9 Misconduct in scientific research and publishing – what it is and how to deal with it

As mentioned at the start of this book (see Chapter 1, page 4), the peer-review process depends on the trust and good behaviour of all the participants. Unfortunately, as in all areas of human activity, good behaviour sometimes falls by the wayside, and misconduct occurs. Worryingly, the incidence of misconduct in science appears to be increasing. Or perhaps it is just being picked up more frequently or more people are being made aware of it. Whichever is the case, most editors and journals can, unfortunately, expect to come across instances of suspected or alleged misconduct. The misconduct may range from the relatively minor to the very serious, and it may involve any of the parties in the peer-review process. Whatever the suspected or alleged type and extent of misconduct, there is one absolute and overriding rule: suspected or alleged misconduct must not be ignored (see Golden Rule 13). It is the duty of editors-in-chief and journals to look into each case at journal level and decide whether there is any substance to the suspicion or claim of misconduct, and then either to deal with it themselves or to alert the appropriate agency for further investigation and action. This applies both to submitted manuscripts and to papers already published. Editors must resist any temptation just to reject a manuscript that they suspect may be problematical and to pass it, and so the problem, on to another journal. This not only opens up the risk of inaccurate or fraudulent data being published and becoming part of the literature, it may also lead people who misbehave to think that, if they can get away with it once, why not again?

Editors and journals must, however, always be very careful to distinguish between genuine errors and the intention to deceive; the latter constitutes misconduct, the former does not. They should not make or spread allegations of misconduct before investigating any suspicions and finding them to be substantiated. Not only can this seriously, and perhaps unjustly, damage a researcher's reputation, it also opens up the possibility of litigation. It must be recognized that some apparent 'misbehaviour' may be the result of ignorance of good practice. This can happen, for example, with authors who do not have much experience of research or publishing, or with very junior authors who have not received much, or perhaps any, guidance from their supervisors in these areas. It is expected that, as part of the scientific process, junior

Golden Rule 13

Suspected or alleged misconduct must not be ignored.

researchers gain an understanding of the practicalities and ethics of research work and scientific publishing from their supervisors and this should form part of their research education. However, there is evidence to suggest that this is not always so. In a survey of its junior researchers, the American Physical Society found that a significant number of physics students complete their doctorates without any formal instruction in data collection and recording.[1] Many of the respondents called for more attention to be given to ethics questions. They felt that, although proper mentorship by supervisors was key to establishing patterns of ethical behaviour, there should also be mandatory ethics seminars and discussion. Journals also have a role to play in this educative process, by publishing guidelines, providing feedback and highlighting inappropriate or bad behaviour. If misbehaviour due to inexperience or inadequate knowledge on the part of junior authors is found in manuscripts submitted to, or in papers published by, a journal, the senior authors or principal investigators must also accept responsibility for this, as they have failed in their supervisory and instructor roles; they cannot plead exemption due to ignorance of what people in their research groups are doing or submitting for publication. They also, therefore, have to accept the penalties that journals may impose.

Beware!

Apparent misconduct may be the result of genuine error. Take great care not to make or spread allegations that have not been substantiated.

Editors are very busy people. For many, their editorial duties represent just a small part of their professional activities, and some editors may be working with very little support and possibly inadequate resources. Investigation of alleged misconduct can be very time-consuming. The situations are frequently sensitive, calling for diplomatic handling, and there may also be legal implications. It is therefore not surprising that some editors may be reluctant to initiate investigations, even at journal level, despite being ethically obliged to look into all problematical issues. There may, however, be editors who are not aware of the sorts of problems that can arise, what can be done to address them, and where they can turn for help. This chapter provides some guidance on this.

What types of misconduct can occur?

