Preserving Scientific Integrity and Safeguarding Our Citizens: Challenges for Scientific Publishers in the Age of Bioterrorism

Ronald Atlas, Ph.D.
President, American Society for Microbiology
and
Codirector, Center for Deterrence of Biowarfare and Bioterrorism
Dean, Graduate School
University of Louisville
Louisville, Kentucky

"Scientific Openness and National Security" Workshop

Co-sponsored by the National Academies and the Center for Strategic and International Studies

January 9, 2003
Washington, DC

As Chair of the Steering Committee for today's program, I want to join Dr. Alberts and Dr. Hamre in welcoming you to what I expect will be a thought-provoking day. The program should cause each of us to think about the pivotal role of scientific communication in today's society and our ethical responsibilities to prevent the misuse of the scientific information that we publish. As President of the American Society for Microbiology, I want to thank Dr. Alberts and the National Academy of Science for agreeing to hold this meeting and also to thank Dr. Hamre for the participation of the Center for Strategic and International Studies.

As the publisher of 11-peer-reviewed life science journals, the ASM requested this meeting because of the concern that technical articles might inadvertently aid those engaged in acts of terrorism. We thought it important for the Academy to initiate a discussion among publishers in the life sciences about the possible development of publication policies that might reduce the threat that scientific information in the life sciences could be misused for acts of bioterror.

We had received requests from some authors that they be allowed to withhold critical information from articles submitted to journals published by the ASM because of concern that data could be misappropriated and/or that scientific findings could be misused. The ASM was worried that if we acceded to these requests, we could easily alter the fundamental tenets of science by eliminating reproducibility of scientific research and undermining the peer-review process for evaluating scientific merit. We were also concerned that other publishers were, or soon would be, facing similar challenges and that the actions of individual publishers could have broad repercussions for the reliability of scientific communication.

Given the potential impact that changes in scientific publishing standards could have on science, the ASM felt that the National Academy was the appropriate venue for discussing the issues facing life sciences publishers worldwide. The National Academy in turn felt that it was important to involve the Center for Strategic and International Studies to include a national security perspective.

Clearly, since September 11, 2001 and the ensuing anthrax attacks, there has been heightened fear that terrorists might be able to subvert the scientific enterprise by misusing scientific information that is widely available in journals and other scientific publications, including scientific information available on the Internet. The prospect for greatly expanded biodefense research has intensified questions about the secure conduct of scientific inquiry and about the publication of research results in the life sciences. While science holds enormous promise for improving health and protecting the public, it also provides opportunities for terrorists to misuse scientific information for deliberate harm. There have been calls for scientists and publishers to restrict the release of "sensitive" scientific findings. Concerns about the potential misuse of biological information raise a series of problematic questions for researchers, academic institutions, and publishers:

- Should more research in the life sciences be classified, and should academic institutions perform such research for the national interest?

- Should there be restrictions on publication, or other dissemination of biomedical research results—even when the research is not classified and if so, what criteria should be used and who should decide?

- Should some aspects of biotechnological research be withheld from publication, such as methods sections or genome sequences, and should publishers agree to publish articles with details omitted?

- Should we manage access to scientific information and if so, who should be responsible for controlling that access?

These questions capture the fundamental issue of today's discussions—namely, should we restrict dissemination of scientific information and access to knowledge in the life sciences to ensure security against bioterrorism?

The American Society for Microbiology, which has been at the center of public attention concerning the threat of bioterrorism since the anthrax attacks of Fall 2001, has recognized the legitimacy of concerns about the publication and dissemination of scientific information. This past October, in testimony before the House Science Committee, ASM expressed support for taking prudent steps that would deny scientific and technical information to terrorists. But at the same time, the ASM expressed great concern that restraint of scientific publication and international information exchange could adversely affect public health by inhibiting scientific research and medical progress.

As we will hear in the opening session, the issues confronting the public availability of information the life sciences are not novel. They have occurred in other fields, including nuclear physics, engineering and mathematics—for example in computer science and cryptography. In fact, we know that questions of secrecy in science occurred in the 1600s, as evidenced by the following quotation from Sir Francis Bacon, who established the scientific method: "And this we do also: we have consultations, which of the

inventions and experiences which we have discovered shall be published, and which not; and take all an oath of secrecy for the concealing of those which we think fit to keep secret; though some of those we do reveal sometime to the State, and some not" (1). So from the inception of modern science, the community of scientists has tried to act responsibly to protect the public and nations against potentially dangerous scientific information.

