THE ROYAL SOCIETY

Policy document 04/03

Royal Society response to the House of Commons Science & Technology select committee inquiry into the scientific response to terrorism[1]

February 2003

1 The Royal Society welcomes the opportunity to respond to this timely inquiry. The Society has a long-standing interest in countermeasures for controlling the threat from biological weapons, having produced two reports on the subject: S*cientific aspects of control of biological weapons* (July 1994) and *Measures for controlling the threat from biological weapons* (July 2000)[2]. Last year the Society also responded to the Foreign & Commonwealth Office Green Paper Strengthening the Biological and Toxin Weapons Convention[3]. The Society is happy to provide further expert evidence to the Inquiry if required.

2 The Society has recently been involved in discussions regarding the ethical responsibility of scientists, as seen in the joint editorial by Lord May and Bruce Alberts in *Science* last November[4]. This interest is reflected in the submission's focus on codes of conduct for scientists. This response has been prepared in consultation with members of the Royal Society's standing committee on the Scientific Aspects of International Security (SAIS) and the Royal Society working group responsible for the July 2000 biological weapons report.

3 The Society is currently starting a new science policy study investigating the detection and decontamination of chemical and biological weapons. The terms of reference of this study will be finalised shortly, and we look forward to its discussions being informed by the Select Committee's final report of their inquiry.

Summary of key points

Codes of conduct

4 Addressing issues of scientific responsibility and ethics in research is an important but complex undertaking, which can only be tackled in a number of complementary ways. One is the agreement of a universal set of standards for research that can be incorporated into internationally supported treaties; another is a concerted effort to increase awareness of international treaties and implicit codes of ethical conduct amongst researchers.

5 Explicit codes of conduct work when they can be directly enforced, for example when membership of a professional body is a prerequisite to work in a particular field of science, engineering or technology. Where codes of conduct cannot be directly enforced, they serve to raise the awareness of scientists to their legal, moral and ethical responsibilities. In this situation codes of conduct can be a useful part of a number of measures aimed at raising the awareness of scientists of these issues, along with a programme of education, starting at undergraduate level and continuing through out the scientists career.

---

[1] For terms of reference of inquiry see http://www.parliament.uk/parliamentary_committees/science_and_technology_committee/scitech1191202.cfm

[2] Available online at http://www.royalsoc.ac.uk/templates/statements/statementDetails.cfm?StatementID=114

[3] Available online at http://www.royalsoc.ac.uk/files/statfiles/document-206.pdf

[4] Available online at http://www.royalsoc.ac.uk/files/statfiles/document-207.pdf

Public communication of policy

6 In the event of an incident attempts should be made to reduce panic by issuing accurate information to the public and media.

Ethical code of conduct for scientists working with dangerous substances or pathogens

7 Scientists accept, and indeed often initiate, formal regulation of their work, particularly in those areas where the dangers are perceived to be greatest (such as research on contagious diseases) or the ethical and moral concerns most obvious (such as research involving human embryos). A notable example is the voluntary moratorium, put in place by the scientific community itself in the 1970s, during the early days of 'gene-splicing', a technique for cutting up and re-combining different pieces of DNA. Following the landmark Asilomar meeting at Pacific Grove, California, in 1975, the work of molecular biologists across the world went ahead under a set of self-imposed and precautionary guidelines.

8 Formal legislation, however, can often be a blunt tool. We need to be especially careful in how we limit free speech and academic freedom, in case we inflict greater damage on society than that which we aim to prevent. Most scientists fully recognise the need for restrictions in exceptional circumstances in which academic freedom may be curtailed. However, these need to be spelled out clearly and carefully for a specified time period, and not in sweepingly general terms. For example, in the Export Control Bill debated in Parliament last year measures were included to prevent the transfer from the UK of materials and technologies that could be used to produce chemical, biological, radiological or nuclear weapons, but not to be a general restriction on academic freedom.

Issues needing to be addressed relating to codes of conduct

9 There are a number of issues relating to codes of conduct and the ethical responsibilities of scientists that we would recommend the Select Committee considers. A number of related activities could be pursued in working towards increasing the awareness of scientists. These are also outlined below and attest to the complexity of addressing an issue, which, though universally felt to be of importance, poses considerable challenges.

