

Science and Technology Committee Inquiry into Peer Review

EVIDENCE SUBMITTED BY THE SOCIETY FOR GENERAL MICROBIOLOGY

Introduction

The Society for General Microbiology (SGM), founded in 1945, is an independent learned and professional scientific body dedicated to promoting modern microbial science. It has established itself as one of the two major societies in its field globally, with some 5,000 members in the UK and abroad. Further information about SGM is provided in Appendix 1.

General comments

The peer review system for research papers and grant proposals is fair and there is still no better way of measuring quality, although there are issues. The increasing speed of publication means there is more time pressure on reviewers who may be handling a number of papers at once. With the rise in research that is multidisciplinary and becoming increasingly specialized it is sometimes difficult to find reviewers with sufficient expertise. Reviewer bias towards competitors or collaborators is also an issue. There may be measures to reduce bias that will improve the system of peer review.

Specific comments

1. the strengths and weaknesses of peer review as a quality control mechanism for scientists, publishers and the public;

Strengths for scientists and public alike

- The certainty that the discourse is based on facts, on tested and reproducible elements. Conclusions hence are reliable and hypotheses are clearly indicated as such.
- Improves the abilities of reviewers, since they see the mistakes in the authors' papers and learn from them in their own work. Peer review can also draw reviewers' attention to new technologies or approaches that they may otherwise be unaware of.

Weaknesses for scientists

- The process can be biased by referees showing favour to collaborators or being unfavourable to competitors. It is sometimes difficult to publish an article due to competitors unfairly advising for rejection. This is limited by

the multi-reviewer system, except in some high-ranked journals where sometimes one unenthusiastic review is sufficient for a rejection.

- Reviewers may sometimes be unfamiliar with the background literature and thus the context of the research.
- Because of rapidly growing specialized knowledge in some areas, it can be difficult to find reviewers with sufficient expertise.
- Lack of payment for peer review could mean it is undervalued.

2. measures to strengthen peer review;

- Anonymity of reviewers must be maintained. Double-blind reviewing might reduce bias under some circumstances, but is difficult to achieve in practice as it is often straightforward for the reviewer to 'guess' who the authors are. Nevertheless, experiments with double-blind and open reviewing systems should be encouraged in an attempt to reduce perceived or actual bias.
- Engaging more than two reviewers per paper is often desirable.
- Reviewers should be given sufficient time to consider proposals and should not be handling too many papers at one time.
- Reviewers must be chosen carefully for interdisciplinary proposals to prevent referees commenting on areas outside of their expertise.
- Successful senior academics who are leaders in their field must be encouraged to review grant applications and papers. For grant proposals, a degree of citizenship could be employed, where declining invitations to referee can be counted against the ability to submit grants.
- The key point that is missing is the need for institutions, research councils and funders to recognize the value of the contribution that researchers are making by taking part in peer review. Peer reviewing must be given more credit in research assessment and regarded as equally important as publication, since one can't exist without the other in the current system.

3. the value and use of peer reviewed science on advancing and testing scientific knowledge;

- If real experts are used then state of the art knowledge is applied and built upon to deliver excellence.
- Research does not always generate immediate impact (as described in the Research Excellence Framework). Therefore impact should be viewed as a positive to a proposal but lack of impact should never be considered as negative.
- Further research, or applications can be founded on published material.

4. the value and use of peer reviewed science in informing public debate

- Peer-reviewed science can be used as a basis upon which to dispel media hype based on unsound scientific reports e.g. the alleged link between the MMR vaccine and autism.
- The use and value of peer review is limited by the lack of public awareness of how peer review works and what it ensures.
- The unreliability of other information published outside of the peer review system should be highlighted.