Questions of whether scientific information needed to be constrained to protect national security became particularly intense during the Cold War, especially, during the Reagan Administration. At that time the National Academy of Science undertook a careful examination of freedom of scientific enquiry and communication as it related to national security. In 1982 the Academy issued the Corson Report (2), named for its chair, Dale Corson. Mitch Wallerstein, who you will hear shortly, was the executive secretary for the committee. The Corson Report concluded that greater security would be achieved by the open pursuit of scientific knowledge than by attempts to curtail the free exchange of scientific information and by increased secrecy.

As a direct result of that report, the Reagan Administration in 1985 issued National Security Decision Directive 189, stating: "It is the policy of this Administration that, to the maximum extent possible, the products of fundamental research remain unrestricted. It is also the policy of this Administration that, where the national security requires control, the mechanism for control of information generated during federally-funded fundamental research in science, technology and engineering at colleges, universities and laboratories is classification" (3). This directive was issued when the Reagan Administration was especially concerned about the flow of information to Communist States.

As later proclaimed by Neal Lane, science advisor during the Clinton Administration: "National security requires scientific excellence… [and] Scientific excellence requires openness" (4). Even after 9/11 and the anthrax attacks, Condoleezza Rice, assistant to President Bush for National Security Affairs affirmed the importance of openness of

fundamental research: “The key to maintaining U.S. technological preeminence is to encourage open and collaborative basic research. The linkage between the free exchange of ideas and scientific innovation, prosperity, and U.S. national security is undeniable…the policy on the transfer of scientific, technical, and engineering information set forth in Nation Security Decision Directive 189 shall remain in effect, and we will ensure that this policy is followed” (5). Yet concern remains that fear of terrorism will lead to new government restrictions that may be counterproductive.

The American Society for Microbiology’s view is that, even in today’s era of terrorism, open and collaborative research is key to protection against bioterrorism. The best defense against anthrax or any other infectious disease is information—information in a form that can be used by scientists and public representatives to guide rational and effective actions to ensure public safety. As stated by Abigail Salyers, past President of American Society for Microbiology in an editorial in the journal Science, “Our need to know the potential risks and consequences associated with bioterrorism agents is vital to the development of effective measures to ensure public safety. Placing new barriers in the path of the free flow of scientific information will ultimately undermine our best defenses against bioterrorism and, ironically, compromise the public health that we are trying to protect” (6).

Dr. Salyers notes that censorship of scientific communication would provide only a false sense of protection. She points out that eliminating critical methods from scientific publications certainly compromises our ability to replicate and validate results, one of the cornerstones of scientific research, and emphasizes the crucial role of peer review for reducing the likelihood of errors being perpetuated. I consider these to be very important points. In our war against infectious diseases and in our quest to find effective defenses against biothreat agents, we cannot afford to go down the road of cold fusion. We must protect the integrity of the scientific process, which depends upon open communication, peer reviewed publication, and repeatability of experiments to validate scientific findings. As MIT professor Seth Lloyd said in an editorial commentary in last Saturday’s New York Times: “Secret knowledge, no matter how laboriously acquired, is less than

science…The benefits of scientific knowledge accrue far more rapidly when that knowledge lies open for all to see, to test and to try" (7). I think it safe to say that the general view from the scientific community is that we should recognize that national security is best served by allowing the free flow of scientific and technical information.

Thus, like the Presidents of the National Academies who expressed support for building high walls around a narrowly defined set of information (8), the ASM feels that the government needs to focus its efforts on keeping only critical national security information secret and that should be done by classification. We are concerned that fear could lead to excessive classification and that government constraint of unclassified information could have a negative impact on the advancement of the life sciences that is critical to future public health. We especially fear that restriction of unclassified and ill-defined " sensitive homeland security information" could easily have a chilling impact on the infectious disease research that is critical for biodefense. We need to avoid the specter of government censorship. We need to find the right balance.