10 Issues of scientific responsibility and ethics in research are of pre-eminent importance, particularly in the light of recent experiments with potentially dangerous implications, such as those conducted in Australia in which the interleukin-4 (IL-4) gene from a mouse was inserted into the mousepox virus, enhancing its virulence[5], and the synthesis of the polio virus from only its chemical components in a laboratory[6].

11 Owing to the well-known 'dual-use' nature of areas of science such as advanced biotechnology, it is extremely difficult to oversee such research so as to encourage the free international exchange of ideas and their ethical application, whilst at the same time discouraging maleficent work. Whatever strictures are applied, ultimately it will depend on an individual's judgment as to whether 'dangerous' research is conducted or not. A concerted effort to increase awareness of ethical issues amongst researchers and to improve standards in the scientific community should therefore be a priority. One way of achieving this is through codes of conduct that are developed by academic and professional bodies to lay out international standards in biotechnological research. As the majority of existing codes of conduct are currently national rather than international in scope, as highlighted in paragraph 21, it would be a considerable undertaking to

[5] Ronald J Jackson et al (2001). *Expression of Mouse Interleukin-4 by a Recombinant Ectomelia Virus Suppress Cytolytic Lymphocyte Responses and Overcomes Genetic Resistance to Mousepox*, Journal of Virology, 1205-1210

[6] Jeronimo Cello, Aniko V Paul, and Eckard Wimmer (2002). *Chemical Synthesis of Poliovirus cDNA: Generation of Infectious Virus in the Absence of Natural Template.* Science 297: 1016-1018

write, agree and enforce an international code. The National Academy of Sciences working group investigating research standards and practices to prevent destructive application of advanced biotechnology is currently discussing these issues from a US perspective[7]. Its final report is expected in July 2003.

12 Whilst it is broadly agreed that researchers in the UK do follow accepted codes of conduct, for example in adherence to safe laboratory practice, these do not necessarily extend to consideration of the broader ethical implications of their work. Safe laboratory practice is backed by Health and Safety legislation so individuals face court action if they disregard it. The UK scientific community is well aware of both the legislation and the ways it is implemented in safe laboratory practice, making it an effective system. In contrast, current codes of conduct relating to the ethical responsibilities of scientists and other UK legislation are not well known and consequently are little discussed. For example, there is considerable ignorance of agreements such as the Biological Weapons Convention and Chemical Weapons Convention amongst UK researchers, despite the majority of the terms of these Conventions being written into a number of pieces of specific UK legislation, such as the Biological Weapons Act 1974, the Anti-Terrorism Crime and Security Act 2001 and the Chemical Weapons Act 1996.

13 There would be significant value in addressing this issue in the UK as this would inform not only UK researchers but also the large number of foreign scientists working in the UK. The ethical implications of research, the relevance of international treaties and good research practice should all be considered in formulating a code of ethics. Amongst other things, this could reduce the likelihood of scientists inadvertently undertaking inappropriate research.

14 International cooperation and support are essential if such a project is to be successful. One way of achieving this would be to incorporate a code of conduct into international treaties, to which each Government acts as guarantor.

15 One way of ensuring that ethical considerations are taken into account would be to include an ethical assessment as part of the research funding process. The BBSRC is currently considering how this could be included in its grant application forms, making both the applicant and the funder consider the ethical dimension of the proposal.

16 Serious consideration needs to be given as to how to ensure that such a code will be effective. This includes questions such as how the code and good practice procedures will be enforced, who will be responsible for checking a researcher's work, what penalties would occur if a researcher contravened the code, whether 'whistleblowing' would be encouraged, and what mechanisms would be in place to protect the whistleblower. It is likely, however, that one of the most practical and effective methods of control generated by a code of conduct will be an increased peer pressure from the academic community itself.

17 The mechanism by which academic and industrial scientists share their research – through publishing in journals - should also be examined in any attempt to improve ethical standards. Journal editors and potential authors, conference organisers and speakers, should be reminded that the ethical standards of work will play an integral part in determining whether it is appropriate for publication and discussion. These issues were discussed at a workshop held by the National Academy of Sciences entitled scientific openness and national security[8] in January 2003.

