



[DEFENDANT]

Ruling by the Committee on Scientific Dishonesty for Health and Medical Science concerning complaints received on 2 and 3 April 2011 against [DEFENDANT]

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**Danish Committees on
Scientific Dishonesty**

18. December 2013

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1 Introduction

On 2 and 3 April 2011, [COMPLAINANT] submitted two complaints by e-mail to the Danish Committees on Scientific Dishonesty (DCSD), based on suspicion of scientific dishonesty by you, in the form of reuse and manipulation of images in four articles.

The case has been considered by the Committee on Scientific Dishonesty for Health and Medical Science (USF). A draft ruling of 25 June 2013 was sent to the parties for consultation pursuant to section 13(3) of executive order no. 306 of 20 April 2009 on the Danish Committees on Scientific Dishonesty, as amended by order no. 144 of 20 February 2012. The parties' comments in the responses to the consultation process have been included in this final version of the ruling to the extent that they contained significant new information (see title 5).

2 Ruling

On the basis of her role as co-author of the four articles referred to in part 4, the Committee finds [DEFENDANT] (the Defendant) guilty of scientific dishonesty pursuant to section 2, no. 1 of executive order no. 306 of 20 April 2009 on the Danish Committees on Scientific Dishonesty, as amended by order no. 144 of 20 February 2012.

Pursuant to section 15(1), no. 2, of the DCSD Order, the Committee recommends that the following articles be withdrawn:

[ARTICLE A]

And

[ARTICLE D]

This unanimous decision was reached by Lise Wogensen Bach, Ulla Feldt-Rasmussen, Palle Holmstrup, Kirsten Ohm Kyvik, Ole Haagen Nielsen, Jens Overgaard and Henrik Gunst Andersen (chairperson).

3 Summary

In April 2011, a professor at a university (the Complainant) submitted two complaints to the DCSD, alleging scientific dishonesty in research conducted by a researcher (the Defendant) in four specific articles. The research in the four articles focused on the incidence of various proteins and enzymes in muscle tissue and their regulation during muscle activity. The Complainant asserts that the Defendant's selection of immunostained sections and subsequent processing of the images for the articles amounts to reuse of the same sections and images for the purpose of reporting different research results.

The Complainant was herself a co-author (lead author) of the four articles. According to the information received by the Committee, the Complainant became aware that images had apparently been reused in the articles and subsequently chose to report the articles to DCSD. The Complainant explains in greater detail how she thought that this reuse had come about – including which images were repeated in the articles concerned.

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The Complainant states that the images were devised by the Defendant, and illustrated results from the part of the projects for which the Defendant was responsible. The Complainant also states that the Defendant had personally dealt with the optimisation of antibodies, staining, photography, and the selection of images and their presentation in journals. According to the Complainant, the Defendant was also responsible for the methodology section with regard to the immunohistochemistry, as well as the image captions.

The Defendant contends that she is innocent of all charges of scientific dishonesty. The Defendant disputes, inter alia, the claim that she alone was responsible for the staining and the selection of sections and photographs for the articles.

Concerning collaboration with the Complainant, the Defendant states that everything had to be done quickly, which increased the likelihood of mistakes, etc. occurring, and that nobody spent time checking details before the articles were submitted to the journals. The Defendant also states that although there is no doubt about the fact that mistakes were made in the context of the collaboration between the Complainant and the Defendant, she never consciously or deliberately made any errors, let alone knowingly or deliberately committed fraud. The Defendant also states that a number of other people in addition to the Complainant and Defendant were co-authors of the articles concerned and that they – like the Complainant and the Defendant – should have discovered the errors.

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Concerning the two articles referred to in the first complaint, the DCSD finds that images were reused.

Concerning the two articles referred to in the second complaint, the DCSD finds the same sections were used, as the tissue structures were identical with the same artefacts occurring. The DCSD also takes into account that the images could only have been produced by deliberate manipulation with changes to the sections and staining.

The DCSD concludes in relation to both complaints that there has been 'undisclosed fabrication of data or substitution with fictitious data', pursuant to section 2, no. 1 of the DCSD executive order, and that a serious breach of good scientific practice therefore has been committed. The DCSD finds that the undisclosed fabrication of data or substitution with fictitious data, which was confirmed on the basis of the available information, cannot reliably be attributed to the Defendant. The DCSD finds, however, that the Defendant, in her role as co-author with special responsibility for the images in the articles, should have discovered the image manipulation, if not earlier, then during the preparation of the final manuscripts for submission to the respective journals. On the basis of an overall assessment of the information available to it, the Committee therefore concludes that the Defendant has acted at the very least in a grossly negligent manner as co-author of the four articles. In summary, the Committee concludes that the Defendant is guilty of scientific dishonesty as defined in the DCSD executive order, section 2, no. 1.

During the proceedings, the Committee referred exclusively to the complaint filed against the Defendant. The Committee finds, therefore, that it falls outside its remit to extend the complaint to cover individuals other than the Defendant.

The Complainant informed the Committee that on 4 April 2011 she had brought the matter to the attention of the authors involved, including the Defendant, as well as the relevant journals, that article C and article B had been withdrawn by the respective journals, and that the Complainant requested that the journals concerned withdraw articles A and D. DCSD recommends that the Defendant also withdraw articles A and D.

4 Process, background and subject matter for the case

4.1 Complaint 1



On 2 April 2011, [COMPLAINANT] (the Complainant) submitted a complaint by e-mail asserting that [DEFENDANT] (the Defendant) was guilty of scientific dishonesty in connection with the articles:

[ARTICLE A]
[DEFENDANT], [CO-AUTHOR 1]¹, [CO-AUTHOR 2]², [CO-AUTHOR 3]³,
[COMPLAINANT].
[INFORMATION ABOUT PUBLICATION].⁴

and

[ARTICLE B]
[DEFENDANT], [CO-AUTHOR 1], [CO-AUTHOR 2], [CO-AUTHOR 4]⁵,
[CO-AUTHOR 5]⁶, [COMPLAINANT].
[INFORMATION ABOUT PUBLICATION].⁷

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Three appendices were attached along with the complaint.

4.2 Complaint 2

On 3 April 2011, the Complainant also asserted that the Defendant was guilty of scientific dishonesty in connection with the articles:

[ARTICLE C]
[CO-AUTHOR 6]⁸, [CO-AUTHOR 7]⁹, [CO-AUTHOR 2], [CO-AUTHOR 1],
[DEFENDANT], [COMPLAINANT].
[INFORMATION ABOUT PUBLICATION].¹⁰

and

[ARTICLE D]
[CO-AUTHOR 2], [DEFENDANT], [CO-AUTHOR 1], [CO-AUTHOR 7], [CO-AUTHOR 8]¹¹, [CO-AUTHOR 5], [CO-AUTHOR 4], [COMPLAINANT].
[INFORMATION ABOUT PUBLICATION].¹²

Four appendices were attached along with the complaint.

¹Hereinafter referred to as Co-author 1

²Hereinafter referred to as Co-author 2

³Hereinafter referred to as Co-author 3

⁴Hereinafter referred to as article A

⁵Hereinafter referred to as Co-author 4

⁶Hereinafter referred to as Co-author 5

⁷Hereinafter referred to as article B

⁸Hereinafter referred to as Co-author 6

⁹Hereinafter referred to as Co-author 7

¹⁰Hereinafter referred to as article C

¹¹Hereinafter referred to as Co-author 8

¹²Hereinafter referred to as article D



Later on 3 April 2011, the Complainant submitted a new e-mail, correcting an error regarding the year in the first one.

4.3 Proceedings after submission of complaints 1 and 2

On 5 April 2011, the Complainant forwarded an e-mail of the same date from [RESEARCHER] (MSc PhD, Senior Scientist) to the Complainant and requested that the e-mail be added to the case (Complaint 1).

On 17 August 2011, the DCSD Secretariat sent an e-mail to the Defendant via her lawyer, apprising her of the Complainant's submission.

On 27 September 2011, the DCSD Secretariat received an e-mail from the Defendant's lawyer, containing comments and appendices 1 and 2 referring to both complaints. The Defendant also called on the DCSD to requisition all of the material, including raw photographs, and informed the Committee that it was available in a database on a shared computer in the photomicroscopy room at [THE UNIVERSITY LABORATORY].¹³

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On 3 October 2011, the DCSD Secretariat e-mailed the Defendant's comments of 27 September 2011 and appendices for consultation to the Complainant.

On 27 October 2011, the Secretariat received an e-mail containing the Complainant's comments and appendices G_1 to G_18.

On 28 October 2011, the DCSD Secretariat e-mailed the Complainant's comments of 27 October 2011 to the Defendant via her lawyer.

On 17 November 2011, the DCSD Secretariat received the Defendant's concluding remarks in an e-mail from her lawyer. The Defendant also requested that all 'author declarations' related to the works concerned be presented. In addition, she requested that DCSD ask the Complainant to identify which articles are included in the individual academics' theses. In particular, the Defendant stated that it would be relevant to obtain the 'author declarations' for article C in connection with the publication, but particularly in connection with the use of the article in academic theses.

On 22 November 2011, the Defendant's comments were e-mailed to the Complainant for information.

On 24 November 2011, the DCSD Secretariat received an email from the Complainant requesting that an attached e-mail of 24 November 2011 be added to the case papers. The e-mail concerned was of the same date and was from first author of article C (Co-author 6) regarding Figure 2 in the article.

On 25 November 2011, the DCSD Secretariat received a follow-up e-mail with the figure attached as a .jpg file. The figure was also delivered to the Secretariat, in .tiff format and on a CD-ROM, by messenger.

¹³Hereinafter referred to as the University Laboratory



On 25 November 2011, the DCSD Secretariat e-mailed the Defendant and requested comments about the figure.

On 5 December 2011, the Defendant responded by e-mail.

In this e-mail, the Defendant also presented comments under the headings 'Separate issues covered by the case' and 'New information concerning the case', and requested that the DCSD treat them separately. She also asked the DCSD to evaluate whether the Complainant's actions had been responsible or acceptable in these matters.

The Defendant also repeated her request that all 'author declarations' related to the works cited be presented, etc. (see also above).

On 13 December 2011, the DCSD Secretariat e-mailed the Complainant, requesting her comments.

On 20 December 2011, the Complainant e-mailed her response to the Defendant's comments – including those related to 'Separate issues covered by the case' and 'New information concerning the case' (see above). The Complainant also attached statements from Co-author 2 (dated 15 December 2011) and Co-author 6 (dated 17 December 2011) concerning the collaboration with the Defendant on the production of the immunohistochemical images.

