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Research Integrity: Making the Right Choices

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When the US Department of Health and Human Services, the European Science Foundation (ESF), the European Commission and Portuguese Ministry of Science, Technology, and Higher Education, the International Council of Science (ICSU), NATO, the European Molecular Biology Organization (EMBO), and the UK Research Integrity Office and Committee on Publication Ethics (COPE) join forces to tackle an issue, you know it's a big one. The first world conference on research integrity, which took place in Lisbon last September under the auspices of these organizations, set an unequivocal tone: Researchers are human, and there is more scientific misbehavior in scientific labs than makes headlines.

Early-career scientists need to learn to hold themselves to high ethical standards.

FOR EARLY-CAREER RESEARCHERS, IT'S A MINEFIELD.

"There will be temptations" -- and pressures -- to misbehave, says Nicholas Steneck, Emeritus Professor of history at the University of Michigan in Ann Arbor and co-organizer of the Lisbon conference on behalf of the US Department of Health and Human Services Office of Research Integrity (ORI). Young scientists who succumb to those pressures may see their careers derailed. But even those who don't succumb can be brought down by scientific misconduct. Sitting idly by -- or, alternatively, speaking out -- as others in the lab commit research sins can sink the careers even of those who do nothing wrong. It's hard to know what to do.

PRESSURES AND TEMPTATIONS

The U.S. Office of Science and Technology Policy defines research misconduct as "fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results." But "the definition of misconduct varies from university to university, and from country to country," Steneck says. And though they may not rise to the level of 'misconduct,' there are some less serious research sins that should also be avoided, and often these come from merely cutting corners or getting sloppy.

Serious or not, scientific misbehavior is far more common than most people realize, according to a 2002 survey of 3,600 mid-career scientists and 4,160 postdocs whose research was supported by the National Institutes of Health (NIH). 33% of respondents -- 38% of mid-career scientists and 28% of early-career scientists -- admitted sanctionable misbehavior in the previous 3 years, including falsifying or fabricating data, not disclosing conflicts of interest, using others' ideas without credit, and failing to present data that contradict one's previously published research.

Scientific misbehavior "always has been a problem, but [it is] today in particular," says Ulrike Beisiegel, chair of the German Research Foundation's (DFG) ombudsmen committee and director of the Institute of Molecular Cell Biology at the University of Hamburg. "We have so many more researchers and not that many more positions. It's a very tight competition which is putting a lot of pressure" on researchers. Scientists "who see competition as a major factor in their environment are more likely to misbehave…, including engaging in misconduct," says Melissa Anderson, associate professor of higher education at the University of Minnesota in Minneapolis, a co-author of the 2002 survey.

A recent study of ORI's investigations of cases of plagiarism, falsification, or fabrication in the biomedical and

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behavioral sciences in the United States suggests that postdocs and graduate students are especially vulnerable to temptations. Some fraction of these researchers are likely to respond by lowering standards or cutting corners to meet their deadlines and obligations if "they don't know how to answer demands on their time," says Elizabeth Heitman, associate professor of medical ethics at the Center for Biomedical Ethics and Society at Vanderbilt University, Tennessee. Worse, they're likely to experience pressure from supervisors and advisors "to clean up results," or to publish them too quickly in an effort to beat the competition, Anderson says.

CHOOSE YOUR POISON

But while early-career scientists may be under greater pressure to misbehave, they're also the most likely to do something about it when they see other people doing it. Of the 60-or-so cases the DFG ombudsman handles each year, Beisiegel says, about two-thirds are initiated by early-career scientists. Young scientists, she believes, are less likely to look the other way. "Old professors have gentlemen's agreements on what to do… or not, not always according to the best scientific practices," she says.

Those unfortunate enough to witness misconduct face difficult decisions. Expose wrongdoing and your lab may be shut down or have its funding withdrawn. Your research may be stalled and your graduation may be delayed. You could even lose your job. Even if the guilty party survives the accusation, the young researcher who rats him out is likely to take a fall. All this is bound to take a toll on your mental and physical wellbeing.

