National Board for Assessment of Research Misconduct (“the Board”) finds

**[REDACTED]**

and **[REDACTED]** not guilty of research misconduct regarding the following article:

**[REDACTED]**

The Board has examined only those authors whose names are printed in bold text above. The other authors’ culpability has not been investigated since they lack ties with Swedish higher education institutions.

### Background

On 16 April 2020, Karolinska Institute submitted to the Board, in accordance with Section 6 of the Swedish Act (2019:504) on responsibility for good research practice and the examination of research misconduct (“the Act”), a case concerning research misconduct. The case was based on allegations, reported to the university on 7 April 2020, that the above article contained fabrication and manipulation, and described poorly correlated ideas and experiments. The report gives examples of suspected images and diagrams in the article.

The researchers named in the allegations contest the accusations of research misconduct and declare that they are unfounded. The corresponding author and head of the research group, **[REDACTED]**, has responded in writing to comments from the complainant, along with original images for western blots and an Excel file for data quantification.

The Board has obtained two experts’ statements in the case. One expert<sup>1</sup> was tasked to use suitable computer-based technical aids to analyse the raw-data images for the suspected diagrams, numbered 10, 2A, S2A and 3B, in the article. He writes in his statement that he is unable to find any evidence of manipulation of these images.

The other expert<sup>2</sup> was engaged to examine whether the article involved breaches of good research practice in the form of fabrication or falsification of data, according to the complainant’s suspicions expressed. This second expert writes that he agrees with the

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<sup>1</sup> Petter Ranefall, Associate Professor (Docent) of Computerised Image Processing, Uppsala University.

<sup>2</sup> Anders Virtanen, Professor of Biology, Uppsala University.

conclusion drawn from the computer-based analysis of gel images, that the diagrams investigated have not been manipulated manually or used more than once. However, in his estimation he is unable to dismiss the allegations of fabrication and falsification, since there are certain outstanding questions about how the experiments were carried out and reported in the article, and he has detected further issues in need of clarification. Given these questions and issues, the Board has obtained further responses from the alleged offenders giving explanations of how the experiments were performed, analysed and presented in the article.

## Grounds for decision

### Legal regulation

The Board's remit is to examine issues of research misconduct under the Swedish Act (2019:504) on responsibility for good research practice and the examination of research misconduct ("the Act"). Section 2 of the Act defines research misconduct as a serious breach of good research practice in the form of fabrication, falsification or plagiarism, committed with intent or through gross negligence, in the planning, conduct or reporting of research.

### Fabrication, falsification or plagiarism

The forms of misconduct the Board is tasked to examine are fabrication, falsification and plagiarism. These terms are not defined by law, but in the preparatory work for the Act reference is made to the fact that they are described in codes (codices) and guidelines on research ethics, such as *The European Code of Conduct for Research Integrity*.<sup>3, 4</sup> They are also explained in the Swedish Research Council's publication *Good Research Practice*.<sup>5</sup> Fabrication is often described, according to the preparatory work for the Act, as inventing results and documenting them as if they were genuine. Falsification refers to manipulation of research material, equipment or processes, or unjustified alteration, omission or suppression of information or results. Lastly, plagiarism is defined as a researcher's use of other people's texts, ideas or work without duly acknowledging the original source.<sup>6</sup>

Breaches of good research practice categorised as types other than the above-mentioned ones are dealt with instead by the entities responsible for research themselves under Section 17 of the Swedish Higher Education Ordinance (1993:100).

The Board's assessment is that the original questions of fabrication and falsification have been sufficiently investigated and, following the final statement by the head of the research group, [REDACTED] no matters remain in need of further examination by the Board. After considering the investigation and the experts' statements, the Board finds that it has not been demonstrated that no fabrication or falsification of images and diagrams in the article has taken place.

However, the Board finds that it is important, in diagrams of western blots, to publish the image of the protein of interest with the associated checks on uploaded images to ensure correct representation of the experiment and avoidance of misunderstanding.

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<sup>3</sup> *The European Code of Conduct for Research Integrity*, revised edition. Berlin: All European Academies (ALLEA); 2018, section 3.1.

<sup>4</sup> Swedish Government Bill 2018/19:58, pp. 45, 100.

<sup>5</sup> *Good Research Practice*, Swedish Research Council; 2017, Chapter 8.

<sup>6</sup> Swedish Government Bill 2018/19:58, pp. 45, 100.

In summary, the Board finds that the researchers reported are not guilty of research misconduct.

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The Board has decided in this case following its presentation by caseworker Miriam Matsson.

Thomas Bull  
Chair

Miriam Matsson  
Caseworker