On 9 January 2012, the DCSD Secretariat e-mailed the Defendant and requested her comments.

On 20 January 2012, in response to this request, the Defendant sent her comments and repeated her request that 'author declarations' be presented.

On 21 February 2012, the DCSD e-mailed all of the co-authors of the four articles and requested that they inform the Committee of the contributions they had made or the parts of the articles each had contributed. The DCSD also asked for their assistance in clarifying who had produced and processed the rest of the data in the article, including the images.

On 11 March 2012, Co-author 1 e-mailed co-author declarations for all four articles to the DCSD.

On 11 March 2012, Co-author 2 e-mailed co-author declarations for all four articles to the DCSD.

On 25 February 2012, Co-author 3 e-mailed a co-author declaration for article A to the DCSD.

On 22 February 2012, Co-author 4 e-mailed co-author declarations on behalf of himself and Co-author 5 for articles B and D.



On 23 February 2012, Co-author 6 stated in an e-mail to the Secretariat that he has nothing to add to his statement of 17 December 2011, as previously submitted by the Complainant (see above).

On 29 February 2012, Co-author 7 e-mailed co-author declarations for articles C and D to the DCSD.

On 25 April 2012, the Complainant submitted co-author and author declarations for all of the articles by e-mail.

On 17 June 2012, Co-author 8 submitted a co-author declaration for article D.

In his declaration, Co-author 3 informed the DCSD that he exerted no influence on the editorial part of the production of article A, and therefore has no knowledge of how and with what contributions the article was produced.

In general, the co-author declarations received by the DCSD describe the Defendant as responsible for the immunohistochemistry, data contribution, and certain representative sections, images and captions.

The statement by co-authors 4 and 5 also included the following about article B:

‘...

As far as I know, but I cannot demonstrate it, the muscle samples were coming from [COMPLAINANT]’s laboratory; she together with [CO-AUTHOR 2] and [CO-AUTHOR 1] were the ones doing the experiment regarding design of the study, recruitment of volunteers, maximal oxygen uptake test, muscle collection, PCR analysis (Figure 1), and input to the manuscript.

Our contribution was very minor: we provided the polyclonal MT+1&2 antibody (raised in my lab) and input to the manuscript.

In my opinion, [DEFENDANT] received the human samples from [COMPLAINANT]’slab, and she prepared the sections and carried out the histochemistry and immunohistochemistry (figs. 2 and 3). [DEFENDANT] analyzed the stainings, prepared the figures and wrote the first draft of the paper. [CO-AUTHOR 5] and I never looked at the original stainings, and we do not know if anyone from [COMPLAINANT]’s lab did. Rather, we got from [DEFENDANT] figs. 2 and 3 and believed that they represented the mean result of all the samples of those stainings.

...’

Concerning article D, their comments included:

‘In this manuscript there is data produced in humans and data produced in mice (comparison of IL-6 KO mice with wild-type mice). The mouse experiments were carried out in my lab; [CO-AUTHOR 2] and [CO-AUTHOR 1] came several times to my lab and were also involved in the mouse experiments and in the RT-PCR analyses of their muscles described in the paper (Fig 4). Besides, we provided input to the manuscript once we got the draft. All the human data come from [COMPLAINANT] lab (recruitment of volunteers, study design, exercise, IL-6 infusion, ELISA and RT-PCR), and in this case they were the ones responsible for the writing of the paper. The role of [DEFENDANT] here was again to receive muscle biopsies from those experiments, prepare sections, and doing stainings: presumably [DEFENDANT] did the stainings of IL-6r shown in the paper (Figs 2 and 3). I believe [DEFENDANT] analyzed the stainings obtained and decided which ones were representative of all the samples. [CO-AUTHOR 5] and I never looked at the original stainings, and we do not know if anyone from [complainant]’slab did.

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This paper was also reported to DCSD, because apparently [DEFENDANT] again used the same tissue sections in two different papers: it looks like that Figure 3.D of this paper is identical to Figure 2.A in a paper where I was not a co-author ([ARTICLE C]). Again, a very stupid thing to do, and I would not rule out that [DEFENDANT] rather committed a mistake when picking up the photo. But since she did not provide any information to any of us, it was the logical step to denounce the papers to DCSD and to inform the journals. The second paper has been retracted, while the decision of [JOURNAL] is still pending.'

Also concerning on article D, co-author 8's comments included:

'...2. My knowledge about contribution by the other authors

According to my knowledge, the other authors of the article contributed in the following way:

[CO-AUTHOR 2]: *Helped with Study 1 and was deeply involved in carrying out the experimental part of Study 3. Analysed and prepared the presentation of the data (except plasma IL-6 levels, Table 1, and immunohistochemistry, Figure 2 and 3), wrote the manuscript draft, coordinated implementation of revisions suggested by the co-authors and, finally, submitted the final manuscript.*

[DEFENDANT]: *Responsible for the immunohistochemistry (IHC) presented in Figure 2 and 3, including the preparation of the images, writing the method section regarding IHC and writing the result section about the IHC data.*

[CO-AUTHOR 1]: *Helped with Study 1 and was deeply involved in Study 3. Involved in the revision of the manuscript before submission.*

[CO-AUTHOR 7]: *Deeply involved in running Study 2. Involved in the revision of the manuscript before submission.*

[CO-AUTHOR 5]: *Involved in Study 3. Involved in the revision of the manuscript.*

[CO-AUTHOR 4]: *Provided the animals (wildtype and IL-6 knockout mice) and animal facilities used in Study 3. Involved in designing Study 3. Involved in the revision of the manuscript.*

[COMPLAINANT]: *Responsible for the overall concept regarding IL-6 presented in the manuscript. Involved in the overall design of the 3 studies included in the article. Involved in establishing collaboration with [DEFENDANT], [CO-AUTHOR 5] and [CO-AUTHOR 4]. Involved in the interpretation of the presented data and involved in the revision of the manuscript before submission.*
...

Further

On 6 March 2012, the Defendant's lawyer e-mailed the DCSD and requested an answer to the following questions:

'...

1. Has the DCSD decided to ignore – or ask for answers to – my client's request of 27 September 2011 to study the raw photographs on the shared computer in the photomicroscopy room at the University Laboratory? (page 3, paragraph 1).
2. Has the DCSD decided to ignore – or ask for answers to – my client's request of 17 November 2011 to obtaining "author declarations"? (page 4, paragraph 3). This request was repeated in my client's reply of 5 December 2011 (page 2, paragraph 5) and in my client's comments of 20 January 2012 (page 1, paragraphs 2–6).
3. Has the DCSD taken the initiative to ask other relevant members of staff who were involved in the collaboration between the Complainant and the Defendant, including, for example, [RESEARCHER] and [RESEARCHER]?
4. What steps has the DCSD taken in relation to the individuals who independently used the data that my client is now accused of having deliberately misused – including in relation to these individuals' written acknowledgements of being able to vouch for the content?



On 13 April 2012, the DCSD Secretariat replied (to question 2 above) by e-mail, clarifying that:

‘...to date, the DCSD has only obtained the statements mentioned from the co-authors concerning their input into the preparation of the articles concerned. The DCSD has therefore not yet decided on other steps to take or about the questions you pose in your e-mail of 6 March 2012. The questions will be answered at the latest when the DCSD issues a ruling.
...’

On 14 June 2012, and in the light of the Defendant’s request of 6 March 2012 to study the raw photographs on the shared computer in the photomicroscopy room at the University Laboratory, DCSD subsequently (ref. question 1 above) e-mailed the Defendant’s lawyer, requesting data that might help identify those photo files. DCSD informed the lawyer that it was specifically a question of:

Fig. 1H in article A

Fig. 3D and Fig. 3f in article B

FIG. 2A and Fig 2g in article C

FIG. 3D in article D

The DCSD received no response to this request.

On 22 February 2013, as part of the DCSD’s final enquiries, the Secretariat e-mailed the publishers involved and requested that they – as per the Defendant’s request (see above) – send copies to the DCSD of the ‘author declarations’ submitted when the four articles were published.

On 4 March 2013, the Secretariat received an e-mail from [JOURNAL] with attached copies of the ‘Copyright Transfer & Dual Publication Statement’, signed by the participating authors for article A and article D, and a copy of an e-mail concerning the Defendant’s proof-reading of article A. [JOURNAL] also stated that it was not in possession of any other forms of author declaration.

On 1 March 2013, the Secretariat received an e-mail from [JOURNAL] with attached copies of the ‘Copyright Assignment Form’, signed by the Defendant as the first author of article B. [JOURNAL] stated that it would try to find out whether any other documentation existed, but has not been back in touch since.

On 21 March 2013, the Secretariat received an e-mail from [JOURNAL] (article C) with an attached copy of the ‘Copyright Assignment Form’ signed by Co-author 6, who was the first author of the article.

As part of the consultation on the draft ruling, copies of the correspondence with the publishers were sent to the parties for information.

The Committee has reached decisions on questions 3 and 4 in part 8 of the ruling below.

On 25 June 2013, the Secretariat sent its draft ruling of 25 June 2013 to the parties for consultation, with a deadline for comments of 15 August 2013.

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On 15 August 2013, the Secretariat received the Complainant's comments on the draft ruling of 25 June 2013.

The Committee has not received comments on the draft ruling of 25 June 2013 from the Defendant.

5 The parties' claims, responses and contentions

5.1 The Complainant's claims, responses and contentions

Complaint 1

Articles A and B

The Complainant asserts that the Defendant acted in a scientifically dishonest manner by reusing figures and manipulating images in the articles concerned.

The Complainant asserts that an immunohistochemical image from Figure 1 in article A was reused in Figure 3 in article Figure 1H of article A (micrographs of IL-6 in muscle biopsies) also appears to have been reused in article B as Figures 3D and 3F (micrographs of NITT in muscle biopsies). This was done by rotating Figure 1H in article A by 90 degrees and splitting it in two so it appears as Figure 3D and 3F in article B. Article A states that Figure 1H shows IL-6 immunohistochemical stainings of muscle biopsies taken 24 hours after the start of the three-hour exercise session, while article B states that Figure 3D and 3F show NITT immunohistochemical stainings of muscle biopsies taken three hours after the start of the three-hour exercise session, and six hours after the start of the three-hour exercise session.

