

## Editorial Expression of Concern

Bruce Alberts

Editor-in-Chief

In the issue of 23 October 2009, *Science* published the Report “Detection of an infectious retrovirus, XMRV, in blood cell of patients with chronic fatigue syndrome,” a study by Lombardi *et al.* purporting to show that a retrovirus called XMRV (xenotropic murine leukemia virus-related virus) was present in the blood of 67% of patients with chronic fatigue syndrome (CFS) compared with 3.7% of healthy controls (1). Since then, at least 10 studies conducted by other investigators and published elsewhere have reported a failure to detect XMRV in independent populations of CFS patients. In this week’s edition of *Science Express*, we are publishing two Reports that strongly support the growing view that the association between XMRV and CFS described by Lombardi *et al.* likely reflects contamination of laboratories and research reagents with the virus. In the first Report, “Recombinant origin of the retrovirus XMRV” (2), T. Paprotka *et al.* trace the ancestry of XMRV and provide evidence that the virus originated when two mouse leukemia viruses underwent recombination during experimental passage of a human prostate tumor xenograft in mice in the 1990s. A combination of sequencing, phylogenetic, and probability analyses lead Paprotka *et al.* to conclude that laboratory contamination with XMRV produced by a cell line (22Rv1) derived from these early xenograft experiments is the most likely explanation for detection of the virus in patient samples. In the second Report, “No evidence of murine-like gammaretroviruses in CFS patients previously identified as XMRV-infected” (3), K. Knox *et al.* examined blood samples from 61 CFS patients from the same medical practice that had provided patient samples to Lombardi *et al.* Comprehensive assays by Knox *et al.* for viral nucleic acids, infectious virus, and virus-specific antibodies revealed no evidence of XMRV in any of the samples.

The study by Lombardi *et al.* (1) attracted considerable attention, and its publication in *Science* has had a far-reaching impact on the community of CFS patients and beyond. Because the validity of the study by Lombardi *et al.* is now seriously in question, we are publishing this Expression of Concern and attaching it to *Science*’s 23 October 2009 publication by Lombardi *et al.*

The U.S. National Institutes of Health is sponsoring additional carefully designed studies to ascertain whether the association between XMRV and CFS can be confirmed. *Science* eagerly awaits the outcome of these further studies and will take appropriate action when their results are known.

### References

1. V. C. Lombardi *et al.*, *Science* **326**, 585 (2009); published online 8 October 2009 ([10.1126/science.1179052](http://dx.doi.org/10.1126/science.1179052)).
2. T. Paprotka *et al.*, *Science*, published online 31 May 2011 ([10.1126/science.1205292](http://dx.doi.org/10.1126/science.1205292)).
3. K. Knox *et al.*, *Science*, published online 31 May 2011 ([10.1126/science.1204963](http://dx.doi.org/10.1126/science.1204963)).

17 May 2011; accepted 26 May 2011

Published online 31 May 2011; 10.1126/science.1208542

Include this information when citing this paper.

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published online May 31, 2011

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