



**Robert P. Liburdy, who has been accused of scientific misconduct, states that "my scientific conclusions stand as published." "Interaction between science and religion" is said to provide "opportunities to resist fundamentalism" in both disciplines. Use of the word "extremism" to describe the actions of animal rights groups is discussed. The author of *The Age of Spiritual Machines* revisits some of the concepts and arguments in that book. The possibly rapid growth of funding for the National Institutes of Health can occur without "harming other [research] accounts," according to one reader. And findings from a 1996 report about neuronal apoptosis are retracted.**

### Calcium and EMFs: Graphing the Data

The article "EMF researcher made up data, ORI says" (News of the Week, 2 July, p. 23) by Dan Vergano deals with research that I did on the effect of electromagnetic fields (EMFs) on calcium in lymphocytes that was published in 1992. An allegation of scientific misconduct is a serious charge, and a balanced and neutral review of the facts is essential for truthful conclusions to be drawn about the science. I was attending the annual Bioelectromagnetics Society meeting in June when Vergano sent me a fax (and thus I missed the opportunity to be interviewed by him), but I would like to now provide several facts.

The raw data for my two calcium studies (1) are valid. Thus, these papers are not being retracted, and my scientific conclusions stand as published. I admit no scientific wrongdoing. I could not afford a protracted legal battle with the federal Office of Research Integrity (ORI), and a settlement was reached in which I admit no liability.

The crux of the charges by ORI center on the way fura data (obtained using the fura fluorescent probe) were graphed. For example, to overlay calcium traces for visual comparison, a baseline adjustment was done, and traces were normalized and synchronized for reagent addition. My error was in not describing these procedures in the methods section. Lawrence Berkeley National Laboratory (LBNL) and ORI then characterized this processed data as "fabricated" data, which technically meets the definition of misconduct, but these techniques are used in the literature; for example, baseline adjustment and normalization of calcium traces have been graphically depicted (2). In my 1992 papers (1), calcium-45 isotope data were also presented to cross-validate the fura data; these calcium-45 data fully support my scientific conclusions, as published.

Neutral, scientific experts reviewed the graphical issues independently at my request: Carl Blackman (Environmental Protection Agency); Richard Nuccitelli (University of California, Davis); James W. Putney Jr (National Institutes of Health). Each one constructively criticized me for not reporting these details, but each concluded that there was no intent to deceive, the data support the conclusions, and this was not scientific misconduct.

Since 1992, additional experimental studies have provided support for alterations in calcium in cells exposed to EMFs (3).

Replication of findings is critical to the scientific process and, since 1993, in our laboratory, environmental magnetic fields have been shown to block tamoxifen and melatonin action in human breast cancer cells (4). Four independent replications of these findings have been reported at scientific meetings in 1998 and 1999 (5).

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#### References

1. R. P. Liburdy, *Ann. N.Y. Acad. Sci.* **649**, 74 (1992); R. P. Liburdy, *FEBS Lett.* **301**, 53 (1992).
2. D. O. Ruehlmann *et al.*, *FASEB J.* **12**, 613 (1998).
3. These studies are reviewed in part at [www.niehs.nih.gov/emfrapid](http://www.niehs.nih.gov/emfrapid).
4. R. P. Liburdy *et al.*, *J. Pineal Res.* **14**, 89 (1993); J. D. Harland and R. P. Liburdy, *Bioelectromagnetics* **18**, 555 (1997); J. Harland, S. Engstrom, R. P. Liburdy, *Cell Biochem. Biophys.*, in press.
5. C. F. Blackman, S. G. Benane, D. E. House (Environmental Protection Agency, Research Triangle Park, NC), poster P-11, meeting of the Bioelectromagnetics Society, St. Pete Beach, FL, 7 to 11 June 1998; R. A. Luben and A. P. Morgan (University of California, Riverside, CA), presentation A-3-4, *ibid.*; J. E. Morris, W. B. Chrisler, D. L. Miller, L. B. Sasser, L. E. Anderson, (Battelle, Pacific Northwest National Laboratory, Richland, WA), poster P-12, *ibid.*; M. Ishido, Y. Kurokawa, H. Nitta, M. Kabuto (National Institute for Environmental Studies, Tsukuba, Japan), poster P-40, meeting of the Bioelectromagnetics Society, Long Beach, CA, 20 to 24 June 1999; Battelle, Pacific Northwest National Laboratory is a National Replication Laboratory in the National Institutes of Environmental Health Sciences/Department of Energy EMF RAPID program.
6. Further information on the topic of this letter can be found on the discussion page of the Bioelectromagnetics Society Web site [www.bioelectromagnetics.org](http://www.bioelectromagnetics.org).

### Activism and Extremism

May I comment on the terminology used in the article "European researchers grapple with animal rights" by Robert Koenig (News Focus, 4 June, p. 1604)? While not in any way supporting the violent actions of various animal rights groups in Europe (or anywhere else), I am unhappy with the use of the word "extremism" to describe the actions of such groups. By the use of such a morally loaded, pejorative adjective, these groups are in fact being condemned in the mind of the reader before their actions have even been described and analyzed.

Surely the correct thing to do would be to describe them as "activists" and then readers could decide for themselves to what degree their actions could be described as "extreme."

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**Officers of the "Nuclei Anti Sostificazioni" (Food and Substance Anti-Alteration Unit) examining a traditional Italian panettone Christmas cake in the Cagliari laboratory in Sardinia. Two popular brands were removed from stores in December 1998 because an animal rights group said that it had injected some of them with rat poison.**

#### Response

The word "extremists" was used to distinguish between the typical animal-rights activists (nonviolent) and those activists who make violent threats in support of their goals.

**—Robert Koenig**

### Fundamentalisms

Eric Stone (Letters, *Science's Compass*, 11 June, p. 1773) responds to Constance Holden's profile of the Templeton Foundation (News Focus, 21 May, p. 1257) by asserting that "no matter how you slice it, religion will involve supernatural inter-