The Complainant states that she had also been made aware that Figure 3E (four hours and 30 minutes after the start of the three hours of training) and Figure G (nine hours after the start of the three hours of training) in article B would seem to originate from the same section, split in two and rotated slightly in relation to each other. She also agrees that the evidence would suggest that the same illustration has been used in two different scientific articles, published in 2003 and in 2005.

The Complainant also submitted an e-mail of 5 April 2011 from [RESEARCHER] MSc PhD to the Complainant, which included the following:

'...

I do not know whether you and the DCSD have discovered that [DEFENDANT] had already manipulated the images in the [JOURNAL] article in 2003.

Some of us have looked more closely at the images in the article, and it turns out that six of the images in Figure 1 match 2-and-2 if you turn one image upside down (A+B, D+E and F+G) – see the example below.

This suggests cheating back in 2003, and not just reuse of images in 2005.

...

She used the same method in the 2005 [JOURNAL] article, in which images B+C and D+F clearly fit together.

If you and the DCSD are already aware of these facts, please ignore this e-mail. If not, it should probably be reported to the DCSD.

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...'

The Complainant states that these images were produced by the Defendant, and illustrate results from a part of the project for which the Defendant was responsible. The Complainant states that the part of the project group based at [UNIVERSITY HOSPITAL] conducted experiments at [UNIVERSITY HOSPITAL]¹⁴ in which they took muscle biopsies, and that these were analysed by the Defendant at the University Laboratory because the analysis method was not available in the Complainant's department.

The Complainant also states that the Defendant wrote in an e-mail of 21 February 2003 (Defendant's Appendix 1) to the Complainant that she would take photos of the tissues and present them to the Complainant, that the Complainant responded on 22 February 2003 (Appendix G_4), and that this response shows that the Defendant would receive 'The presentation set of the results, the final figures ready for publication (on photo paper and on CD), the methodology-, results- and figure caption sections for the manuscript (paper and CD)'. The Complainant contends that the Defendant, at the request of the Complainant, confirmed that she had cut all biopsies. However, the Complainant never saw evidence that all biopsies were analysed, nor any evidence that the Defendant selected the representative sections for the publication.

The Complainant also observes that the fibre type staining was performed in her laboratory in accordance with Appendix G_5, that she received the final IL-6 photos from the Defendant (appendices G_6 and G_7) and that the Complainant was the corresponding author, while the Defendant handled all correspondence in connection with the proof-reading of article A (Appendix G_8).

The Complainant states that the correspondence shows that the stainings were conducted in parallel for IL-6 and metallothionein (MT); that they and others had already published several articles on exercise-induced IL-6 production; that the Complainant proposed that they tried a 'fast track' to [JOURNAL] (according to the Complainant, an ultra-short article on the IL-6 data); that they opted to publish MT data separately; that the finding that muscle expresses MT was a completely different story, which would require additional data before it could be published; and that as a result, article B was not published until 2005 in a form that included experiments conducted by Co-author 4 and Co-author 5.

Finally, the Complainant also states that during the preparation of article B, it was the Defendant alone who was responsible for the immunohistochemical work, including the selection of the section and the production of figures for publication, and that this work did not involve anyone from the Complainant's laboratory (Appendix G_17). The Defendant was first author and corresponding author of article B (Appendix G_18).

Complaint 2

Articles C and D

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¹⁴Hereinafter referred to the University Hospital



The Complainant asserts that the Defendant acted in a scientifically dishonest manner by reusing figures and manipulating images in the articles concerned.

Concerning article C, the Complainant asserts that Figure 2A (pre-exercise) and Figure 2G (24 hours after the start of the three-hour exercise session) used the same tissue sample, but the sections shown were moved slightly. The Complainant also states that because the stainings are different on the sections, and because the sections are slightly different, it is difficult to spot the overlap unless you are specifically looking for it. Concerning article C and article D, the Complainant states that the general perception is that Figure 2A (pre-exercise) in article C is identical to Figure 3D (24 hours after the start of the three-hour exercise session) in article D. The Complainant states that two .jpg files were attached along with a magnification of the images to which they refer, and that the overlapping tissue section in article C is framed in a red box.

Concerning these articles, the Complainant states that the Defendant produced these figures and that they illustrate results from a part of the project for which the Defendant was responsible. The Complainant supplements this by stating that muscle biopsies were taken in connection with experiments conducted at the University Hospital, and that the Defendant analysed these at the University Laboratory because the method of analysis was not available in the Complainant's department.

Concerning article C, the Complainant states in particular that the e-mail correspondence shows that the Defendant performed analyses, designed the figures and wrote the captions for the article, and sent the final figures directly to Co-author 6 and the Complainant (Appendices G_9 and G_10).

Concerning article D, the Complainant states in particular that the e-mail correspondence also shows that the Defendant performed the analysis work and selected the sections to be included in the figures presented in the article (Appendices G_11, G_12, G_13 and G_14).

According to the Complainant, the documentation above shows that the Defendant sent the final figures to the Complainant and her collaborators.

Both complaints

As far as both complaints are concerned, the Complainant has stated, inter alia, that when you look at the articles individually, it does not immediately give rise to suspicions of fraud, but when the figures are presented as separate JPG figures there is, in the Complainant's view, no room for doubt.

The Complainant asserts that collaboration with the Defendant is described in the Complainant's Appendix G_1, which shows that the Defendant and Complainant were equal senior researchers and that at no point did the Complainant mentor the Defendant. The Complainant therefore disagrees with the Defendant's wording that the Complainant had 'the sole and absolute right to make decisions'.

Concerning the four articles reported to the DCSD on suspicion of image manipulation, the Complainant contends that the Defendant was personally responsible for



the optimisation of antibodies, staining, photography and selection of images and producing figures for the journals, and also that the Defendant wrote the methodology section for immunohistochemistry and the figure captions.

The Complainant also states that when her research group became aware of the errors in their articles, she informed her dean in the first instance, and suggested that this information should also be passed to the independent panel set up by the Danish Council for Independent Research to investigate the Defendant's research. The Complainant states that when the case was presented in the BT newspaper and covered by the rest of the media (2 and 3 April 2011), she decided, in consultation with her dean, to report the articles to DCSD; that their research group reviewed all of the articles the Defendant had co-authored in order to find other possible errors or manipulations; that they enlisted outside help and identified errors related to two further articles; and that they asked an external consultant (an experienced pathologist) to go through all of the images. However, the pathologist found no sign of image manipulation other than that reported to DCSD on 3 and 4 April 2011¹⁵.

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The Complainant informs the Committee that on 4 April 2011 she informed the authors involved, including the Defendant, as well as relevant journals, about the case (Appendix G_15), that article C and article B had been withdrawn and that [JOURNAL] had been asked to withdraw article A and article D (Appendix G_16).

The Complainant states that it is highly regrettable that the group had not realised earlier that there were instances of image manipulation and/or serious errors in the articles as cited in the submission to DCSD. The Complainant asserts, however, that there is no doubt that the Defendant alone was responsible for optimising antibodies, staining, photography and the selection of images, and the presentation of the final figures and accompanying captions to the scientific journals.

Additional comments, etc.

On 24 and 25 November 2011, the Complainant submitted Figure 2 (in article C) in .jpg and .tiff format on CD-ROM and forwarded an e-mail of 24 November 2011 from Co-author 6. The e-mail mentions that:

'I am the first author to whom [DEFENDANT] refers in connection with [ARTICLE C]. [DEFENDANT] was the one who designed Figure 2 [ARTICLE C]. [DEFENDANT] gave me the figure on a CD-ROM. This CD-ROM was submitted to the DCSD by the [COMPLAINANT]. The version of the figure that we used for the article is on the CD-ROM "New revised figure 22/11/04", which [DEFENDANT] has burned onto a CD for me. I subsequently received the text for the figure by e-mail (see Appendix G.9-2). I did not play any role in the design of Figure 2. It is a figure that I received in finalised form from [DEFENDANT].'

On 20 December 2011, the Complainant subsequently submitted further comments (response to the Defendant's comments (see below) to the said submission of the CD-ROM). The Complainant states that the Defendant's comments primarily relate to articles C and D, for which Co-author 6 and Co-author 2 were the first authors.

¹⁵The DCSD Secretariat received the two complaints covered in this case on 2 and 3 April 2011.



As mentioned above, the Complainant attached statements from Co-author 2 (G_19) and Co-author 6 (G_20) describing the collaboration with the Defendant on the production of the immunohistochemical figures.

The Complainant states in this respect that Co-author 2's article (article D) was included in Co-author 2's PhD thesis, while Co-author 6 (the first author of article C) did not include the above article in her PhD thesis. The Complainant refers to the fact that Co-author 2 (first author of article D) writes that the Defendant's IHC data (according to Co-author 2) made up approx. 30% of article D, and that Co-author 2 therefore described her contribution to conducting experiments and processing data for article D with a B, which corresponds to a personal contribution of 34–66% (G_19).

The Complainant also states that fibre type stainings (ATPase) were carried out by her research group either under the auspices of [RESEARCH CENTRE] at the University Hospital or via a bioanalyst (employed by the Complainant), which conducted the staining at either the Complainant's or the Defendant's laboratory. The Complainant asserts that, with regard to the articles concerned, her research group did not take the photographs, or select or present the figures, including figures that contain ATPase-stained slides. She states that the Defendant was sent the ATPase-stained slides in order to compare them with parallel sections, stained (for example) IL-6 or IL-8, produced in her laboratory, and that this was the approach in the article above, with Co-author 6 as first author (G_20). The Complainant refers to the fact that Co-author 6's declaration shows that neither he nor their laboratory were involved in producing the final figure. She also states that there is no ATPase staining in Co-author 2's article (article D).

Regarding the two articles of which the Defendant is first author (article A and article B), the Complainant states that there is an ATPase staining in article A. This is not included in Figure 1, where an error/instance of dishonesty has been pointed out. The ATPase staining is only included in Figure 2. The final figure, which contains an ATPase staining and an IL-6 staining, was sent by the Defendant to the Complainant (G_6). There is no ATPase staining in article B.

As part of the consultation on the draft ruling of 25 June, the Complainant contends that the Committee has not addressed all of the Complainant's allegations of scientific dishonesty. The Complainant states, therefore, with reference to an e-mail of 5 April 2011 from [RESEARCHER], that six of the images in article A's Figure 1 fit together in pairs. According to the Complainant, the pairs are Figures 1a and 1B, Figures 1d and 1E, and Figures 1f and 1G. It is the view of the Complainant that these three pairs of images stem from individual sections that have been divided in two, after which one part has been rotated 180 degrees. Three original sections therefore appear as six different images. The Complainant also states (see the e-mail of 5 April 2011 from [RESEARCHER]) that the same method is used in article B's Figure 3, where Figures 3b and 3C, and Figures 3d and 3f are four images created from two original sections.

