Social Responsibility

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Summary

Emerging Challenges
Science-related ethical challenges continue to emerge. One example is the area of dual use technologies, which can be used for beneficial purposes such as protecting public health or for harmful use by terrorists and others. There are harmful effects of climate change and challenges on how best to ameliorate them. There are issues related to the use of human stem cells in research and whether advances with their use will lead to healing of diseases as well as defining whether the obtaining and use of human stem cells is ethical. There appear to be beneficial advances in using nanotechnology but questions of the safety of such molecules have not been well studies or resolved. Therefore, scientists, along with other groups, need to participate in addressing these new ethical issues from their special vantage point of having an understanding of the scientific underpinning of these discoveries.

Responsibility of Science
The Board of Directors of the American Association for the Advancement of Science in May 1998 wrote a Framework for Federal Science Policy. They said that, "AAAS believes that, if the U.S. is to respond effectively to the challenges of the 21 st century, we must find ways to reorganize our science and technology enterprise to address tomorrow's needs and aspirations: maintaining global sustainability, improving human health, addressing economic disparities, understanding our place in the universe, promoting peace and security, and directing the products of technology toward the betterment of society, nationally and worldwide."

Responsibility of Scientists
Much remains to be done and scientists need to use their skills and training to be part of the solutions.

Background

The motives which drive people to become scientists are many and varied. Some scientists are motivated by the chance to alleviate disease and suffering, others want to understand the mechanisms by which things work, others like the intellectual challenge

and the joy of discovery, while still others may see science as a well-supported and respected occupation. In like manner, scientists (and institutions comprised of scientists) view their responsibilities to society and how best to express these responsibilities in varied ways. For a more complete discussion of the scientist in society, the reader is referred to the chapter with this title in The Ethical Dimensions of the Biological and Health Sciences (2002) or to the book by Resnick (1998), The Ethics of Science, An Introduction.

Here we discuss some courageous examples of how scientists in the past have expressed their responsibilities, reasons for scientists having such responsibilities, a possible spectrum of responsibilities from certain ones that are essential to the responsible practice of science, to others which individual scientists will choose to assume. Also discussed will be some ways scientists today can and are fulfilling their important responsibilities to society. Advances being made in contemporary science continue to present new challenges as well, which will require thoughtful efforts of scientists, working with others including the public, to define and act for the good of all.

One articulation of why scientists must seriously consider their responsibilities to science is stated in the preface of a book on the ethical dimensions of science (Bulger, Heitman and Reiser, 2002):"A critical feature of disciplines that call themselves professions is systematic reflection about the ethical traditions that govern them and their relationship with society. Such reflection is critical to fostering the public trust that sustains the professions' right to self-regulation and claims to authenticity."

Examples

Scientists through the ages have undertaken numerous socially responsible actions; a few particularly courageous examples are given here.

Henry Beecher, in an article in 1966, alerted the medical profession to 22 published instances of ethical problems he believed to exist in clinical research conducted with vulnerable and/or disadvantaged persons who were the subjects in their clinical research studies, sometimes without any semblance of informed consent.

As an exemplary demonstration of professional self-governance in 1975, a group of scientists and others led by Nobel laureate Paul Berg organized a meeting at Asilomar, California to review and discuss the appropriate ways to deal with the potential biohazards in scientific research being done using recombinant DNA molecules. They discussed the potential biohazards in certain types of recombinant DNA research in light of the scientific knowledge and of the containment facilities that were available at that time. The group called for a voluntary moratorium by scientists working on certain types of recombinant DNA experiments until safety was better understood. This would allow politicians and the public time to assess the real and/or perceived dangers of certain experiments that might have serious potential risks before regulatory decisions were made.

Hans A. Bethe (1997), a Nobel laureate physicist, worked on the atomic bomb during World War II because of what he thought was a life-or-death struggle with Nazi Germany. However, after the war was over, he refused to help with the development of the hydrogen bomb since he did not see the reason for this new weapon as there was no imminent war at that time.