Many whistleblowers manage to put their careers back on track, but others leave science and a few suffer permanent damage. "They are very frustrated and are turning into these people who are very unhappy and blame others," Beisiegel says. The alternative -- choosing not to expose wrongdoing -- is hardly a more promising option. In addition to a heavy weight on your conscience, you may have to share the frying pan with your supervisor if the misconduct is discovered.

"It's a terrible position for a young scientist because you are caught between blowing the whistle with all the consequences for your own career, or being [associated with] fraudulent research, which can also destroy your career," Anderson says.

WHAT SHOULD YOU DO?

"The integrity of research is everyone's responsibility," Steneck says. "If you see something that you don't think is right, all professionals have a responsibility to raise their concerns."

But if you proceed, proceed with great care. Before blaming anyone, make sure you understand what's going on and that what you have seen violates specific scientific, professional, or ethical standards. If you keep having problems repeating experiments done previously in your lab and you suspect the results have been falsified, start by asking how the original work was done. "Students … can say, for example, … 'I have never seen this procedure, can you explain to me how it works?'" Heitman says. If your questions are systematically evaded or the results still can't be reproduced, you may have a problem. Just don't jump to conclusions too quickly.

Once you're convinced that misconduct has occurred, find help. A young scientist "shouldn't try to take on an issue like that alone. He or she needs to talk to another faculty member or supervisor or maybe there is someone in the institution … willing to have a confidential conversation about what may be happening," Anderson says. In countries and institutions where they exist, the ombudsman is usually the right person to approach.

Once you've reported your suspicions to the right people, they should help you deal with them. "Find out what the options are, and work with someone who you think will take the matter seriously," Anderson says. If they don't, what then? Young scientists "have a responsibility to bear witness, but institutions and public universities shouldn't expect students to go out on their own and be the whistleblower. They can't be a canary in a coalmine," Heitman adds.

PLAYING IT SAFE

For the most part, landing in a research environment with shoddy ethics is just bad luck. "It's very difficult to know in advance. If you look at the worst cases of scientific misconduct, the people involved are very productive, charismatic, brilliant ... They are the kind of people who will attract young scientists," Anderson says.

Still, you can tweak the odds in your favor. Before committing to a new place, visit and talk to people there. While "no one is going to admit to pressures to engage in questionable practices," asking people privately "whether they'd choose to come back again [and whether] they'd choose their current PI again" may yield some indirect insight, Heitman says. Beisiegel also recommends checking the publication record of the lab: be wary of those that publish at lightening speed or rarely mention Ph.D. students and postdocs as contributors.

Needless to say, it's not always the PI's fault. Early-career scientists need to learn to hold themselves to high ethical standards. "If someone were watching over [your] shoulders, would you do anything differently? … Don't cut corners. Don't try to make your findings better than they really are," Anderson says. "It's not only being honest to others but particularly to yourself as very often you are driven by your hypothesis and you get a slightly unreal picture of what you

are doing. Look carefully at the data," says Beisiegel. Ultimately, "know yourself and what your temptations are," Heitman says.

This of course requires knowing the ethical rules. "I would recommend … [that young scientists] spend time looking at the professional codes in their area of research," Steneck says. Check the guidelines and protocols at your university, read the publication rules for the journals you want to publish in, attend meetings and courses on the responsible conduct of research, and talk to trusted senior confidants. "Young people … need to talk to their mentors and other supervisors and find out how they've learned to cope with these pressures" without compromising their integrity, Anderson says.

"Many researchers think that [research integrity] is something they don't really have to think about," Steneck says. But "there are a couple of reasons why one should take it seriously. One is self-interest: If you are not aware of the rules, you can make mistakes and these … could come back to haunt you." But there are collective reasons, too, for taking research integrity seriously. It is in "our interest to maintain … a good reputation. That's not a given." Losing the public's trust could have political repercussions and mean less funding and freedom for researchers in the future.

Further resources

- US Office of Research Integrity's Introduction to Responsible Conduct of Research written by Nicholas Steneck.
- US National Academies' On Being a Scientist: Responsible Conduct in Research
- US National Institutes of Health Training in the Responsible Conduct of Research Web site
- Howard Hughes Medical Institute (HHMI) Research Policies
- UK Research Integrity Office
- UK Committee on Publication Ethics (COPE)
- German Research Foundation's (DFG) ombudsman committee

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