5.2 The Defendant's responses and contentions

The Defendant contends that she is innocent of the Complainant's allegation of scientific dishonesty.

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Defendant's general comments

In support of her contentions, the Defendant states in general, inter alia, that the complaints relate to a formal collaboration between the Complainant and the Defendant, which consisted of the Defendant providing an immunohistochemical staining, which the Complainant could have at her disposal and use in her muscle studies. The Defendant contends that she had nothing to do with the rest of the process and that she did not participate further in the muscle studies.

Regarding the way in which the collaboration worked, the Defendant refers to her Appendix 1, which is an e-mail of 21 February 2003 from the Defendant to the Complainant.

In it, the Defendant states, for example:

' ...
I have now seen an IL-6 staining and staining for MT-I + II (metallothionein isoform I and II) in all of your muscle biopsies. This is highly interesting because both IL-6 and the MT-I + II are significantly increased by exercise. In muscles from the "residual" groups, there is almost no IL-6 or MT-I + II.
It is logical that both have increased, as they also "go together" in the brain and other tissues in the event of pathology/stress.
They are present (in the brain and also in the spleen, liver and bone marrow) acutely in the event of inflammation/pathology, and they are also both present and important in the event of regeneration.

IL-6 is a general inducer of MT-I+II, so it is very likely both that IL-6 induces the increased MT-I+II in your muscles, but also that MT-I+II are potent antioxidants and factors involved strongly in and induced by inflammation/pathology, so that exercise is guaranteed to induce MT-I+II by itself. I am assuming that exercise causes a stress on the tissue and provokes free radicals, right?

The next thing I will do is take photos of the tissues and present them so that you can see for yourself.

A quick question: the various indications of time indicated for the exercise groups (-1/2, 3, 4 1/2, 6, 9, 24) – are these times before or after exercise? And should we not do other stains on the tissues (the following could be relevant/interesting, for example: TNF-alpha, TNF-alpha receptor, IL-1, staining of various other antioxidants, stainings for different oxidative stress markers, staining for different apoptosis markers)?

' ...'

The Defendant also states that she was only peripherally involved in the Complainant's muscle research. She states that her contribution consisted only of a series of stains on muscle biopsies that arrived at the University Laboratory from the Complainant's department, where they had conducted a study in which healthy volunteers cycled on an exercise bike for three hours. According to the Defendant, there was therefore no daily contact between the laboratories, which were in the University Hospital and the University Laboratory, respectively, and the collaboration was relatively distant.

The Defendant states, inter alia, that all case-related stains by her were made on biopsies from this one bicycle study; that it was therefore more or less an 'assembly-line process', as a given biopsy ended up being stained several times for different markers; that for each immunostaining (or after a few stains), a new muscle article was produced that also contained other data from the Complainant's group;

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that the Complainant had sole and absolute right to make decisions; that the Complainant selected what should be included in each article; and that articles were thus also produced as an assembly-line process, on the basis of the relatively few biopsies from the one (see above) cycling study.

The Defendant also states that the pace of the work meant that there was often a flood of e-mails back and forth in order to co-ordinate which stains the Complainant wanted included in which article. The Defendant states that, at first, she sent photos by taking raw photos of all of the stained tissue, but that the Complainant's own group later took the photos themselves and learned staining and microscope techniques, etc. in the Defendant's laboratory, which she put at their disposal.

The Defendant contends that all of the sections and the tissue from the cycling study, which had been stained in the Defendant's laboratory, were subsequently transferred to the Complainant (see the Defendant's Appendix 1). The Complainant is, therefore, the only person able to go back and find out what went wrong with which biopsies, including the labelling of biopsies and associated sections, and why one or more of these – clearly mistakenly and deeply regrettably – appears incorrectly as both 'pre-exercise' and '24h post-exercise' tissue, as unfortunately happened in article C, for example.

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The Defendant contends that the overwhelming probability is that this photo is from the '24h post-exercise' group, because the same biopsy occurs in this group – i.e. the '24h post-exercise' group in article D. As the staining always had to be made on serial adjacent sections, in order to ensure comparability between stainings (i.e. comparison of the localisation for various cytokines' expression in the muscle fibre), the two photos seen in Figure 2g in article C and in Figure 3d in article D are, according to the Defendant, not a mistake, as the two photos show two adjacent sections from the same biopsy, i.e. a biopsy from the '24h post-exercise' group.

The Defendant states that this is important because the Complainant opts to exclude this essential point and thereby present the case as being as 'fraud-like' as possible by not noting that there are two '24h post-exercise' photos with two different stainings, but instead showing only one '24h post-exercise' photo along with the 'pre-exercise' photo. This means that the above point about the biopsy (as being a correct '24h post-exercise' biopsy) is obscured, and thus omitted. Conversely, the Defendant asserts that she cannot rule out that the Complainant may not have discovered this herself, but that had this been the case, she would hardly have alleged that it was rooted in deliberate fraud committed by the Defendant alone.

The Defendant contends that similar errors are found in the two articles concerning IL-6 and MT (methallothionein) expression in muscle, and that in these articles, photos from a single biopsy have been wrongly filed, because the same photos from the same section have been saved as both '3h post-exercise' and '6h post-exercise' in article B and '24h post-exercise' in article A. The Defendant also contends that this is undoubtedly a mistake, one that is deeply regrettable and should have been spotted, because it is obvious that something is wrong, and that the same four authors (Defendant, Co-author 1, Co-author 2 and the Complainant) worked on the two articles, so it is poor form that not one of them noticed this. On this point, the Defendant states that, when things have to be done as quickly as possi-



ble, it is far easier for errors and sloppiness to occur, and that nobody took the time to double-check the details before the article was submitted.

The Defendant states that something similar happened in the text in Complaint 2, in which the Complainant calls article C from 2005 ‘the 2004 IL8 article’ and ‘IL8 article 2004’ several times, and that this error is repeated so often in her submitted material that it becomes slightly ironic, because it illustrates the way in which the articles themselves were completed, i.e. carelessly and too quickly to double-check and correct, etc. The Defendant also identifies errors in the text in Complaint 1, in which the Complainant states that Figure 3e and Figure 3g in article B represent fraud, and that this must be a misunderstanding on the part of the Complainant, as is clear from article B, Figure 3.

The Defendant states that the collaboration with the Complainant led, in practice, to a new muscle article each time new immunostaining data was generated, including other data, e.g. mRNA measurements, made by/in the Complainant’s group. The Defendant informed the DCSD that she was not involved in generating this data, and that since muscle studies, as already mentioned, were not part of her focus area, she can now see, with regret, that she was not paying enough attention to the composition of the data in the articles or the final presentation and conclusions drawn in the articles.

The Defendant states that she regrets this, and that she regrets and is sorry that she did not participate more actively in the whole muscle-study process, as she might have discovered that there had clearly been errors and/or mix-ups of samples and errors in connection with the filing or transfer of photos. However, according to the Defendant, it is unlikely that errors occurred in all of the cases mentioned by the Complainant – the tissue in Figure 2g in article C and Figure 3d in article D is in all probability correct, but there is something wrong with the tissue in Figure 2a, article C, which has undoubtedly been either registered, marked or filed wrongly.

The Defendant states that, in relation to the above, she also regrets that she did not participate more actively in the whole muscle-study process, as she might have been able to avoid contradictory information and/or obviously over-interpretive conclusions appearing in some of the articles.

The Defendant adds that there is no doubt that the error mentioned above happened, but that, for her part, she never consciously or deliberately made a mistake, let alone consciously or deliberately committed fraud. Moreover, writers other than the Defendant were also involved in all of the articles referred to – and indeed, some were involved in more than one of the articles – and they, like the Defendant, could and should have noticed the errors or have reacted.

Regarding this point, the Defendant states that, in particular, someone should have reacted in cases where exactly the same data was used independently of the other authors – for example, in a PhD thesis by a student in the Complainant’s group. In such cases, the students state that they have conducted all of the processes themselves, so are able to vouch for the data and the work, and that the student and/or, at the very least, the supervisor should, arguably, have discovered the error and carelessness, but nobody reacted then either.

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The Defendant states that she has not personally used the published and case-related data from the muscle study in theses, supervision, books, presentations, etc., but she cannot imagine that she would not have spotted the errors had she used the data in any such context. In those instances where the case-related data formed the basis for academic papers and/or bachelor/master's assignments, the authors/students and their supervisors (in this specific case, the Complainant) should have checked for errors. The same is true of the Complainant using the data mentioned above and related articles in her major reviews, in which she takes full credit for the work (e.g. the following review, which is from this year: [REVIEW]). According to the Defendant, the Complainant is still citing the articles that she now denounces to the DCSD.

Concerning the process of article writing, including the presentation of the results, the Defendant states that all co-authors, including herself, could have done a better job of double-checking. She acknowledges that she did not participate enough, that she was responsible for how the immunostaining was to be done, and made sure that this was done either by a laboratory technician or the primary investigator (typically a PhD student), and that she did not participate further in the actual work of article writing, including deciding which data was included, checking for errors, double-checking processes, etc.

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The Defendant's comments on the individual articles

Articles A and B

The Defendant states that, in her appendices G_1, G_3 and G_4, the Complainant actually confirms that the muscle studies were not the Defendant's focus, that she only had a minor interest in this area, and that she simply submitted and showed the presentation pack's data to the Complainant, who then evaluated it herself. According to the Defendant, this is also supported by the Complainant's Appendix G_5, in which it is clear that the Defendant only produced a 'draft', which was then sent to the Complainant for her to review and assess. The Defendant states that it is, therefore, incorrect of the Complainant to assert that she had nothing to do with the staining.

The Defendant states that the appendices document who did the staining and the selection of sections and photos for the articles and that it was not her alone.

On this point, the Defendant also states that the appendices show that some of the stains (ATPase histochemistry) seen in the figures, were not made by the Defendant, or in her laboratory, but by the Complainant's laboratory (e.g. Appendix G_5). Furthermore, she states that Appendix G_6 shows that the Defendant sent to the Complainant a figure in which there are photos of IL-6 immunohistochemistry and the above-mentioned ATPase histochemistry, and that the latter, in itself, proves that it was not only the Defendant who carried out the staining or selected photos for the figures. The ATPase-staining method was, at the time in question, only available under the Complainant's protocol. It was conducted in the Complainant's laboratory and/or by the Complainant's staff, and sections from this were subsequently selected for the article.