Discussion

Case Study 1

This issue involves whether it is ever ethical to censor scientific research, and if so, how this would best be done and by whom. Much of this debate has come from two particular scientific papers (as described by Michael J. Selgelid, A Tale of Two Studies, Hastings Center Report, 2007; 37: 35-42) from which this case has been derived). In the first study done by Ron Jackson and collaborators from Canberra, Australia, a genetically engineered strain of mouse pox was produced by insertion of the IL-4 gene into the viral genome. The resulting virus was found to kill mice, even if the mice had either a natural immunity or had a vaccination using the normal strain of mouse pox. The findings and the Materials and Methods were published in the Journal of Virology 75;(2001):1205-1210. The concern is that the same kind of scientific procedures could be used to produce a vaccine-resistant smallpox (although small pox has a larger genome, it appears that samples of smallpox virus have not all been destroyed since the Soviet supplies were not well controlled). In another study, American scientists had used synthetic biology to manufacture a polio genome by attaching together commercially available strands of DNA in accordance to a map of the RNA polio genome (published on the internet). By adding some protein, they created a "live" virus that paralyzed mice. The findings and the Materials and Methods were published by Cello et al. in Science 2002; 297: 1016-1018. The concern about this is whether publishing these studies might allow others to produce dangerous pathogens. The United States National Research Council (Biotechnology Research in an Age of Terrorism, Washington, DC, NAP, 2004.) has proposed relying on the scientific community's voluntary self-governance in making decisions about what should be published. Selgelid (2007) argues that there should be censorship of this type of scientific study, since, "this kind of manufacture of biological weapons is relatively easy and inexpensive."

Questions:

1. What do you think? Should scientific research be censored?
2. What do you think is the right answer for the country?
3. If there were to be censorship, how should the censorship process be designed and what groups should be involved?

Case Study 2[i]

New estimates suggest that there are 7.5 million girls and women 14 to 24 years old in the US who are infected with human papillomavirus (HVP), a microbe that can lead to cases of cervical cancer in 2.2 percent of women carrying one of the two strains that are

most likely to cause cervical cancer. This new finding, published in Journal of the American Medical Association, is likely to encourage the use of a vaccine that has been approved by the Food and Drug Administration for females 9-26 years of age. A company that produces this vaccine, has been said to be talking to members of state legislatures to encourage them to require vaccination of middle-school girls. This is now being considered by 18 states. For example, Texas's governor earlier issued an executive order requiring the vaccine in school girls. Some parents have objected to such mandates for the use of the HPV vaccination because the infection is transmitted only through sexual contact and that can be avoided by choice.

Please discuss the ethical issues that this raises.

Discussion Questions

1. Are you as a scientist morally responsible for the applications of your research findings? What role do you think is right for you to play in this?
2. If you are involved with research on RU486 (an abortifacient) are you contributing to the empowerment of women, to the disintegration of the family, to the killing of embryos, or to the increase in scientific knowledge? Is such an action ethical?
3. In 1975, some leading scientists called a moratorium on the use of certain recombinant DNA experiments until appropriate procedures, safeguards, and limits were established. What do you think about this moratorium? Are there areas today in which a similar moratorium would be useful? Should there be a similar moratorium on the cloning of human embryos? Should there be a moratorium on xenotransplantation until proper controls for the possible spread of diseases from animals to humans are instituted?
4. If you develop a genetic test to screen for a fatal disease such as Huntington's, what is your responsibility for recognizing, education the public or the patient, or helping to resolve social, legal or ethical issues related to the use of the test, such as issues with job or insurance discrimination? What so you thin are your responsibilities to the public to help them understand these issues?

