

## LETTERS

edited by Jennifer Sills

## Risks of Neonicotinoid Pesticides

IN THE NEWS FOCUS STORY “PESTICIDES UNDER FIRE FOR RISKS TO POLLINATORS” (10 May, p. 674), E. Stokstad writes that the use of neonicotinoid insecticides has been partly restricted because of their effects on pollinators. Neonicotinoid insecticides are also a threat to vertebrates due to their high toxicity, environmental persistence, water solubility, and potential for surface- and groundwater contamination (1).

Developed by Shell in the 1980s and by Bayer in the 1990s (2), neonicotinoid insecticides are now the most widely used insecticides in the world because they are less toxic than older insecticides (1). However, when neonicotinoid insecticides bind to the postsynaptic nicotinic acetylcholine receptor of animals, the resulting excitation can be lethal (3). The American Bird Conservancy reported that a songbird could be killed by a single neonicotinoid-treated corn kernel and that a bird would die after eating a small canola or



**Collateral damage.** Neonicotinoids harm house sparrows and other songbirds.

wheat grain coated with imidacloprid (a common type of neonicotinoid) (1). The same report suggested that neonicotinoid insecticides have high reproductive toxicity in birds (1). Rats' respiration and behavioral symptoms can be greatly disturbed by neonicotinoid insecticides, raising the possibility that neonicotinoids may also negatively affect human health (3, 4).

In the past, we underestimated the risks of widely used pesticides. As we work to replace older insecticides with less toxic alternatives, we must use caution to prevent a similar mistake.

GUANGMING ZENG,<sup>1,2\*</sup> MING CHEN,<sup>1,2</sup> ZHUOTONG ZENG<sup>3</sup>

<sup>1</sup>College of Environmental Science and Engineering, Hunan University, Changsha 410082, China. <sup>2</sup>Key Laboratory of Environmental Biology and Pollution Control (Hunan University), Ministry of Education, Changsha 410082, China. <sup>3</sup>State Key Laboratory of Medical Genetics, Central South University, Changsha 410078, China.

\*Corresponding author. E-mail: zgming@hnu.edu.cn

## References

1. American Bird Conservancy, “The Impact of the Nation’s Most Widely Used Insecticides on Birds” (March 2013); [www.abcbirds.org/abcprograms/policy/toxins/Neonic\\_FINAL.pdf](http://www.abcbirds.org/abcprograms/policy/toxins/Neonic_FINAL.pdf).
2. W. D. Kollmeyer *et al.*, in *Nicotinoid Insecticides and the Nicotinic Acetylcholine Receptor*, I. Yamamoto, J. E. Casida, Eds. (Springer-Verlag, Tokyo, 1999), pp. 71–89.
3. F. M. Fishel, “Pesticide toxicity profile: Neonicotinoid pesticides” (Univ. of Florida, IFAS, Gainesville, FL, 2005); [http://allianceofdelray.com/picture/271neonicotinoid\\_pesticide\\_toxicity\\_profile.pdf](http://allianceofdelray.com/picture/271neonicotinoid_pesticide_toxicity_profile.pdf).
4. J. Kimura-Kuroda, Y. Komuta, Y. Kuroda, M. Hayashi, H. Kawano, *PLoS One* **7**, e32432 (2012).

Integrity Training:  
Conflicting Practices

N. H. STENECK RIGHTLY PLEADS FOR GLOBAL research integrity training, although he acknowledges that “[i]mproved and expanded global [responsible conduct of research] training will not necessarily reduce misconduct or improve integrity in research” (“Global research integrity training,” Policy Forum, 3 May, p. 552). Research suggests that mentoring and a lab’s actual practice of integrity—or the lack thereof—are more important than formal training in research integrity (1).

We analyzed European guidance documents on research integrity and misconduct (2). Most guidance documents propose, without providing much detail, that education in good research practices should be part of research training. However, there is no consensus across Europe about the content, for-

mat, timing, or frequency of such courses, nor is there a common view on who needs training and who qualifies to lead the training. What level of student or researcher should training target? What kind of training could help professors, who heavily influence the culture in which their researchers work (1)? Is there evidence that training adults promotes integrity or prevents dishonest behavior in other areas of life?

Successful guidance for researchers should entail a harmonized strategy to stimulate research integrity. Further research will tell us whether this strategy should focus on training researchers or on the broader goal of creating a culture of integrity in research environments.

SIMON GODECHARLE,\* BEN NEMERY,  
KRIS DIERICKX

Department of Public Health and Primary Care, Faculty of Medicine, University of Leuven, 3000 Leuven, Belgium.

\*Corresponding author. E-mail: simon.godecharle@med.kuleuven.be

## References

1. M. S. Anderson *et al.*, *Acad. Med.* **82**, 853 (2007).
2. S. Godecharle, B. Nemery, K. Dierickx, *Lancet* **381**, 1097 (2013).

Integrity Training:  
Misconduct’s Source

IN HIS POLICY FORUM “GLOBAL RESEARCH integrity training” (3 May, p. 552), N. H. Steneck writes that research misconduct, to date, has been found to be an intractable problem. He calls for a global research effort using common standards to determine whether improved training is a reasonable way to improve integrity in research.

We should not be surprised to find that Responsible Conduct of Research courses do not influence the behavior of trainees.

Research misconduct—fabrication, falsification, and plagiarism—are the academic equivalents of lying, cheating, and stealing. Ethical standards prohibiting such behavior are established long before students begin graduate training in science.