The Defendant states that when she wrote to the Complainant (see Appendix G_6) that the enclosed figure was 'finished', she meant that the individual images



had been laid out on a page of figures composed of the ATPase staining (from the Complainant's laboratory) and the IL-6 staining (from the Defendant's own laboratory), along with lettering, scale bars, etc. In other words, according to the Defendant, it did not mean that she had conducted all of the staining and selection of sections and photos herself.

The Defendant states that she – as seen in Appendix G_7's e-mail correspondence – saved the relevant figures in the appropriate formats (.jpeg and .psd) in the correct resolution, etc., i.e. corresponding to the journal's requirements, and that she arranged for the figures to be printed on photo paper, etc. According to the Defendant, this was merely a case of preparation prior to submission and publication of the article and not, per se, an indication of who stained or photographed which sections. It is therefore misleading of the Complainant to refer to this and similar appendices, claiming that she has documentation that the Defendant alone cheated with her own and/or the Complainant's data.

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The Defendant states that the other appendices, e.g. Appendix G_8, show that the articles and their revision were carried out in collaboration, in which the Defendant submitted her specific contribution to the Complainant, who ultimately reviewed the contributions of the Defendant and the other co-authors. She also states that the Complainant has not responded to her statement that the work could never be done fast enough, but she has confirmed the Defendant's point of view, e.g. in Appendix G_5, in which the Complainant writes in an e-mail that she has 'copy-pasted a lot' and the others would have to 'clear up the worst misunderstandings'. According to the Defendant, this shows a lack of care and an apparent indifference and negligence with regard to possible mistakes, for which the Complainant bears by far the greatest responsibility.

The Defendant states that similar negligence is reflected in Appendix G_1, in which Complainant describes her collaboration with the Defendant, and that this relationship is further commented on in the Defendant's initial response. Despite this, the Complainant writes in Appendix G_1 that the Defendant conducted and manipulated 'immunoblots'. This is factually incorrect, because immunoblotting is a method with which the Defendant has never worked. The fact that the Complainant does not even distinguish between immunohistochemistry and immunoblotting – which, despite similarities in their names, are two very different methods that result in two fundamentally different kinds of dataset – means it is hardly surprising that the Complainant made mistakes and is now trying to disclaim responsibility for them.

In connection with this, the Defendant states that it is clear that the Complainant does not differentiate between cutting a section from a biopsy and analysing (immunohistochemical stain) the excised section. She refers to Appendix G_4, in which the Complainant asked the Defendant if she had made sections of all biopsies, which she confirmed. Nevertheless, the Complainant refers to this in her response, as if she has not received documentation for the fact that all biopsies had been analysed. According to the Defendant, this is something completely different from just cutting the biopsy. Again, this illustrates, in the Defendant's opinion, the above-mentioned degree of lack of care and/or indifference to the work.



Concerning article B and its immunostainings and presentation of figures, the Complainant has specifically written that no one from her laboratory was involved. According to the Defendant, this is again factually incorrect, because the article contains ATPase staining, which can only have been done with the Complainant's input, cf. the Defendant's description.

In addition, according to the Defendant, Appendix G_17 shows that individuals from the Complainant's group were involved – which again is only natural, since the same person is co-author of the article – and that the article contains Figure 1 data, which stems from the Complainant's laboratory. The Defendant contends that the fact that she is listed in one article as corresponding author is not tantamount to documentation of the Complainant's assertions.

Articles C and D

Concerning article C, the Defendant contends that it is incorrect of the Complainant to assert that she attaches e-mail correspondence documenting that the Defendant alone had done all of the work, including the figure (and caption), and that the first author therefore had nothing to do with the work. The Defendant refers to the Complainant's appendices G_9 and G_10. In Appendix G_9, it appears that the first author has written to the Complainant that he received the captions by e-mail from the Defendant. However, he also writes that he did not receive the figure by e-mail, as the Complainant asserts. She also argues that Appendix G_9_2 shows that the Complainant did not just receive finished results from the Defendant, as there was a dialogue and exchange between her colleagues, such as the first author and the Defendant. According to the Defendant, the above-mentioned appendix also shows, among other things, that the Complainant is wrong to assert that no one from her group participated in the histological work.

Regarding this, the Defendant states that the Complainant's claims are not consistent with the fact that data was used in academic theses emanating from her group, for which 'author declarations' have been drawn up that contradict the Complainant's assertion that the Defendant alone was responsible for all of the work.

The Defendant contends that Appendix G_10_1 also contradicts the Complainant. It includes Figure 2 from article C, which among other things shows an ATPase staining, which proves that the Complainant was actively involved in producing the figures for this article, as the Defendant did not conduct ATPase staining or handle sections for this. See also the description above, as according to the Defendant the same applies to the other articles.

About this point, the Defendant states that it is therefore, at best, a distortion of the truth when the Complainant, in her written response to the DCSD, writes that the Defendant did all of the work on this figure in article C, and also that it is untrue when the Complainant asserts that no one in her group was involved in this work.

The Defendant states that she worked on the layout of the images individually on a page of figures and inserted descriptions/letters, scale bars, etc., before handing



over the figure to the first author. However, this does not mean that she alone produced all of the stains and selected the sections, etc. for the figure, rather that – as per Appendix G_10_2 – the Defendant merely sent a figure on which she had changed the figure's letter so that it was replaced with a description, that the Defendant sent the first author a caption and a figure with changed markings, that the figure was prepared jointly, and that the microscopy findings were also exchanged as part of a dialogue, as seen in Appendix G_9 and Appendix G_10.

In this respect, the Defendant states that it was totally untrue when the Complainant wrote to DCSD that documentation above clearly shows that the Defendant submitted the final figures to the Complainant and her 'partners'. According to the Defendant, this does not constitute documentation, and the partners mentioned are in fact the Complainant's PhD students.

Regarding article C, the Defendant says that there is no more evidence supporting the Complainant's false claims; that Appendix G_11 reveals that – contrary to the Complainant's allegations – data was exchanged between the Complainant's staff and the Defendant; that Appendix G_12 consists only of a review of the findings after the microscopy of the sections, which are also listed at the top of the appendix, where it says that this is a 'report'; and that it is also clear from the text in the Appendix that the Defendant suggested that they should compare their data with each other, which contradicts the Complainant's allegations about the very same appendix and case management.

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The Defendant contends that this appendix does not constitute proof that she produced a figure for the article alone, let alone that she had any interest in doing so fraudulently. The Defendant also says that it is even more important to note that Appendix G_12 does not mention the figure in the publication at all, but rather a lecture that the Complainant was to give at that time; that the Appendix shows that it was the Complainant alone who ultimately made the decision about choice of data, etc.; and that the first paragraph in the 'after exercise' section indicates that samples were mixed up, which is consistent with the substance of Defendant's first consultation response.

By way of conclusion, the Defendant states that it is therefore a fact that the aforementioned appendices do not contain what the Complainant claims and otherwise stubbornly repeats. There is nothing in the attached appendix that satisfies the Complainant's obvious desire to construct documentation for the accusations in order to continue to disclaim her own responsibilities.

The Defendant contends that it can be inferred cumulatively from all of the Complainant's appendices that the Defendant tried her best to comply with the Complainant's wishes in terms of putting her laboratory and knowledge at the disposal of the Complainant.

She also states that, during the collaboration with the Complainant, a total of more than 2,000 pictures were taken of muscle tissue, which have always been freely available on the photomicroscope's hard drive, and that the pace of work and the culture, both in the Complainant's department and in general, mean it is impossible to rule out the potential for unfortunate errors during the filing or naming/labelling of the raw images.



Additional comments, etc.

Concerning the Complainant's submissions on 24 and 25 November 2011 of Figure 2 (article C) in .jpg and .tiff format on CD-ROM, the Defendant states that the CD-ROM contains only one figure, which she – as previously described – had burned to the CD-ROM.

In conclusion, the Defendant summarises the essence of her previously submitted accounts, as described above, and contends, inter alia, that she had worked on laying out the individual images on a page of figures and inserted letters/descriptions, scale bars, etc., before handing over the figure to the first author, but that this does not mean that she alone produced all of the stains and the selection of the section, etc. for the figure.

6 Rules and regulations

This case has been processed under the Danish act on research consulting, etc., cf. consolidation act no. 1064 of 6 September 2010 and executive order no. 306 of 20 April 2009 on the Danish Committees on Scientific Dishonesty, as amended by order no. 144 of 20 February 2012.

Scientific dishonesty is defined in section 2, no. 3 of the act and section 2 of the executive order.

“Section 2. Scientific dishonesty is understood to mean: Falsification, fabrication, plagiarism and other serious violations of good scientific practice committed intentionally or due to gross negligence during the planning, implementation or reporting of research results. Scientific dishonesty includes:

- 1) Undisclosed construction of data or substitution with fictitious data.*
- 2) Undisclosed selective or surreptitious discarding of own undesired results.*
- 3) Undisclosed unusual and misleading use of statistical methods.*
- 4) Undisclosed biased or distorted interpretation of own results and conclusions.*
- 5) Plagiarism of another person's results or publications.*
- 6) False statements concerning authorship, title or workplace.*
- 7) Submission of incorrect information about scientific qualifications. ”*

7 The Committee's ruling

7.1 The concept of dishonesty

As part of the consultation on the draft ruling of 25 June 2013, the Complainant points out that the wording of the definition of scientific dishonesty has changed, and that as a consequence, the one used at the time the articles were produced differs from the one used now.

In the period 1992-1998, the definition of scientific dishonesty rested solely on a set of rules for DCSD approved by the Danish Medical Research Council (SSVF) on 18 December 1992. The definition was as follows:



“Section 2.

[...]

(2) Academic dishonesty includes all deliberately fraudulent actions in the course of the application-research-publication process, as well as cases of incompetence so severe that they can be considered to have an equivalent impact on scientific credibility. This corresponds to intent or gross negligence.

