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talking point

Animal rights, human wrongs?

Introduction to the Talking Point on the use of animals in scientific research

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The balance between the rights of animals and their use in biomedical research is a delicate issue with huge societal implications. The debate over whether and how scientists should use animal models has been inflammatory, and the opposing viewpoints are difficult to reconcile. Many animal-rights activists call for nothing less than the total abolition of all research involving animals. Conversely, many scientists insist that some experiments require the use of animals and want to minimize regulation, arguing that it would impede their research. Most scientists, however, try to defend the well-established and generally beneficial practice of selective experimentation on animals, but struggle to do so on an intellectual basis. Somehow, society must find the middle ground—avoiding the cruel and unnecessary abuse of animals in research while accepting and allowing their use if it benefits society.

In any debate, one should first know the facts and arguments from each side before making an educated judgement. In the Talking Point in this issue of *EMBO reports*, Bernard Rollin provides ethical arguments against animal experimentation (Rollin, 2007). Rather than simply demanding adequate regulations to ensure animals are well treated and do not suffer unnecessary and avoidable pain, Rollin questions the assumption that humans have an automatic right to make decisions for other animals. In his expansive and stimulating article, he concludes that there is no logical basis for the way in which we treat animals in research; in fact, we would not tolerate such treatment if the animals were *Homo sapiens*; therefore, we cannot tolerate such treatment for other sentient creatures that, like us, are able to experience and suffer pain.

Practicing scientists will be comforted by the views of Simon Festing and Robin Wilkinson from the Research Defence Society in London, UK, who emphasize the extent to which legislation already limits the use, and ensures the welfare, of animals used in research (Festing & Wilkinson, 2007). With a particular focus on the UK, they highlight how public opinion and legislation have worked together to control invasive research on animals within a legal and ethical framework, despite objections from the scientific community to the additional bureaucracy and costs that such laws engender. It is ironic then, that the UK is also where militant opponents of animal research have committed the most attacks against scientists and research institutes.

Turning to the wider picture, the European Commission is now rewriting its 1986 Directive on the protection of animals used for experimental and other scientific purposes. The Commission intends to reiterate its emphasis on the 3Rs—replacement, reduction and refinement—as a way to reduce the number of animals used in biomedical research (Matthiessen *et al*, 2003). However, the recent passage of the REACH (Registration, Evaluation and Authorisation of Chemicals) directive, which calls for the additional testing of tens of thousands of chemicals to determine if they pose a danger to humans and/or the environment, inevitably means bad news for laboratory animals. According to the German Federal Institute for Risk Assessment, the implementation of REACH will involve the killing of up to 45 million laboratory animals over the next 15 years to satisfy the required safety tests (Hofer *et al*, 2004).

Although optimists might think that cell-based tests and methods could replace many of the standard safety and toxicity tests for chemicals or medicines, regulatory bodies—such as the US Food and Drug Administration, the US Environmental Protection Agency and the European Agency for the Evaluation of Medicinal Products—are not in a rush to accept them. After all, their task is to protect society from the devastating side effects of new drugs and other compounds, so any replacement test must be at least as reliable and safe as existing animal-based tests.

There are also good scientific reasons to retain the use of animal-based tests. Most scientists who work with cell lines know that they are full of chromosomal anomalies; even cells from the same line in two laboratories are not necessarily biologically identical. Cell-based tests also have other limitations: they assume that the cell type in which side effects manifest is known; that there are no interactions between different cell types that are found in many tissues; and that culture conditions adequately mimic the whole organism. Even if cell-based tests could replace animal-based tests, there are still no alternative methods available to test for teratogenicity or endocrine-disrupting activity, which require animal-based tests over several generations. Unfortunately, it is unlikely that cell and tissue cultures can sufficiently replace animals in the short term.

In the absence of safe alternatives to replace the animals used in research, the emphasis shifts toward reduction and refinement. However, this implicitly accepts the need to use animals in the first place, which is the point that Rollin challenges. Following his arguments, it is easy to see how anti-vivisectionists question whether humans have the right to decide how to use animals in what is generally thought to be the common interest. Similarly, it is easy to understand why

researchers and society pass over these difficult questions, believing that the end justifies the means.

In my view, the most important point in this debate is the cost–benefit analysis used to justify certain types of research while prohibiting others. Society at large already relies on this: it accepts the use of animals in biomedical research but does not tolerate their use in cosmetics testing. This is a pragmatic distinction based on weighing the benefits to society—such as drug safety—against the costs to animals: pain, suffering and death.

In some cases, the benefits seem to outweigh the costs. If a cure for cancer was found, or a vaccine against malaria developed, the treatments would have to be tested on animals—for toxicity, unexpected side effects and efficacy—before being administered to millions of people. Here, the benefit to society might be obvious, and the use of animals morally justifiable. In other cases, the costs seem too high to justify the benefits. In experiments that could and should be done with cell lines, using higher animals as 'laboratory consumables' is ill-conceived and expensive. Such unnecessary use of laboratory animals was widespread in the 1960s and 1970s, but thankfully is no longer officially tolerated.

Between these extremes, however, is a huge area in which the balance of costs and benefits is more difficult to achieve. Understanding ourselves and the world in which we live is not merely an intellectual exercise—it defines us as humans. To gain this knowledge relies on experiments, some of which require the use of animals—for example, generating transgenic mice to understand the function of a gene. These might reveal crucial information for tackling a disease, but in general it is hard to justify every such experiment with potential benefits for human health. Consequently, it is not possible to determine *a priori* whether an experiment is morally justified if its outcome merely advances understanding rather than producing a cure.

In my view, we should adopt a pragmatic attitude. An experiment that uses animals would be justifiable if it is done in such a way that causes minimal pain to the animals involved and if all possible alternative methods have been explored. When scientists take the lives of animals into their hands, they have a particular duty to avoid unnecessarily cruel treatment—not only during experiments but also in the way the animals are kept and handled. In this regard, a legally binding regulatory framework that reflects ethical considerations is not necessarily an undue intrusion on the freedom of research: it provides scientists with a good guide of what is socially permissible, and instills a greater awareness that animals are sentient beings, which are able to suffer and experience pain as much as humans do. If it strikes the right balance, such a framework might do more to reduce the number of animals used in research than any attacks on scientists and scientific institutions. To guide lawmakers in drafting regulations that both address valid criticism and enable valuable research, scientists and society must continue this debate to define what is needed and what is necessary.

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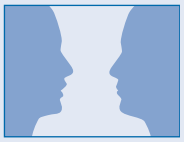

For more discussion on this topic, see also
Rollin BE (2007) Animal research: a moral science. This issue p521.
Festing S, Wilkinson R (2007) The ethics of animal research. This issue p526.