

Inconclusive Findings: Now You See Them, Now You Don't!

<http://dx.doi.org/10.1289/ehp.1408106>

The environmental health literature is rife with controversial papers that evoke criticism, support, and, most importantly, a desire to better understand the findings put forth by the authors. A research article by Séralini and colleagues (Séralini et al. 2012), published in the journal *Food and Chemical Toxicology (FCT)*, is one such article resulting in considerable discourse (Arjó et al. 2013; Barale-Thomas 2013; Grunewald and Bury 2013; Ollivier 2013; Wagner et al. 2013; Sanders et al. 2013; Schorsch 2013; Séralini et al. 2013) and a call for new research (European Commission 2013). This is all part of the scientific process in a modern research environment. However, the retraction of the article by Séralini et al. from *FCT* sets a new precedent in the management of peer-reviewed publications that we believe has serious implications for environmental public health. The retraction announcement by the Editor-in-Chief specifically states, "Ultimately, the results presented (while not incorrect) are inconclusive, and therefore do not reach the threshold of publication for *Food and Chemical Toxicology*" (FCT 2013). The Editor-in-Chief also was very clear that he "found no evidence of fraud or intentional misrepresentation of the data."

This article (Séralini et al. 2012) has been controversial from its initial publication. We do not wish to discuss the merits of the authors' conclusions or their implications for the commercial products in question. Those issues have been debated in the open scientific literature since the publication of the paper, and we agree with many of the critiques. However, the retraction of any paper because it is "inconclusive" has adverse implications on the integrity of the concept of the peer-review process as the critical foundation of unbiased scientific inquiry.

The paper was peer reviewed by scientists on behalf of the *FCT* and published accordingly. Hence, it initially met the threshold for publication. In our opinion, there must be a different threshold for forced retraction of the paper, and we believe that this paper did not reach that threshold. The COPE guidelines for retracting articles (Committee on Publication Ethics 2009) provide four reasons for retraction: scientific misconduct/honest error, prior publication, plagiarism, or unethical research. None of these reasons apply to this particular article, and yet Elsevier, a member of COPE, chose to retract the paper.

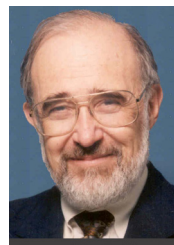
The nature of science is such that individual studies are rarely, if ever, conclusive. Numerous published studies have later been found to be deeply flawed through further scientific investigation, as may well be the study by Séralini et al. To our knowledge, there is no precedent for "inconclusive data" being a reason for retraction for Elsevier or other publishers, or elsewhere in the scientific literature. To single out this one study for retraction is almost certainly due to the controversy following its publication. The repercussions of this directed action extend well beyond this single publication and raise several larger scientific questions. Will these data, which could well have been accepted by another journal, now be tainted beyond possibility for inclusion in usual weight-of-evidence reviews of the body of peer-reviewed science? Will the response to new science by interested parties now be focused on dueling attempts to have the paper retracted rather than on performing additional studies to replicate or refute the findings? Does this retraction strengthen the scientific process, or does it confuse scientific discourse with public relations?



Christopher J. Portier



Lynn R. Goldman



Bernard D. Goldstein

Efforts to suppress scientific findings, or the appearance of such, erode the scientific integrity upon which the public trust relies. The retraction by the *FCT* marks a significant and destructive shift in management of the publication of controversial scientific research. Equally trouble-

some is that this retraction does not really impact how the science will be viewed by scientists, but only how it is viewed by others outside of the scientific community. We feel the decision to retract a published scientific work by an editor, against the desires of the authors, because it is "inconclusive" based on a *post hoc* analysis represents a dangerous erosion of the underpinnings of the peer-review process, and Elsevier should carefully reconsider this decision.

The authors declare they have no actual or potential competing financial interests.

Christopher J. Portier,¹ Lynn R. Goldman,² and Bernard D. Goldstein³

¹International Agency for Research on Cancer (Senior Visiting Scientist), Lyon, France; ²George Washington University School of Public Health and Health Services, Washington, DC, USA; ³Graduate School of Public Health, University of Pittsburgh, Pittsburgh, Pennsylvania, USA
E-mail: cportier@mac.com

REFERENCES

- Arjó G, Portero M, Piñol C, Viñas J, Matias-Guiu X, Capell T, et al. 2013. Plurality of opinion, scientific discourse and pseudoscience: an in depth analysis of the Séralini et al. study claiming that Roundup™ Ready corn or the herbicide Roundup™ cause cancer in rats. *Transgenic Res* 22(2):255–267.
- Barale-Thomas E. 2013. The SFPT feels compelled to point out weaknesses in the paper by Séralini et al. (2012) [Letter]. *Food Chem Toxicol* 53:473–474.
- Committee on Publication Ethics. 2009. Retraction Guidelines. Available: http://publicationethics.org/files/retraction_guidelines.pdf [accessed 8 January 2014].
- European Commission. (2013). FEEDTRIALS KBBE 2013. Available: <http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/fp7/calls/fp7-kbbe-2013-feedtrials.html> [accessed 6 January 2014].
- FCT (Food and Chemical Toxicology). 2013. Retraction notice to "Long term toxicity of a Roundup herbicide and a Roundup-tolerant genetically modified maize" [Food Chem. Toxicol. 50 (2012) 4221–4231]. Available: http://ac.els-cdn.com/S0278691513008090/1-s2.0-S0278691513008090-main.pdf?_tid=867acb42-7d39-11e3-8229-00000a0b0f01&acdnat=1389717357_6f18f1266da44d_ea98219be8314cd69d [accessed 14 January 2014].
- Grunewald W, Bury J. 2013. Comment on "Long term toxicity of a Roundup herbicide and a Roundup-tolerant genetically modified maize" by Séralini et al. [Letter]. *Food Chem Toxicol* 53:447–448.
- Ollivier L. 2013. A comment on "Séralini, G.-E., et al., Long term toxicity of a Roundup herbicide and a Roundup-tolerant genetically modified maize. *Food Chem. Toxicol.* (2012)," <http://dx.doi.org/10.1016/j.fct.2012.08.005> [Letter]. *Food Chem Toxicol* 53:458.
- Sanders D, Kamoun K, Williams B, Festing M. 2013. Re: Séralini, G.-E., et al. Long term toxicity of a Roundup herbicide and a Roundup-tolerant genetically modified maize. *Food Chem. Toxicol.* (2012) [Letter]. *Food Chem Toxicol* 53:450–453.
- Schorsch F. 2013. Serious inadequacies regarding the pathology data presented in the paper by Séralini et al. (2012) [Letter]. *Food Chem Toxicol* 53:465–466.
- Séralini GE, Clair E, Mesnage R, Gress S, Defarge N, Malatesta M, et al. 2012. Long term toxicity of a Roundup herbicide and a Roundup-tolerant genetically modified maize. *Food Chem Toxicol* 50(11):4221–4231.
- Séralini GE, Mesnage R, Defarge N, Gress S, Hennequin D, Clair E, et al. 2013. Answers to critics: why there is a long term toxicity due to a Roundup-tolerant genetically modified maize and to a Roundup herbicide. *Food Chem Toxicol* 53:476–483.
- Wagner R, Lerayer A, Fedoroff N, Giddings LV, Strauss SH, Leaver C, et al. 2013. We request a serious reconsideration of the recent paper by Séralini et al. alleging tumorigenesis in rats resulting from consumption of corn derived from crops improved through biotechnology (Séralini et al., 2012) [Letter]. *Food Chem Toxicol* 53:455–456.