Author misconduct

In 2005, the journal *Nature* reported a survey in which scientists funded by the National Institutes of Health (NIH) in the USA were asked about misbehaviours relating to their work.[2] Over 3000 scientists who were in either early or mid career were surveyed in 2002 and asked about their work-related behaviour over the previous

3 years. The misbehaviour categories presented ranged from very serious to relatively minor. Included amongst the more serious were: falsifying data, using other people's ideas without permission or due credit, failing to present data that contradicted their own research, overlooking others' use of flawed data or questionable interpretation of data, and changing the design, methodology or results of a study in response to pressure from a funding source. Not only was a wide range of questionable behaviour found, the numbers of scientists admitting to such behaviour were worryingly high. The situation becomes even more worrying when one considers that the figures obtained were probably conservative as there may have been underreporting due to concern by the respondents about possible identification even though their anonymity had been assured. Despite this possible concern, around a third of the scientists admitted to some form of misbehaviour in the top-10 most serious categories during the previous 3 years. The authors of the report felt that the occurrence of the types of misbehaviour they found represents a greater threat to the integrity of science than that resulting from the high-profile cases of fraud that appear in the media (see this chapter, page 176). (As an aside, it should, however, be recognized that the cases of scientific fraud that do hit the media are very damaging as they seriously undermine public confidence in science and its reporting.) For the categories of misbehaviour most relevant to scientific publishing, the results showed that 6% of the respondents had failed to present data that contradicted their own previous research, 5% had published the same data or results in two or more publications, 10% had inappropriately assigned authorship credit, 11% had withheld details of methodology or results, and 15% had dropped observations or data points from analyses. Very alarmingly, nearly 30% admitted to inadequate record keeping related to research projects.

This survey shows that not only is there a real problem with research misbehaviour, but that it is quite a significant one. Editors therefore need to be alert to this. It would, however, be totally unrealistic to expect editors and the peer-review process to be able to detect many of the potential forms of misbehaviour. For example, it would be impossible to know if data points had not been included or experiments had not been carried out in the way reported. Editors and reviewers have to assess what is submitted. They can, however, and should, always request more data or clarification if they come across anything that is unclear or suspicious. Part of their role in the peer-review process is to pick up errors and ensure that these are corrected or addressed before work is published.

Why is there this relatively high level of misbehaviour? One can speculate that it is partly linked to the great pressure on researchers in an increasingly competitive market to publish in order to get funding and promotion. There is also pressure to be the first to publish, as that brings the greatest rewards, and so corners may be cut and standards lowered to achieve this. Part of the blame has also been levelled at the top multidisciplinary science journals, which have been accused of rushing manuscripts through review in their quest to publish the hottest papers and to be the first to do so.[3] There are concerns that standards may be being compromised. These journals, which do receive exceptional and highly novel and innovative

manuscripts, must also ensure that the review of such manuscripts is exceptionally rigorous and extra-stringent. Reviewer choice is absolutely critical, and the number and range of reviewers used is likely to be greater than usual, particularly for manuscripts reporting unexpected results or if previous findings or hypotheses are being overturned.

What is scientific misconduct by researchers? The Office of Research Integrity (ORI; http://ori.dhhs.gov, and see this chapter, page 189) in the USA defines it as follows:

> 'Scientific misconduct' or misconduct in science means fabrication, falsification, plagiarism, or other practices that seriously deviate from those that are commonly accepted within the scientific community for proposing, conducting, or reporting research. It does not include honest error or honest differences in interpretation or judgments of data.

And it defines a suspect manuscript as one

> submitted to or published in a journal which is suspected of including or being based upon falsified or fabricated data, results, or methodology or plagiarised text or ideas.

What is meant by these categories of misconduct and what types of behaviour fall into those categories?

Fabrication and falsification

Fabrication is where data or facts are just made up or invented, and falsification is where data or facts are altered or manipulated. They can range from the creation or alteration of a single datum point to the invention of a whole series of experiments or manipulation of data on a massive scale. Deception, dishonesty and false representation are involved, and therefore these activities constitute fraud. The behaviour is not accidental; there is always the intention to deceive. There have, over the years, been significant numbers of cases of scientific fraud reported.[4] Whereas the majority may not have been very widely known outside of the scientific community, the whole world has been rocked by a number of very serious fraud cases in the first years of the 21st century. These have been reported extensively in the popular media, and so have become highly visible. That the work involved was published in some of the top and most prestigious science journals after peer review has sent out worrying signals not just to the scientific community but also to the general public. The more such cases there are, the more public confidence in the scientific process is eroded. The following two cases highlight such scientific fraud.

The Jan Hendrik Schön case. In 2002, Jan Hendrik Schön was acknowledged to be a brilliant young physicist. He had a prolific publication record, with many of his papers published in the top science journals. However, a number of groups were