(3) The area of scientific dishonesty covered by DCSD's remit includes falsifying or distorting scientific messages or falsely highlighting the input of particular researchers. As such, it covers:

- construction of data*
- selective and surreptitious discarding of unwanted results*
- substitution with fictitious data*
- deliberate misuse of statistical methods with the aim to draw other conclusions than the data provides a basis for*
- distorted interpretation of results and distortion of conclusions*
- plagiarism of another person's results or publications.*
- distorted indication of the results of others*
- improper claims of authorship*
- misleading applications"*

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In 1998, a definition of scientific dishonesty inserted in the executive order of the DCSD, see executive order no. 933 of 15 December 1998, entered into force on 1 January 1999. Section 3 of the order reads:

“3. Scientific dishonesty covers acts or omissions that cause research to be falsified, the scientific message to be distorted or gross misrepresentation of an individual's involvement in the research. This includes:

- 1) Construction of data.*
- 2) Selective and surreptitious discarding of unwanted results.*
- 3) Substitution with fictitious data.*
- 4) Undisclosed unusual and misleading use of statistical methods.*
- 5) Deliberately distorted interpretation of results and distortion of conclusions.*
- 6) Plagiarism of another person's results or publications.*
- 7) Deliberately distorted reproduction of the results of others.*
- 8) Improper crediting of author.*
- 9) Applications with incorrect information.*

(2) In order to label conduct scientific dishonesty, it must be possible to prove that the individual concerned acted with intent or in a grossly negligent manner.”

In 2005, the definition of scientific dishonesty was amended by a new DCSD Order, order no. 668 of 28 June 2005, which came into force on 1 August 2005. Section 2 of the order reads:



“2. Scientific dishonesty is defined as intentional or grossly negligent conduct in the form of falsification, plagiarism, concealment or similar, which involves improper misrepresentation of your own scientific work and/or research results. This includes:

- 1) Undisclosed construction of data or substitution with fictitious data*
- 2) Undisclosed selective or surreptitious discarding of own undesired results*
- 3) Undisclosed unusual and misleading use of statistical methods*
- 4) Undisclosed biased or distorted interpretation of own results and conclusions*
- 5) Plagiarism of another person’s results or publications*
- 6) False statements concerning authorship, title or workplace*
- 7) Submission of incorrect information about scientific qualifications. ”*

Act no. 552 of 16 June 2008 introduced a definition of scientific dishonesty into the act on research consultancy, etc. This provision entered into force on 1 December 2008, see executive order no. 1130 of 24 November 2008.

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The preparatory documents for the amendment were intended to clarify the provision.

The definition, which is preserved in section 2 (3) of the current act on research consulting, reads:

“Scientific dishonesty, falsification, fabrication, plagiarism and other serious violations of good scientific practice committed intentionally or due to gross negligence during the planning, implementation or reporting of research results”.

As a result of the amendment, the DCSD Order was also amended to reflect the definition in the act. The definition below was inserted by order no. 1122 of 25 November 2008 and the wording has been preserved in the current order from 2009:

“2. Scientific dishonesty is understood to mean: Falsification, fabrication, plagiarism and other serious violations of good scientific practice committed intentionally or due to gross negligence during the planning, implementation or reporting of research results. Scientific dishonesty includes:

- 1) Undisclosed construction of data or substitution with fictitious data*
- 2) Undisclosed selective or surreptitious discarding of own undesired results*
- 3) Undisclosed unusual and misleading use of statistical methods*
- 4) Undisclosed biased or distorted interpretation of own results and conclusions*
- 5) Plagiarism of another person’s results or publications*
- 6) False statements concerning authorship, title or workplace*
- 7) Submission of incorrect information about scientific qualifications. ”*

The Committee is of the opinion that even though changes have been made to the wording of the definition of scientific dishonesty, no substantive changes have been made to the content, i.e. the substance of the definition has remained the same despite changes to the wording. This decision is underpinned by statements in past DCSD annual reports. Following the amendment in 2005, the DCSD chairperson



stated that the change was not considered to represent any real difference to the definition of dishonesty. After the 2008 amendment, the chairperson noted that the change consisted of a clarification of the previous definition. Comparing the wording of the various iterations shows that the definition has remained almost identical from 1992 until the present.

The Committee notes that the requirement for “improper misrepresentation” in the 2005 definition was not repeated verbatim in 2008. It adds that the word “improper” was chosen to signal that a certain degree of gravity was required, a requirement covered in the 2008 definition by stating that only a ‘serious’ breach of good scientific practice is tantamount to dishonesty. In assessing whether a serious breach of good scientific practice has been committed, it is implicit that the breach is likely to mislead the reader of the scientific product concerned. In practice, a criterion about misleading will, therefore, be part of DCSD’s assessment of whether a given action can be characterised as scientific dishonesty.

Since 1992, the subjective requirements in the definition have been intent or gross negligence. The wording ‘gross carelessness’ in the 1998 definition does not alter this since this wording has in practice been interpreted as corresponding to gross negligence.

In this light, the Committee finds that the definition of scientific dishonesty, as per the current wording, has covered the same content since 1992. The Committee has assessed the individual charges using the definitions of scientific dishonesty valid at the time that the scientific products emerged and found no reason for a different ruling to the one that results from the application of the current definition. In the ruling below, the Committee will, therefore, only use the definition of scientific dishonesty contained in the current act on research consulting, etc. and the DCSD Order.

7.2 Basis and subject matter for the case

DCSD has based its ruling on the documents mentioned in part 4. above. 4 Process, background and subject matter for the case

The Committee has, as shown in part 4, obtained special, individually drawn-up author declarations from all authors of the four articles mentioned in the two complaints. In February/March 2013, the DCSD Secretariat also requisitioned directly from the journals involved copies of the author declarations that were submitted to the journals when the manuscripts were published. The Defendant’s request for author declarations has therefore, in the eyes of the Committee, been met. However, it is also the Committee’s opinion that the author declarations from the journals are not relevant to its assessment of the case, as the journals’ declarations relate only to copyright issues and do not disclose, for example, the individual authors’ contributions to the articles.

The Committee notes that the Defendant has not replied to its request for data that could help to identify the photo files (raw photos) stored, the Defendant informs the Committee, in a database on a shared computer in the photomicroscopy room at the University Laboratory.

The DCSD has not therefore been able to identify these files, nor has it had a basis for contacting the university and requesting a study of the raw photos stored on the University Laboratory computer mentioned.

Thus, the only documentation for the image material is what was published in the articles.

The assessment of the case and the DCSD ruling were made on the above basis.

7.3 Analysis

Complaint 1

Complaint 1 deals with figures and associated descriptions in the articles A and B, which were reproduced in the articles as follows:

Figure 1 from article A:

Figure 1 from [ARTICLE A]

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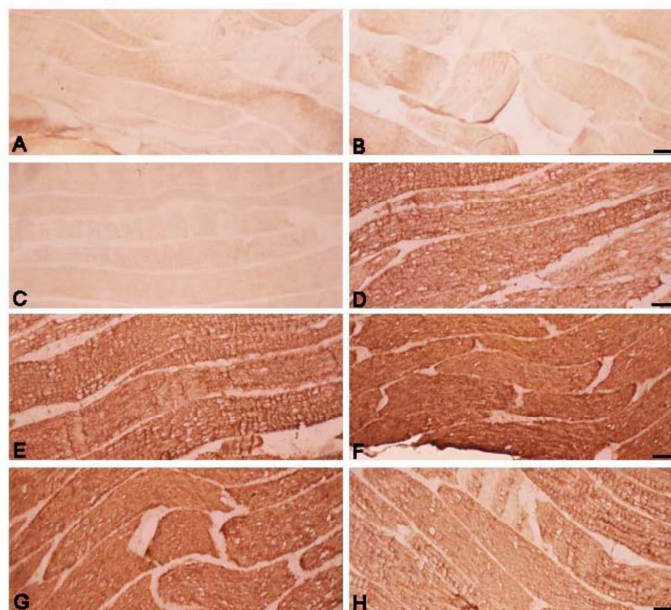
IL-6 immunostainings of human muscle biopsies

A+B: Resting
subjects

C-H:

Time points
0; 3h, 4.5h;
6h; 9h and 24h

3 h of bicycling
(0-3h)



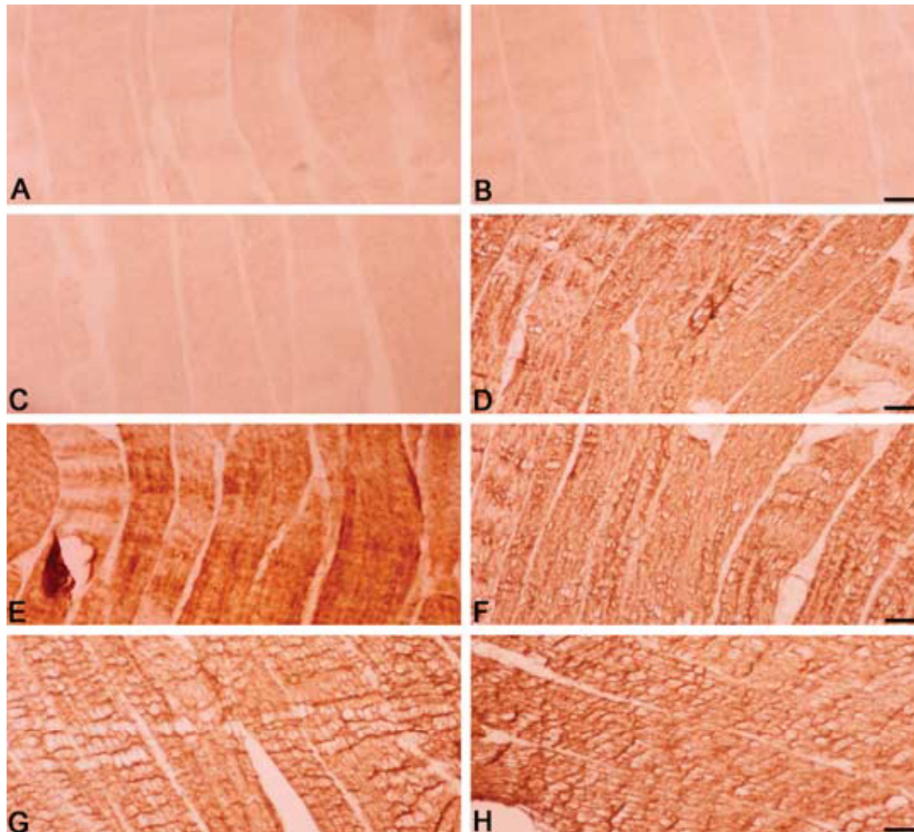
With the caption:

Figure 1. IL-6 expression in skeletal muscle tissue of resting subjects (A–C) and exercising subjects (D–H). A, B) Resting subjects at 1/2 h (A) and 6 h (B) show no significant IL-6 immunostaining. C) Before exercise began, IL-6 expression was generally absent in the muscle tissue. D) By 3 h, when the exercise had just ended, the muscle tissue showed significantly increased IL-6 immunoreactivity. E–G) By 4.5 (E), 6 (F), and 9 h (G), the IL-6 expression was still significantly increased relative to that of resting muscle tissue. H) By 24 h, the IL-6

levels had decreased but was still clearly higher than those of resting muscle tissue. Scale bars: A–H) 50 μ m.”