5. the extent to which peer review varies between scientific disciplines and between countries across the world;

- Between disciplines there can be variation e.g. one group may support each other and another be more critical leading to one losing funding if both are judged under the same committee e.g. plants and microbes (BBSRC).
- In France, the process is similar, although forms are generally more structured, word limited and involve numerical ranking.
- In the US for some schemes it is very similar, but more constructive as grants can be improved and resubmitted multiple times.
- For international journals with international editorial boards, the process does not vary much.

6. the processes by which reviewers with the requisite skills and knowledge are identified, in particular as the volume of multi-disciplinary research increases

- It is important to cover all areas as one discipline is not qualified to judge another properly.
- It is also important to engage with leaders in the area and ensure they referee. Journal editors are usually knowledgeable about experts in different fields.
- Collaborative reviews may be encouraged.
- The recent EPSRC call 'Multidisciplinary research at the Research Complex in Harwell' was a fine template for the multidisciplinary grants.

7. the impact of IT and greater use of online resources on the peer review process

- Some journals have experimented with post-publication open review, whereby anyone can comment on a paper, and the authors can respond. It can be difficult to judge the value of a review if it comes from an unknown or unrecognized source, and the danger overwhelming those qualified to review with a mountain of unreviewed work.
- Increasing use of online resources facilitates the reviewer's task, but also puts pressure on the reviewers for rapidity. This can be positive, quick circulation of information but may result in sloppiness.

8. possible alternatives to peer review.

- It is difficult to see any alternative to the peer review system

Sources

This response has been prepared from written evidence provided by Dr Paul Hoskisson, University of Strathclyde; Dr Kim Hardie, University of Nottingham; Dr Agnès Fouet, INSERM and Professor Peter Kämpfer, Universität Giessen.

Appendix 1

The Society for General Microbiology (SGM) was founded in 1944/1945 and is now the largest microbiological society in Europe. It has over 4500 individual members of whom 75% are resident in the UK. The remainder are located in more than 60 countries throughout the world. Almost all full members are qualified to doctoral or higher level; there are 1000 postgraduate student members. More than 700 schools and a number of companies are corporate members.

The Society provides a common meeting ground for scientists working in academic centres and in a number of fields with applications in microbiology (medicine, dentistry, veterinary medicine, pharmaceuticals, numerous industries, agriculture, food and beverages, the environment and education). The majority of Society members are employees of universities, research institutes, health services, government agencies and small to multinational companies.

The science of microbiology covers a great diversity of life forms: disease-related molecular structures such as prions and viruses, archaea, bacteria, fungi, protozoa and algae. Microbes are of crucial importance in a number of processes affecting all life on Earth: the cause and control of disease, fertility of soils and aquatic environments, fermentation, biodegradation of waste materials and dead biomass, bioprocessing steps in drug and antibiotic production, and molecular biotechnology.

The Society's objective is to advance the art and science of microbiology. It does this by:

- Organizing regular scientific meetings at centres throughout the UK and abroad, where microbiologists meet to hear and discuss the latest research findings. The largest meetings last 4 days and involve up to 1400 participants.
- Publishing four major international learned journals: *Microbiology*, *Journal of General Virology*, *Journal of Medical Microbiology* and *International Journal of Systematic and Evolutionary Microbiology*. The journals are available on-line through HighWire Press (<http://www.sgmjournals.org>).
- Representing the science and profession of microbiology to government and the media. The Society is represented on a number of biological and biomedical committees and organizations, in the UK and internationally, thereby exerting influence on science policy and education, regulatory affairs and international collaboration.
- Promoting microbiology as a career for young people, by increasing awareness of microbiology in schools and aiding the development of teaching

resources. The Society also provides grants for young scientists to attend scientific meetings and training courses.

- Keeping members informed of current developments in professional and scientific matters in microbiology, through publication of the magazine *Microbiology Today* and other means.

The Society is a Charity registered in England and Wales (No. 264017) and in Scotland (No. SC039250) and a Company Limited by Guarantee, registered in England and Wales (No. 1039582). It is governed by a Council drawn and elected from the membership. The Society employs a staff of over 30 at its headquarters.

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