Additional Considerations

From what do the scientists derive their responsibilities to society?
Emerging scientific knowledge not only stimulates significant public interest but also public concerns. In some circumstances, scientists do not seem to become involved with addressing or take little responsibility for the social problems related to their discoveries. As early as 1950, Pigman and Carmichael wrote that scientists have obligations to explain not only the purposes and nature of science and to clarify issues related to patent and secrecy to the public, but to accept obligations to others as well. They used the creation of an oath to help scientists with this obligation.
Reiser and Bulger (1997) have argued that scientists have responsibilities to society for several reasons. The scientists' responsibility is derived from their work as a scientist not from their role as a citizen but with increasing technical needs, scientists may have crucial insights in their role as citizens due to their familiarity with both the science and the technology involved. However, when a scientist has special knowledge about and

responsibility for a certain discovery, which has a consequential outcome, their responsibility "comes from a direct commitment to take account of effects which their own actions revealed". That is, if the scientific knowledge produced would not otherwise be known, the scientist should accept responsibility for their actions in its discovery.

In addition, in their role as scientists, they have been given an intellectual warrant by society to uncover nature's secrets by using the funding provided by society in order that their discoveries will benefit humankind. Scientific knowledge comes from work by the scientists that would not otherwise by known. Although society provides oversight regulations, the scientists who use this power should have ethical codes or commitments to help them identify harmful social consequences which their discoveries have disclosed or created. Also, scientists who use human volunteers or animals in their experiments must follow standards that protect both humans and animals from harm or abuse. These precedents, established by scientists themselves, imply a responsibility not only for these individual subjects but similarly for society itself from being harmed by the scientific community (Reiser and Bulger, 1997). Scientists who makes the discoveries not only receives the credit by must accept responsibility to help society use the discovery appropriately.

Ways in which Scientists Can Exercise their Responsibilities to Society

Scientists have certain essential responsibilities to society due to the very nature of science itself. These include: honestly observing, recording and interpreting aspects of the material world (which includes avoiding financial conflicts of interest and examining personal biases, using experimental methods to ensure objectivity, and the honest use of ideas of others); respect for other (including human participants in one's research, and humane care and use of other animal species in research, and to the environment as well as to colleagues such as students, employees and trainees); stewardship of resources; and scholarly competence in both obtaining knowledge and to the efficient and timely transfer of results by passing it on to other scientists, students and the public. They also have a responsibility that products produced in their work are transferred to the public for its benefit by obtaining appropriate patents (Bulger, 1994).

Besides the essential responsibilities, scientists may chose to express their responsibilities to society in many other ways such as choosing an research project that will likely provide important information for the good of society, alerting society to the benefits and harms of the outcomes of studies in progress, to participate in the discussion of ethical issues that arise from a discovery and to help educate the public and policy makers about these issues that may arise from the discoveries. It must be noted, however, that it is not always possible to know which basic research will prove beneficial to future developments for societal good as was shown by the paper of Comroe and Dripps (1976).

Scientists have many opportunities to serve on various scientific advisory groups both in their own professional societies and in national forums. They can also provide information to policy makers who are writing regulations about scientific practices.

Both Sheila Jasanoff (1993) and Barbara Mishkin (1995) have written about the need for scientists, universities and professional societies to help develop consensus and clearly define best ethical standards of behavior in areas of scientific practice. Finally, scientists can help translate scientific language into language that can be easily understood by lay people who need to learn about the implications of various scientific studies.

Roles of Institutions in Exercising their Responsibilities to Society
Institutions also have responsibilities for improving their own environment in such a way that it supports responsibility of the people working within it. Numerous reports and commissions on improving the environment for science have recommended that academic institutions write policies and procedures that are to be followed within the institution to promote ethical conduct of science, which in turn will encourage science to be done responsibly for the good of the community (reviewed by Steneck and Bulger, 2007). Academic institutions should seek to create an environment that promotes responsible conduct by individual scientists and that fosters integrity by monitoring and evaluating the institutional environment supporting integrity in the conduct of research as suggested by the 2002 Institute of Medicine Study on Integrity in Scientific Research.

Blumenthal et al (2000) have investigated whether support should be given to academic health centers to help support their social missions such as patient care for the poor and uninsured, for training of health professionals, and for research in areas in which economic benefits for socially optimal and basic research are uncertain. These authors have concluded that a convincing rational exists for this.

Resources

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Endnote

[i] Information from an article by David Brown, *The Washington Post*, Wednesday, February 28, 2007.