Figure 3 from article B:

Figure 3 from [ARTICLE B]



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With the caption:

“Figure 3. Immunoreactivity for oxidative stress marker NITT in muscle tissue of resting (A and B) and exercising (C–H) subjects

A and B, resting subjects at 0 h (A) and 6 h (B) show no signs of oxidative stress as NITT staining is absent. C, before exercise began, NITT immunoreactivity was generally absent in skeletal muscles. D, by 3 h when the exercise had just ended, the muscle tissue showed notably increased NITT immunostaining. E, by 4.5 h the NITT immunoreactivity peaked. F–H, by 6 h (F), 9 h (G), and 24 h (H), NITT levels in skeletal muscle decreased relative to those seen by 4.5 h. However, the NITT staining was still clearly increased when compared with resting muscle. Scale bars, 50 μ m.”

Regarding the objective content of the two articles, the Committee bases its ruling on the fact that articles A and B used the same figures to illustrate different points. Specifically, these are the Figures 1a, 1b, 1d, 1e, 1f, 1g and 1h in article A, and Figures 3a, 3b, 3c, 3d and 3f in article B. Regarding Figures 3e and 3g in article B, the Committee does not think that there is a basis for assuming that the



same figures were used as illustration for something different. As such, the Committee does not think that Figures 3e and 3g were manipulated.

After an assessment of the images covered by Complaint 1, the Committee finds that there can be no doubt that the tissue sections, which show the IL-6 expression in resting subjects after half an hour (Figure 1a in article A) and after six hours (Figure 1b in article A), constitute two halves of a section, with one half rotated 180 degrees in relation to the other. The Committee finds that the same is the case for Figures 1d and 1e in article A, and Figures 1f and 1g in article A (Figure 1f has also been reduced to 90% of its original size). In article A, these four illustrations present the IL-6 expression in muscle tissue three hours after the start of the three-hour exercise session (Figure 1d), four hours and 30 minutes after the start of the three-hour exercise session (Figure 1e), six hours after the start of the three-hour exercise session (Figure 1f) and nine hours after the start of the three-hour exercise session (Figure 1g).

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After an assessment of the images, the Committee also finds that there can be no doubt that the tissue section that is stained for IL-6 and represents a biopsy taken 24 hours after the start of the three-hour exercise session (Figure 1h in article A) has been rotated 90 degrees and then split in two and subsequently presented as tissue section from biopsies taken three (Figure 3d) and six hours (Figure 3f) after the start of the three-hour exercise session, and allegedly NITT-stained in Figure 3 in article B.

The Committee therefore finds that there can be no doubt that the Figures 3d and 3f in article B are two connected parts of a single initial section. This in itself is a logical consequence of the above-noted re-use and manipulation of the images from article A in article B.

Following an assessment of the images, the Committee finds that there can be no doubt that Figure 3b and Figure 3c in article B stem from a single original section. The Committee notes that, during its analysis of the interrelationships between Figures 3b and 3c in article B, it became clear that Figure 3a in article B represents a third part in relation to the two pictures mentioned above.

Following an assessment of the images, the Committee does not, however, find any basis on which to assume that Figures 3e and 3g in article B stem from the same section, split in two, moved and rotated slightly.

Concerning subjective intent, the Committee has conducted a closer assessment of the parties' claims and contentions, as set out above in part 5. The Committee has also assessed the accounts given by the other researchers involved. In particular, the Committee notes the following:

The Complainant asserted during the case that the Defendant, as far as the figures in the two articles are concerned, personally dealt with the optimisation of antibodies, staining, photography and selection of images and their presentation in journals. According to the Complainant, the Defendant was also responsible for the methodology section and for the immunohistochemistry and the image captions.

The Defendant has contended during the case, inter alia, the claim that she was solely responsible for the stains and selection of sections and photographs for the



articles. The Defendant has, among other things, stated that she laid out the individual images as single figures on the page, which was composed of the ATPase staining (from the Complainant's laboratory) and the IL-6 staining (from the Defendant's laboratory).

The Defendant has also stated that photos from one of the biopsies were wrongly filed, since the same photos from the same section were filed both as '3h post-exercise' and '6h post-exercise' in article B and '24h post-exercise' in article A. The Defendant has stated that this is undoubtedly a mistake, one that is deeply regrettable and should have been discovered, as it is obvious that something is wrong.

The Committee notes that the co-authors have, to a certain extent, supported the Complainant's interpretation of the process in the two articles, but that several of the co-authors have informed the Committee that it was not only the Defendant who dealt with the images.

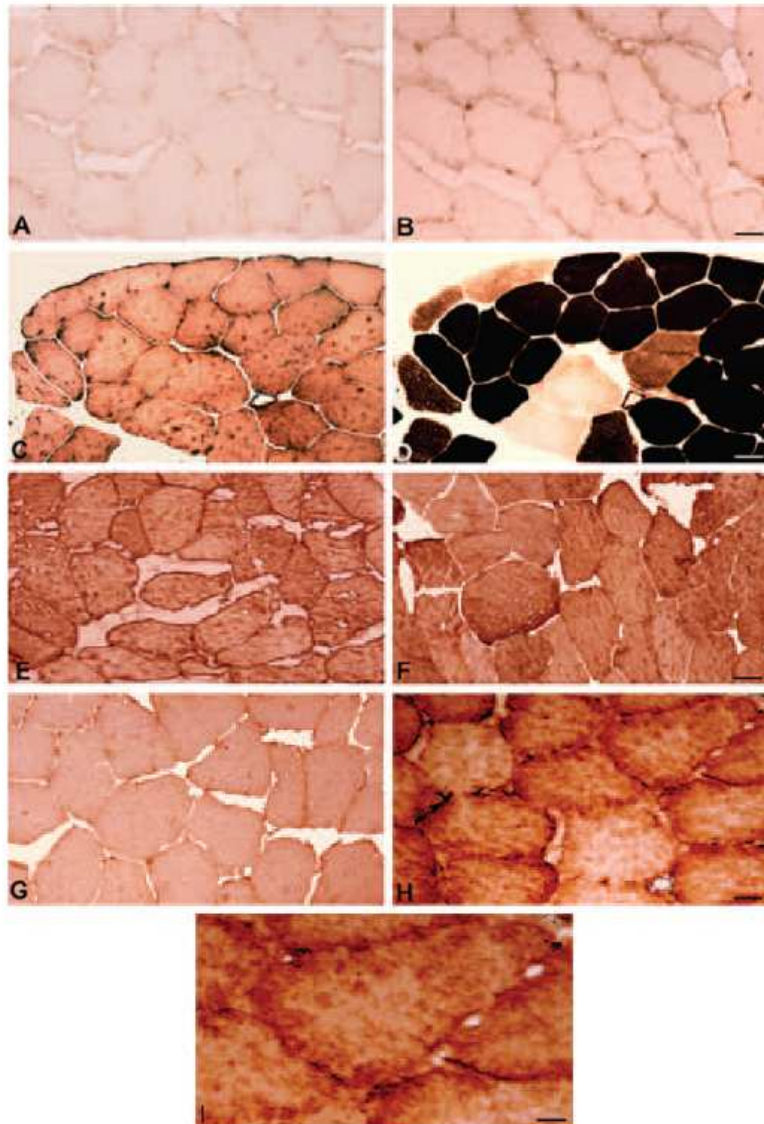
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Complaint 2

The Complaint deals with figures and associated descriptions in the articles C and D, which were reproduced in the articles as follows:

Figure 2 from article C:

Figure 2 from [ARTICLE C]



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With the caption:

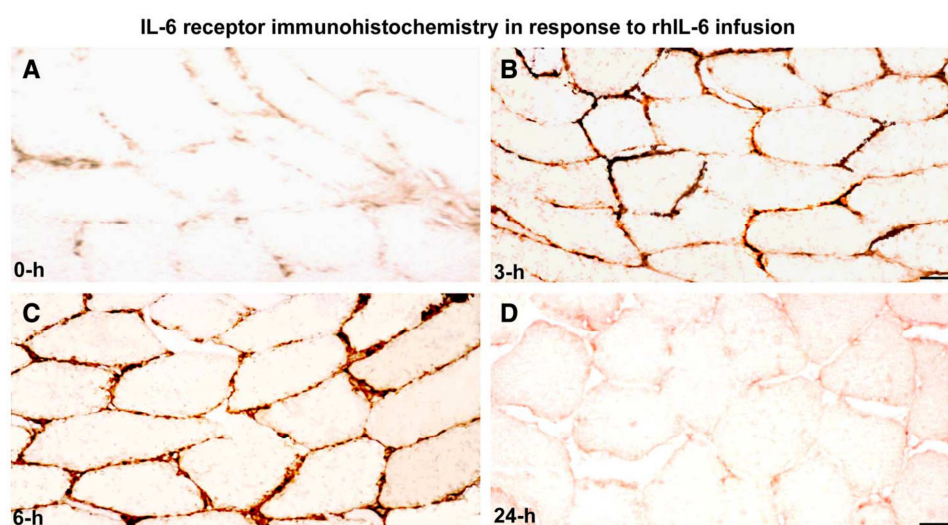
”Figure 2. IL-8 Immunohistochemical expression in skeletal muscle tissue before and after 3h of bicycle exercise

A. Before the exercise began, IL-8 expression was almost absent in the muscle tissue. B. By 3h, when the exercise had just ended, the muscle tissue showed a comparable IL-8 expression relative to the level seen before exercise. C. By 4.5h after exercise, the IL-8 expression was significantly increased in the skeletal muscle tissue, which showed a high level of IL-8 both in general in the cytoplasm and related to the cell membranes, as well as in vessels in the muscle. D. ATPase-stained section. This is the neighbouring section to that seen in C. By comparing C and D, it is seen that both muscle-fibre types express IL-8 after exercise. E and F, IL-8 expression was still very high, and peaked at 6h (E) and 9h (F) following the bicycle exercise. G, after 24h, the levels of IL-8 protein had

decreased again, and the staining appeared homogeneous and mildly increased in the fibres. H and I, higher magnification of skeletal muscle tissue at 9h following exercise. As shown, IL-8 protein is mainly expressed in the cytoplasm, and it is also expressed in the membranes, including the nuclei. We also detected intermittently vascular IL-8 expression in the vessel endothelium of the muscle tissue. Scale bars; A-G, 50 μ m; H, 29 μ m; I, 14 μ m.”