18 Increasing standards in the wider scientific culture will be a considerable and complex undertaking. It will need to be a long-standing objective that adapts over time in response to changes in the field. A variety of

[7] Further details available online at http://www4.nas.edu/webcr.nsf/5c50571a75df494485256a95007a091e/19ff95adb4915a1985256b880060bf40?OpenDocument

[8] Further details available at http://www7.nationalacademies.org/pga/Scientific_Openness_Agenda.html

activities other than a code of conduct will need to be considered, such as producing briefing documents for UK academic and industrial researchers, and supplying packages of information to relevant organizations for their websites. Constant updates on scientific advances and their ethical implications would need to be disseminated amongst the UK academic industrial community and other relevant organizations. The overall aims would be to increase awareness, open debate and widen perspective, as well as encourage vigilance. These varied activities will require a considerable investment of resources and coordination if they are to achieve their aim.

19 There could also be great value in addressing the related issues of education and support for researchers.

20 *Education*. Consideration should be given to some formal introduction of ethical issues into academic courses, at undergraduate and at postgraduate level. In France, for example, all PhD theses must include an element that considers the ethical impact of the accompanying research.

21 *Support for researchers*. This suggestion stems from experience abroad of situations where inappropriate research was being conducted but where the culture or regime of the country did not at that time question it. Researchers who were uncomfortable in their work had no mechanism for reporting or discussing it. Since it is likely that there will continue to be inappropriate pressures from employers or regimes, some way of addressing this should be considered. International bodies representing scientists such as the International Council for Science (ICSU) or the InterAcademy Panel might be the appropriate organisations to deal with these cases.

Examples of codes of conduct

22 There are a number of examples of codes of conduct in fields of science that could be used as a model, perhaps the best-known being the General Medical Council's code of ethics for doctors. Many professional organizations have required members to subscribe to a code of conduct for a number of years (eg Institution of Electrical Engineers since 1972, the American Society of Microbiology since 1988, American Chemical Society since 1965[9]), which includes consideration of the member's role in serving society's interest. Guidance on professional practice is also a common resource, for example for all microbiologists to keep written records for all requests for reagents, technologies and knowledge, and to monitor such requests and derive a risk assessment before deciding whether or not to fulfil a request. Within this context, the standard practice adopted by some institutions of dated records of all ideas, discussion and experimental work in a fixed-page notebook that is periodically signed-off by a supervisor, could become a standard requirement in all microbiological labs. The question of checking how this procedure is upheld would then need to be addressed.

23 A parallel could exist with the World Medical Association Declaration of Helsinki[10], which is a statement of ethical principles that provide guidance to physicians and other participants in medical research involving human subjects. The Declaration was adopted by the 18th WMA General Assembly in 1964 and is revisited and amended periodically.

24 Given the continuum of ethical issues and the pace of research advancement, it is clear that working towards a more informed and aware scientific community will be a long-term, evolutionary process.

[9] Latest version available online at http://courses.cs.vt.edu/~cs3604/lib/WorldCodes/ACS.Code.html

[10] http://www.wma.net/e/policy/17c.pdf

The public communications policy on the threat and response to biological, chemical and radiological terrorism

25 Consideration should be given to providing balanced and accurate information to the general public, as appropriate. If an attack occurred, simple explanatory pamphlets ready for issue may be useful, but erroneous or irrelevant information, which might erode the confidence in the authorities, must be avoided. Communication with the Press and other media must aim at avoiding sensationalism. This may be mitigated by a rapid, highly visible and co-ordinated response from the authorities and well-informed Press Officers who know what is being done to cope with the incident.

26 Providing reliable information to the public and the media in advance of a potential incident can help inform the public and prevent media hype in the event of an attack.

27 Exaggerating the possible effects of biological weapons could increase panic that would be likely to occur to some extent even if the number of casualties is small. A scientifically sound and realistic assessment of the effects in humans of the agents that are most likely to be used should be made as a basis for managing the consequences of BW attacks and for ensuring balanced and accurate information about them.

Please send any comments or enquiries about this submission to:
Nick Green, Science Advice Section, The Royal Society, 6-9 Carlton House Terrace, London SW1Y 5AG
Telephone: 020 7451 2586 E-mail: nick.green@royalsoc.ac.uk