

Opinion of the Austrian Commission for Research Integrity on Case 2009/01

(This opinion has been made public as an exception because the case has been the subject of extensive public discussion.)

The Austrian Commission for Scientific Integrity took action on the basis of a notification from Prof. Alexander Lerchl, Professor of Biology at Jacobs University Bremen. The notification was presented to the Commission during its session on December 21, 2009 and referred to "suspected falsification in two studies" published by Prof. Hugo Rüdiger's former research team on the topic of using the COMET assay to detect DNA damage:

S. Ivancsits, A. Pilger, E. Diem, A. Schaffer, H.W. Rüdiger, Vanadate induces DNA strand breaks in cultured human fibroblasts at doses relevant to occupational exposure; *Mutat Res* 519 (2002), 25-35

E. Diem, H. Rüdiger, Mikrokerntest und Comet Assay: Ein Ergebnisvergleich bei Normalprobanden, *Arbeitsmedizin Sozialmedizin Umweltmedizin* 34 (1999), 437-441

As the allegation relates closely to the suspicions previously voiced by Prof. Lerchl with regard to Prof. Rüdiger (former Head of the Institute for Occupational Medicine, Medical University of Vienna [MUW]) and thus also relates to the findings generated in the course of the EU-funded REFLEX project, the Commission included these events in its deliberations. This refers to the work of Schwarz et al. (2008) and Diem et al. (2005) on the relationship between electromagnetic radiation and cell damage:

E. Diem, C. Schwarz, F. Adlkofer, O. Jahn, H. Rüdiger, Non-thermal DNA-breakage by mobile-phone radiation (1800 MHz) in human fibroblasts and in transformed GFSH-R17 rat granulosa cells in vitro, *Mutat Res* 583 (2005), 178-183

C. Schwarz, E. Kratochvil, A. Pilger, N. Kuster, F. Adlkofer, H.W. Rüdiger, Radiofrequency electromagnetic fields (UMTS, 1950 MHz) induce genotoxic effects in vitro in human fibroblasts but not in lymphocytes; *Int Arch Occup Environ Health*, 2008; 81(6): 755-767

In addition to the information received from Prof. Lerchl and the papers listed above, the Commission also received comments from the scientists involved. In addition, the findings of the MUW's Council on Ethics in Science were also taken into account. The Commission was also able to inspect the laboratory records which contained the original data underlying the publications in question. Regarding the statistical issues raised in relation to these publications, the Commission obtained an external expert opinion. With regard to the works of Diem et al. (2005) and Schwarz et al. (2008), the Commission also had access to the report prepared by COPE (Committee on Publication Ethics).

The notification submitted by Prof. Lerchl refers to the implementation and execution of the experiments from which the authors concluded that DNA damage had occurred. Prof. Lerchl considers the data to be "contradictory and not reproducible". Severe suspicions of a breach of the rules of good scientific practice prompted the Commission for Scientific Integrity to initiate a procedure in this case. The voting members of the Commission handled the case without the participation of Prof. Kleihues, who cited potential bias in the proceedings.

In response to the allegations regarding the publications of Diem et al. (1999) and Ivancsits et al. (2002), Prof. Rüdiger submitted oral and written comments and was able to resolve some of the questions raised. However, it remained unclear how the published results were derived from the available original data. On this basis, the Commission was unable to confirm or refute Prof. Lerchl's allegation regarding falsification. Likewise, the Commission was not able to verify the allegations with regard to the work of Diem et al. (2005) and Schwarz et al. (2008).

In each of the publications, the documentation of the original data and its depiction do not comply with the rules of good scientific practice, thus pointing to a lack of the diligence required to enable replication of the published results.

In light of the significance of these results for the widespread application of mobile communications technology, it would have been appropriate to have the experiments confirmed by an independent research group prior to publication. The experiments conducted by Diem et al. (2005) were repeated by a research group centered around Prof. Günter Speit in 2006, that is, after the publication of the data in question, Prof. Speit's team was unable to replicate the results reported by the research group in Vienna. However, the fact that Speit et al. were unable to reproduce the results cannot be regarded as a verification of the allegations in this case.

The Austrian Commission for Scientific Integrity has therefore come to the conclusion that the scientific community has not yet generated conclusive insights in this field; as a result, further scientific experiments will have to be planned and executed carefully in order to clarify any existing links between electromagnetic radiation and DNA damage as well as its causes.

Vienna, November 23, 2010

Participating members of the Commission:

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