Figure 3 from article D:

Figure 3 from [ARTICLE D]



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With the caption:

”Figure 3. IL-6 receptor protein following rhIL-6 infusion (n=6+6). Protein staining of the IL-6 receptor increases in response to an rhIL-6 infusion with staining being located to the muscle fiber membranes. The staining is most pronounced at 3 and 6 h and has returned to prelevels at the 24-h time-point. A) 0 h; B) 3 h; C) 6 h; and D) 24 h. Scale bars (A–D): 30 μ m.”

Regarding the objective content of the two articles, the Committee bases its ruling on the fact that figures have been reused in articles C and D. Namely, Figures 2a and 2g in article C and Figure 3d in article D.

The Defendant contends that the tissue in Figure 2g in article C and Figure 3d in article D has probably been accurately reproduced, as these figures show two adjacent sections from the same biopsy. However, the Defendant believes that there is something wrong with the tissue in Figure 2a in article C, which is undoubtedly registered, marked or filed wrong. She states that one or more biopsies, including the marking of biopsies and corresponding sections, therefore clearly and deeply regrettably appear incorrectly as both ‘Pre-exercise’ and ‘24h post-exercise’ tissues (for example, in article C).



The Committee finds that there can be no doubt that Figures 2a and 2g are two images of the same tissue sample. The Committee notes that Figure 2a has a less intense hue than Figure 2g, and that the picture extracts from the biopsy have been moved slightly in relation to each other. The Committee therefore takes the view that the figures can only have been produced by deliberate manipulation, with changes in cropping and colour tone between the two figures.

Following an assessment of Figure 2g in article C and Figure 3d in article D, the Committee finds a large degree of similarity between the published photos, especially when those photos are evaluated in detail, including with a view to colour intensity. In this context, the Committee considers it unlikely that the two neighbouring sections would look so alike at micro level. It is therefore the Committee's opinion that these are the same section, as identical tissue structures and artefacts are present. The Committee is therefore of the view that the tissue in Figure 2g (and thus also Figure 2a) in article C and Figure 3d in article D are the same. The Committee also finds that Figure 3d in article D has a less intense hue than Figure 2g in article C. The Committee therefore takes the view that the figures can only have been produced by deliberate manipulation, with changes to colour intensity.

Concerning subjective intent, the Committee has conducted a closer assessment of the parties' claims and contentions as set out above in part 5. The Committee has also assessed the accounts given by the other researchers involved. In particular, the Committee notes the following:

The Complainant states that the Defendant, as far as the figures in the two articles are concerned, personally dealt with the optimisation of antibodies, staining, photography and selection of images and their presentation in the journals. According to the Complainant, the Defendant was also responsible for the methodology section and for the immunohistochemistry and the image captions.

Concerning Figure 2 in article C, the Defendant states that she laid the individual display images out on a page of figures and inserted descriptions/letter markings, scale bars, etc., before sending the figure to the first author (Co-author 6). The Defendant contends, however, that this fact does not mean that she alone conducted all of the stainings and the selection of sections, etc. for the figure. She adds that she sent the caption and figure with altered markings to the first author, but that the figure was jointly produced, and that the microscopy findings were exchanged following a dialogue. The Defendant also contends that the figure contains an ATPase staining, which proves that the Complainant has been involved in the production of the figure, as the Defendant did not do ATPase staining.

Concerning Figure 2 in article D, the Defendant further contends that she was not alone in producing the figure, and also that the production of the figure involved an exchange of data between her, the Complainant and the Complainant's staff.

The Committee notes that the co-authors, to a certain extent, support the Complainant's interpretation of the process for the two articles, but that several co-authors state that the Defendant was not solely responsible for processing the images.



7.4 Conclusion

Based on the information submitted about both complaints, the Committee finds that the same figures were used and an attempt was made to blur this fact by the use of image manipulation. This equates to *undisclosed construction of data or substitution with fictitious data*, pursuant to the DCSD Order, 2 (1).

It is the assessment of the Committee that this represents a serious breach of good scientific practice, as the undisclosed reuse of figures crucially misleads the reader of the articles about the research results.

Pursuant to section 2 of the DCSD Order, it is incumbent upon the Committee to decide the extent to which the serious violation of good scientific practice was committed intentionally or through gross negligence of the accused researcher(s).

The Complainant and Defendant provided conflicting information about the division of responsibilities between the researchers involved. As such, it is not clear who carried out the acts, including image manipulation, which led to the use of the same figures in the articles concerned. The accounts submitted from the other researchers involved do not decisively clarify which of the conflicting perceptions is correct.

After a comprehensive appraisal of the information, the Committee finds that it is unable to ascertain with sufficient certainty that it was the Defendant who carried out the acts that resulted in the reuse of figures.

On the other hand, the Committee is of the opinion that all authors of a scientific article share responsibility for its content, including responsibility for having read the final manuscript before submission to the journal. This is good scientific practice and is also set out in DCSD's own guide to good scientific practice from 1998, i.e. from before articles A–D were submitted for publication:

The 1998 DCSD guidelines include the following:

“Within the bounds of the possible and the reasonable, all authors of an article share responsibility for ensuring that it is based on honest research.”

This practice, i.e. that all authors share responsibility for the content of the article, was also written down later in numerous scientific guides, including DCSD's own guide to good scientific practice in 2009¹⁶, the European Code of Conduct for Research Integrity¹⁷ and the so-called Vancouver rules¹⁸ all of which set non-statutory standards for good scientific practice for the publishing of health-science articles.

The 2009 DCSD guide includes:

“All of the authors of an article also have – within the realms of possibility and reason – a responsibility for ensuring that it is based on honest research so that

¹⁶<http://fivu.dk/publikationer/2009/vejledninger-i-god-videnskabelig-praksis-med-saerlig-fokus-paa-sundhedsvidenskab-naturvidenskab-og-teknisk-videnskab>, p. 31 ff.

¹⁷<http://www.esf.org/publications/member-organisation-fora.html>, p. 7.

¹⁸Uniform Requirements for Manuscripts Submitted to Biomedical Journals: Writing and Editing for Biomedical Publication, Updated April 2010, pt. II.A.1, p. 3.



the risk of fraud is minimised. If irregularities or dishonesty is demonstrated in the research, it will be difficult for the co-authors of the work to disclaim responsibility.”

The 2011 European Code of Conduct says:

”All authors, unless otherwise specified, should be fully responsible for the content of publication.”

The Vancouver Rules, last updated in 2013, say:

“Authorship credit should be based on 1) substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; 2) drafting the article or revising it critically for important intellectual content; 3) final approval of the version to be published; and 4) Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. Authors should meet conditions 1, 2, 3, and 4.”

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On this point, the Committee takes the view that the Defendant, without contention, had a principally supervisory role in the work with the images in the four articles. The Committee also takes the view that the images constituted a key element in the academic messages in the four articles. As co-author, the Defendant has, therefore, a special co-responsibility for ensuring that the articles in their final form accurately present the facts concerning the images.

Although a detailed division of responsibility between the co-authors involved cannot be precisely determined, it is the Committee’s view that the Defendant, in her role as co-author with special responsibility for the images, ought to have discovered the image manipulation, at the very latest, when submitting the final manuscript. The Committee thus emphasises that the figures concerned are of crucial importance for the understanding of the articles’ scientific message.

On this point, the Committee notes that Figures 3d and 3f in article B in particular appear to be a single section divided in two (taken from article A), and that Figures 3a, 3b and 3c in article B have exactly the same hue and display identical structures. Similar circumstances exist in relation to the identical structures in Figures 2a and 2g in article C and Figure 3d in article Furthermore, article A includes three pairs of images with very similar hues and structures, as each pair of images stems from the same section, which has been split in two and rotated 180 degrees. These factors ought to have given rise to the Defendant undertaking a detailed assessment of the images, which would rapidly have clarified that there were substantial problems with the figures concerned.

In light of the Defendant’s special responsibility for the images in the four articles, and because the Defendant did not respond to clear signs that there were major problems with the material, the Committee takes the view, after an overall appraisal of the material, that the Defendant at least acted in a grossly negligent manner as co-author of the four articles, and therefore committed scientific dishonesty as defined in the DCSD Order 2 (1). The information submitted during the case shows that only articles B and C have been withdrawn by the respective



journals. Based on the above, the Committee recommends that articles A and D be withdrawn, pursuant to the DCSD Order, 15 (1), no 2.

8 Other aspects of the complaints

The Defendant has cited claims and contentions that are not covered by the Committee's tangible evaluation in the previous section. Information about this is listed here (below).

8.1 The Defendant's e-mail of 5 December 2011

On 5 December 2011, the Defendant e-mailed the DCSD Secretariat to request that the Committee also consider the Complainant's submission of an erratum and a correction to two different journals ([JOURNAL] and [JOURNAL]) concerning articles other than those covered by the two complaints. The Defendant requested that DCSD assess whether the Complainant acted properly or acceptably in the cases specified.

The Committee finds that these claims do not concern the complaints being dealt with in these proceedings. If the Defendant wishes the DCSD to issue a ruling on such other matters, the DCSD requests that the Defendant files a separate complaint to this effect.

8.2 The Defendant's e-mail of 6 March 2012

The Defendant's lawyer e-mailed four questions on 6 March 2012, as detailed above.

Questions 1 and 2 are discussed in part 4 above.

Questions 3 and 4 sought to ascertain whether DCSD had taken the initiative to involve other people in this case. The Committee has not done so.

This case was considered after a complaint lodged under section 31 (1) of the act on research consulting, etc., and the Committee only has a limited remit to take up cases on its own initiative (see section 31 (3) of the same act). The Committee has ruled on the evidence presented that the articles concerned contain materials that must be considered manifestations of scientific dishonesty, and therefore there is no need for or particular benefit to society of the Committee, on its own initiative, involving others in the case.

9 Appeals procedure

This decision cannot be appealed to any other administrative authority, cf. section 34 of act no. 1064 of 6 September 2010 on research consulting, etc.

Yours sincerely,

Henrik Gunst Andersen
Chairperson
Danish Committees on Scientific Dishonesty:

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