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# Reasons Scientists Avoid Thinking about Ethics

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**Science is a powerful force for change in modern society. As the professionals at its helm, scientists have a unique responsibility to shepherd that change with thoughtful advocacy of their research and careful ethical scrutiny of their own behavior.**

All good science is subversive. It challenges beliefs, pushes the boundaries of existing structures of knowledge, and portends a future different from the current one. For that reason, the Controllers, who rule Aldous Huxley's *Brave New World*, forbade new scientific inquiry, declaring "truth's a menace, science is a public danger."

The public, whose taxes fund much scientific work, is keenly interested in where science is going and the integrity of those who are taking us there. The unprecedented ability of scientists to manipulate the building blocks of life, to create altered biological processes, and to understand and re-engineer biological systems promises fundamental changes in how we heal, how we reproduce, and how we relate to the living world. Science tends to be portrayed by the media in extremes, as a series of sensationalized discoveries punctuated by conflicts and scandals. It is certainly understandable that the public would demand careful examination of such powerful technologies.

Scientists, however, are often wary of ethical scrutiny, and generally reluctant to engage the public in moral conversation about their work. Why aren't scientists more engaged in the ethical debates that characterize the public discourse about science? Why are scientists not more effective advocates of their own work? There are a number of reasons that scientists offer, and each is worthy of examination.

## "I'm Not Trained in Ethics"

Ethics as an academic field has an established body of knowledge, a set of disciplinary concepts, a canon, and many other trappings of an intellectual discipline. Most scientists are not formally trained in ethics. However, scholars trained in ethics do work with scientists and scientific societies helping to set guidelines, assess the impact of new technologies, and so on.

Scientists can learn the ethos of science by example. Albert Einstein once said "Most people say that it is the intellect which makes a great scientist. They are wrong: it is character." Behaving ethically is the principal way that mentors transfer the ethical standards of their profession to their trainees. All the formal ethics training in the world cannot compensate for an unethical mentor. However, the failure to integrate training in professional ethics into the basic scientific curriculum impoverishes the educational mission and, ultimately, science itself.

The National Institutes of Health (NIH) now requires that an ethics curriculum discussing protection of human participants in research be taught in the graduate programs it funds. It would be a shame, however, if training in ethics stopped there. To remain true to the highest goals of science, scientists should periodically revisit the big questions: What is science for? What are the values I bring to my scientific work? Why did I become a scientist, and why am I one now? What are the moral motivations, inclinations, and principles at the heart of my scientific pursuits? How do I advance the cause of scientific progress? Whom does my research serve? Serious consideration of those questions qualifies a scientist for participation in the ongoing discussion of scientific values, even without a specialized training in ethics.

## "My Scientific Work Has Little to Do with Ethics"

What does the daily work of science have to do with ethics? The ethical norms of science are so embedded in scientific work that we can easily take them for granted. When asked why he made his stem cell lines freely available to other scientists, Harvard's Douglas Melton replied, "because there's a long scientific tradition of making the fruits of one's research available to others" (Dreifus, 2006). Making reagents freely available to colleagues is a fundamental ethical tenet of modern science. The work of historians, philosophers, social scientists, and others shows that the questions scientists choose to pursue, the kinds of data that are considered important, the dynamics of collaboration within a scientific team, the interpretation of results, and many other aspects of scientific work are permeated by ethical assumptions, such as the value of sharing the products of scientific inquiry, and the value of mentorship. Science is an eminently social activity.

What distinguishes a profession is not only a body of knowledge or expertise. Professional authority is derived also from a cultural tradition

of service carried out with an expectation of high ethical behavior. Professions try to assure such behavior by developing codes of ethics. For example, the American Medical Association was founded in Philadelphia in 1847 by writing and publicly reading a new code of ethics. Many specific scientific societies have developed codes of ethics. Indeed, later this year, the British government's chief scientific advisor will be releasing an ethical code setting out the values and responsibilities of all scientists who work in the United Kingdom (Pincock, 2006).