As such the ASM believes that as scientists and publishers we have responsibilities to take a leadership role in making sure that our work is not misused. The government at the outset of research funding should decide what it does not want published, and that information should be classified in accordance with National Security Decision Directive 189. We, as scientists and life science publishers, should decide what we consider unethical to publish and we should refuse to publish it.

We recognize that such voluntary restraint on the part of scientists and publishers is fraught with danger. There is indeed a narrow line between censorship and the ethically responsible steps that may be taken by scientists and life science publishers to avoid publishing information that could serve as a "cookbook for bioterrorists." Recognizing what is dangerous and hence unethical to publish is the real problem. There is no clear definition of what should constitute "sensitive homeland security information." That is what makes government regulation problematic for the scientific community. But unless we begin to define what constitutes "sensitive information," in the life sciences, there is a

danger that we will not recognize the significance of the information that we publish and its potential for misuse. Reasoned discussion between the scientific and national security communities is critical.

The closest experience that we have in the life sciences for dealing with such issues is the 1975 Asilomar Conference at which scientists began the voluntary development of guidelines for the conduct of research on the then new technology of recombinant DNA. Today's questions about how to contain sensitive information parallel the questions raised at Asilomar. How can one define what is dangerous?—in this case sensitive information rather than recombinant organisms. And how can one design a system that contains that danger while allowing legitimate biomedical research to proceed without undue inhibition? In essence, what is the equivalent to a BL-3 or BL-4 containment approach for information rather than recombinant organisms? That is the challenge facing us today.

In my view it is up to those of us within the scientific community and the community of life science publishers to define the standards and to establish the right framework—one that can ensure that critical information is withheld from terrorists while still permitting the continued advancement of biomedical research—a framework for the conduct of science that protects the essential communication among scientists so as to ensure the protection of public health. We cannot rely upon government to do this for us. We need to begin by defining what is dangerous and then move to consideration of how best to protect that sensitive information—going beyond classification to ethically responsible citizenship on the part of scientists and publishers. Our program today is organized to facilitate a discussion of how to do this.

In closing let me reiterate that the American Society for Microbiology believes that there should be careful and reasoned debate on how to balance the traditional openness of science with today's threats of bioterrorism. In our view the scientific community must confront issues of improving security related to the publication of research results. We must do so before others with little or no understanding of the value of open scientific

communication inappropriately constrain the fundamental underpinnings of scientific advancement. We must simultaneously protect science from excessive secrecy and from the misuse of openly available scientific information to inflict atrocities on humanity. As scientists and publishers we must work together with government to achieve a proper balance between necessary security, vital scientific research, and publication of information in the life sciences that will provide true protection against the threat of bioterrorism.

The American Society for Microbiology hopes that today's meeting will help guide the way, both for government policy development and for the development of ethical codes of conduct within the scientific community and by publishers in the life sciences. We hope that we can achieve consensus within the scientific community and among scientific publishers of biological journals worldwide on appropriate practices that will enhance national security while protecting the critical freedoms of open enquiry, communication, and publication that that are the cornerstone of science. In the view of the American Society for Microbiology, we as scientists have both an ethical and civic responsibility to come together to establish the norms for information communication in the age of bioterrorism. We therefore look forward to the discussions that we begin today.

Notes:

1. Essay, "The New Atlantis," 1626.
2. *Scientific Communication and National Security*, National Academy Press, Washington, DC, 1982.
3. National Security Decision Directive No. 189, 21 September 1985
4. Presentation, "The New Security Environment," National Academy of Sciences, Washington, DC, 28 September 2000.
5. Letter from C. Rice to H. Brown, Cochairman, Center for Strategic and International Studies, 1 November 2001.
6. "Science, Censorship, and Public Health," Science, 26 April 2001.

7. “Today’s Visions of Science Tomorrow,” New York Times, 4 January 2003.
8. Statement on Science and Security in an Age of Terrorism From Bruce Alberts, Wm. A. Wulf, and Harvey Fineberg, Presidents of the National Academies, October 18, 2002.

The American Society for Microbiology is the largest single life science society, composed of over 42,000 scientists and health professionals. Its mission is to promote research and research training in the microbiological sciences and to assist communication between scientists, policy makers, and the public to improve health, the environment, and economic well-being.