I reviewed the individual narratives in 146 Office of Research Integrity reports of those found guilty of research misconduct. These accounts suggest that misconduct results from a combination of an individual's character traits, such as perfectionism or sociopathy, and his or her circumstances. For trainees, an intense fear of failure was often the driving

force; for established scientists, it was the lure of academic and/or financial rewards (1).

As a psychiatrist, I know that character traits do not lend themselves readily to remediation, and the anxiety induced by the reality of publish or perish cannot be abolished. However, I believe that we can reduce the prevalence of research misconduct through interventions that decrease the fear of failure in the trainee and increase the fear of detection in the established scientist. Better mentoring and better protection of whistleblowers would accomplish these goals.

Responsible Conduct of Research courses may be effective in teaching good research practices (2), but our efforts to decrease misconduct are more likely to succeed if they are moved from the classroom to the laboratory.

**DONALD S. KORNFELD**

Professor Emeritus of Psychiatry, Columbia University College of Physicians and Surgeons, New York, NY 10032, USA.  
E-mail: dsk3@columbia.edu

#### References

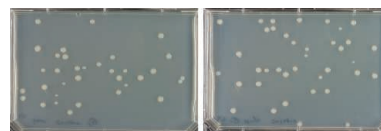
1. D. S. Kornfeld, *Acad. Med.* **87**, 877 (2012).
2. N. H. Steneck, *Sci. Eng. Ethics* **12**, 53 (2006).

## CORRECTIONS AND CLARIFICATIONS

**This Week in Science:** "Essential novelty" (7 June, p. 1139). In the final sentence, "centrosome" should have been "centromere." The HTML and PDF versions online have been corrected.

**News Focus:** "Mysteries of development" by J. Travis (7 June, p. 1156). In the banner caption, the fruit fly embryos pictured show mRNA molecules, not microRNAs. The caption has been corrected in the PDF version online.

**Reports:** "Killing by bactericidal antibiotics does not depend on reactive oxygen species" by I. Keren *et al.* (8 March, p. 1213). In Figure 2A, a picture of bacterial growth on agar plates was inadvertently duplicated by the authors during revision of the manuscript. The correct version, which was the version in the submitted peer-reviewed manuscript, is shown here. The figure has been corrected in the HTML and PDF versions online. Two panels of fig. S2 were also duplicated, and there was duplication of traces between figs. S2 and S6 in the Supplementary Materials. A correct version of the Supplementary Materials has now been posted, and also includes a correction to the legend for fig. S5. The conclusions of the paper are unaffected.



## Letters to the Editor

Letters (~300 words) discuss material published in *Science* in the past 3 months or matters of general interest. Letters are not acknowledged upon receipt. Whether published in full or in part, Letters are subject to editing for clarity and space. Letters submitted, published, or posted elsewhere, in print or online, will be disqualified. To submit a Letter, go to [www.submit2science.org](http://www.submit2science.org).



the**BUZZ**

## Impact Factor Concerns

In his 17 May Editorial, "Impact factor distortions" (p. 787), Editor-in-Chief Bruce Alberts endorsed the *San Francisco Declaration on Research Assessment* (DORA), which discourages the use of journal impact factor to judge individual scientists and recommends actions to improve the evaluation system. Many readers wrote in to share their own concerns with the prominence of the impact factor metric, and a few pointed out some benefits. Excerpts of some of those comments are below. Read the full comments at <http://comments.sciencemag.org/content/10.1126/science.1240319>.

### A selection of your thoughts:

*I agree. True scientific curiosity cannot be guided by forced objectives...*  
—Suresh Varwandkar

*The Editorial is much welcome, especially...in the context of developing nations.... [S]o-called good science, as measured by impact factor, is dominated by science in the developed world....*  
—Renato de Castro

*...The sooner this [evaluation] practice is out-voted in the United States, the more likely that scientists in [other] countries will put some thought behind how to [judge] scientific worth in their own scientific milieu.*  
—Gaiti Hasan

*...[W]ill journals stop emphasizing their impact factors if everyone agrees that we should not consider them for evaluation?...*  
—Anindita Bhadra

*...Since quantitative measures for research and teaching are becoming difficult to assess, the new measure for a professor's success used by tenure committees is the amount of research money brought in by the scientist. The result is that the scientist has become an administrator....*

—Parveen Bawa

*...[S]cientists are supposed to be role models, mentors, and supervisors for the new generation.... [H]ow can the quality of teaching and supervision be kept high if professors need to mainly focus on producing quantitative metrics?...*

—Malgorzata Blicharska

*...One further argument against using impact factors to judge individual scientists....: The journal impact factor does not say anything about the impact of any individual paper published in that journal.... The citation count per paper (or derivatives like h-index) is much more informative about a researcher's impact on the field than a metric computed per journal.*  
—Eelke Spaak

*...The impact factor offers a solace to researchers who are troubled by the proliferation of substandard or "predatory" journals, which usually do not have an impact factor.*  
—Ravi Murugesan

*...[T]he impact factor allows committee members to delegate part of their evaluation to the assessment performed by the two or three reviewers who initially accepted the publication.... Committee members should instead delegate their evaluation to all of the true experts in the core field of the assessed publication....Aggregating in an online database reviews or ratings on the publications that scientists read anyhow can provide important information that can revolutionize the evaluation processes that support funding or hiring decisions....*  
—Răzvan Valentin Florian