Clearly plagiarism, fabricating results, misrepresenting contributions to a paper, bypassing informed consent, stealing ideas, and other forms of scientific misconduct have a detrimental effect on science. But it is not just misconduct that is threatening science. A fundamental tenet of academic science and medicine is the ability to replicate published research. In a survey published in JAMA, 47% of geneticists who requested additional information, data, or material from academic colleagues regarding their published research reported being turned down at least once; 28% reported that they had been unable to confirm published results because they had been denied access to requested data or materials (Campbell et al., 2002). Science's claim to self-correction and overall reliability is based on the ability of researchers to replicate the results of published studies. Studies cannot be replicated if scientists will not share additional data, information, or materials from published studies, and upholding such ethical norms is every scientist's responsibility.

## "Ethics Is Arbitrary"

From stem cells and cloning to genetic engineering to the sale of organs for transplant, there is no dearth of contentious bioethical debates. Sometimes the debates seem intractable, with all sides convinced of the validity of their ethical position. It is easy to conclude that ethics is essentially arbitrary. Empirical evidence can provide support for ethical conditions, but it cannot ultimately adjudicate between them.

In fact, however, there is widespread consensus on a host of ethical issues in science policy. Consensus tends to be hidden because it is taken for granted; only the controversies make the headlines. For example, developed countries have forged a wide-ranging ethical consensus on research involving human subjects. This includes universal standards of informed consent, risk/benefit analyses, ethics review committees such as Institutional Review Boards, mandatory testing in animals first, protocols to assess toxicity and side effects, conflict of interest declarations, and subject's rights (such as the right to refuse to participate in research without incurring any penalty and to withdraw from research at any time). At the boundaries of the consensus are areas of ethical debate, but that is how it should be. The public discourse eventually may make its way to consensus, but in ethics, process is at least as important as product.

## "Ethicists Mostly Say 'No' to New Technologies"

Ethical principles do set limits on technology, but this is unremarkable. We need limits to be set so that new technologies do not cause harm, violate personal privacy or autonomy, damage a collectively owned natural environment, and so on. Although some bioethicists may use ethical arguments to resist technology in general, the majority of biomedical ethics is in the service of good science. Many bioethicists are trained in the biological or social sciences and have academic appointments in medical or life science departments. The irony of being a bioethicist these days is the possibility of being viewed both as a lackey to pharmaceutical and biotechnological interests by the general public and as an overly cautious obstructionist by the scientific community.

Ethicists and scientists should work hand in hand to assure that scientific research is done to the highest ethical standards, and to prepare the public for reception of scientific innovation. The cloning of Dolly has become the exemplar of the failure to prepare the public for a scientific breakthrough. After the announcement, polls showed that more than 90% of Americans opposed the cloning of animals. Furthermore, the media were filled with stories about creating human clones for organ transplants, celebrity vanity clones, etc., before scientists could reign in the wild speculation and describe what cloning is and what it can and can't do. Had the ethical discussion kept pace with the research, the global hyperventilation over Dolly might well not have taken place.

## "Others Will Make the Ethical Decisions"

Scientists in modern technological societies are professionals, and their work should be viewed through the lens of professional ethics (Chadwick, 2005). Scientists, like all professionals, have ethical responsibilities at three levels: First, scientists must assume personal responsibility for the integrity of their research, their relations with colleagues and subordinates, and their role as representatives of their home institutions. Second, scientists must assume a measure of disciplinary responsibility for the promotion, oversight, and collective activity of their specialized field of inquiry. Finally, scientists must recognize their social responsibility to science as a public enterprise.

Scientists have an obligation, individually as well as collectively, to reflect on the ends, not just the means, of scientific work (Kitcher, 2004). Ethical conversation should be part of "normal science" in every laboratory, academic center, and corporate office.

Sometimes that ethical responsibility may run counter to the practices of an institution or corporation; in those cases, scientific integrity demands that individual scientists respond by speaking out, or trying to change the corporate culture. In rare cases, it may require refusing to participate in a particular project, or in extreme cases, resigning.

## "The Public Does Not Know What It Wants"

The public, in general, is not scientifically sophisticated. Yet somehow the public has managed to

negotiate its way to a consensus on a variety of scientific issues. Despite the initial reaction to the cloning of Dolly, people eventually settled into a consistent and stable belief that animal cloning is basically acceptable, whereas human reproductive cloning is not. Society invests scientists with public trust and privilege, granting them access to funds, materials, public institutions, and even their bodies as subjects for research. In return, society retains a right to set certain limits on the kind of scientific research that it believes is permissible.

If science serves the collective good, then it must contribute its unique perspective to the moral debates of the day. Scientists should be active participants in that cultural conversation, as they are both citizens with a right to make claims about the common good and experts in the topics in question. In that sense, science's biggest failure lies in its lack of engagement with the public. One study of geneticists (Mathews et al., 2005) found that although most thought that scientists should be more actively involved in public outreach and science policy, many felt ill-equipped themselves and unsupported by their peers and institutions in assuming this responsibility. Scientists who frequently engage the public have often been suspect in the eyes of their peers, yet it is precisely that kind of outreach that will most benefit the scientific enterprise.

## "Knowledge Is Intrinsically Good"

A working assumption of modern science is that the generation of knowledge is its own justification. But is all knowledge neutral? Is there any piece of information so potentially disturbing or destructive that we should not pursue it? Some scientists may say that all knowledge is fair game. Yet there are precedents for the idea that there is forbidden knowledge. Kempner and colleagues (2005) interviewed about 40 scientists in a variety of disciplines—including cell and molecular biology, neuroscience, and genetics —from a number of prestigious US academic institutions. They asked them to consider their practices and rationales for limiting scientific inquiry or dissemination. Respondents reported that knowledge may be forbidden because the route to obtaining that knowledge is unethical—certain types of human experimentation simply may not be carried out, for example. Some knowledge may be forbidden because the means to knowledge violates religious or moral constraints, as some claim about human embryonic stem cell research.

Kempner and colleagues were most surprised, however, by the power of informal means of limiting scientific inquiry. Researchers are sometimes attacked after publication of their research—as were famous controversial figures such as Kinsey, Milgram, and Herrnstein and Murray—which may dissuade others from pursuing similar lines of research. In the survey, some participants cited the threat of social sanctions as deterring certain types of research, whereas others reported that there were unspoken rules of their scientific community regarding which research to pursue.

Most would agree that there is scientific research that is inherently unethical and ought not to be pursued. However, there is a more nuanced ethical question: is the pursuit of all scientific knowledge equally *worthy*? That question must be asked every time we allocate funds to certain scientific goals and not to others. In that sense, an ethical sensibility is part of the very funding structures that drive science in certain directions in technological societies.

What kinds of research should we prioritize? It is there that the ethical dialog among scientists, ethicists, and the public can be most fruitful.

## "If I Don't Do It, Someone Else Will"

Biotechnology has become global, but different societies do not always agree on the same ethical standards. Although there is almost universal agreement to ban human reproductive cloning, for example, there is little international agreement about human embryonic stem cell research. Some countries have banned it altogether, others have severely regulated it, and still others have actively promoted it. With such variation, a common argument for pursuing controversial science is its inevitability; if we don't pursue this line of research, then someone else will. But is that argument, even if true, a justification for pursuing a line of research that a scientist otherwise judges to be ethically questionable?

The argument is ultimately an economic, not an ethical one. If science is to maintain its ethical standards, and if scientists want to be trusted by a wary public, ethical guidelines must be developed and adhered to, even when they cause some economic hardship. The primary ethical responsibility is to one's own moral standing.

## Conclusion

Science has become one of the most powerful and pervasive forces for change in modern society. As the professionals at its helm, scientists have a unique responsibility to shepherd that change with careful ethical scrutiny of their own behavior and thoughtful advocacy of scientific research. If scientists find reasons not to do so, the public will find ways to do it for them, and the results may not always be in the best interests of science or society.

## REFERENCES

Campbell, E.G., Clarridge, B.R., Gokhale, M., Birenbaum, L., Hilgartner, S., Holtzman, N.A., and Blumenthal, D. (2002). JAMA *287*, 473–480.

Chadwick, R. (2005). Interdiscip. Sci. Rev. *30*, 247–256.

Dreifus, C. (2006). At Harvard's stem cell center, the barriers run deep and wide. The New York Times, January *24*, F2.

Kempner, J., Perlis, C.S., and Merz, J.F. (2005). Science *307*, 854.

Kitcher, P. (2004). Bioscience *54*, 331–336.

Mathews, D., Kalfoglou, A., and Hudson, K. (2005). Am. J. Med. Genet. *137A*, 161–169.

Pincock, S. (2006). The Scientist. Scientists praise new UK ethics code. Published online January 10, 2006. http://www.the-scientist.com/news/display/22930