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LETTERS

The Possibility of Tenure

A recent ScienceScope item about my tenure dispute with the University of California (10 July, p. 151) quoted me as saying that my minimum requirements for settlement included gaining tenure. There was an important phrase missing that changed the context of what I actually said. My minimum requirements for settlement included a process with the possibility of gaining tenure. It is easy to understand how the reporter might not have heard the entire sentence—the interview was conducted during a crowded, informal, and hurried press conference after my congressional testimony.

Jenny Harrison
35 Windsor Avenue,
Kensington, CA 94708

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GenPharm's Knockout Mice

In his article "Researchers wrestle with concerns over cost and access" (Research News, 5 June, p. 1393), John Travis discusses transgenic animals that carry gene inactivations (knockouts) and their availability to the scientific community through GenPharm. We would like to point out some key aspects of this issue not mentioned in the article.

GenPharm recognized some time ago the need for a reliable and efficient source of widely used transgenic animals for the academic and industrial community. This need was not being met by university laboratories or by other businesses that supply animals for research. GenPharm initially invests a minimum of 9 to 12 months of work and tens of thousands of dollars on every strain it offers. This investment is not government subsidized. The investment enables researchers to expect from GenPharm substantial quantities of transgenic mice that are pathogen free, genotyped, and supplied promptly.

In most cases, patents are pending for transgenic animals that reflect the intellectual property rights of the inventors and the institutions in which they work. In order to breed and sell animals, GenPharm pays for a license from those who hold the patent rights for these animals. GenPharm has an obligation to the holders of the patent rights to protect their proprietary interests by limiting the breeding of these strains to the experimental needs of the investigator. GenPharm does not and should not require any rights to discoveries made using mice it sells, and we will not accept new transgenic animals from institutions that require this condition of sale.

Fortunately, many problems in the field of biotechnology have been foreseen by academic institutions and by the National Institutes of Health, who have collectively adopted a policy of material transfer agreements under which transgenic animals fall. These agreements recognize the need to retain intellectual property rights and commercial rights to materials transferred between organizations. GenPharm's restrictions are, in fact, similar to existing material transfer agreements at universities. They are not "severe" or "expensive" restrictions on breeding. Additionally, our mice are far from being at "unbelievably exorbitant" prices. At about twice the price of a Jackson Laboratory's nontransgenic mouse line, the transgenic mice provided by GenPharm are reasonably priced.

We welcome feedback on our policies in this area and are ready to consider any suggestion for improving them.

Jonathan J. MacQuitty
President and Chief Executive Officer,
GenPharm International,
2375 Garcia Avenue,
Mountain View, CA 94043
Robert M. Kay
Vice President, Research & Development,
GenPharm International

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Exclusive Academies

There is no simple answer, under the present rules, to Faye Flam's query, "What should it take to join science's most exclusive club?" (News & Comment, 15 May, p. 960). If one considers how "exclusive" the different major science academies in the world are (as measured by total number of members per million citizens), then the National Academy of Sciences (NAS) (with 7.9 members per million citizens) is not "science's most exclusive club": it still is more exclusive than the Royal Society (20.6) or the Royal Swedish Academy of Sciences (54.2), but less exclusive than the Accademia dei Lincei (4.6) or the Académie des Sciences (5.7) (*1*). "Exclusive," of course, does not mean "better."

Faye Flam quotes an unnamed chemist as stating that Carl Sagan's admission to the

NAS "could open a floodgate to people whose science isn't spectacular." Well! I suspect that not all of the 1647 active members plus 287 foreign associates and 83 voluntary emeriti of the NAS have done "spectacular" science, if "spectacular" is taken to mean a major scientific innovation that has opened a new field or shaken the foundation of an established one.

That the NAS election process may be faulty is indicated by the observation that out of a total of 178 living American scientists deemed sufficiently prominent to be included with the great scientists of the past in the *Concise Dictionary of Scientists* (2) and in *Asimov's Biographical Encyclopedia of Science and Technology* (3), 44 (25%) are not even members. Because the NAS is so large (2017 total are affiliated), one can conclude that the vast majority of these members have done less "spectacular" work than at least some, if not most or even all, of the 44 nonmembers.

In order to improve the NAS election process and eliminate any "old boys" syndrome, the election of new members could be run by an external body, perhaps consisting of scientists whose original work may not have been of major significance (and who therefore would not qualify for membership), but who dedicate themselves to writing about science with some sophistication. Such persons are generally up-to-date as to what is cooking in science and should be reasonably impartial: it's part of their job. The NAS could also consider an age limit (say, 65 years) in order to make room for younger people and move the elders into the nonvoting emeriti category.

Cesare Emiliani
Department of Geological Sciences,
University of Miami,
Miami, FL 33124

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Fetal Tissue Supply

Although there has been extensive debate over the expected number of fetal specimens suitable for transplantation that would be available from spontaneous abortions and ectopic pregnancies, little relevant data have been presented (News & Comment, 29 May, p. 1274; Letters, 17 July, p. 310).

From 1974 to 1986 we attempted to obtain tissue from all spontaneous abortion specimens in a large Manhattan hospital as part of an epidemiologic study of karyotyped spontaneous abortions (*1*). Morphology was routinely assessed and an attempt was made to karyotype all specimens. We did not test for maternal or fetal infection. To estimate how many specimens might have been suitable for transplantation research, we recently examined data from the final phase of our study, when retrieval of specimens and the rate of successful karyotyping were optimal (*2*). To avoid confusion, we point out that the data referred to in a letter by Julianne Byrne (17 July, p. 310) derive from an earlier phase of this study (from January 1977 through August 1981), when Byrne was a doctoral student working on our project.

National Institutes of Health (NIH) guidelines (*3*) specify that at least 100 fetuses per year of 8 to 16 weeks gestation be available for screening from a fetal tissue bank. Our data indicate that this would require access to about 1250 spontaneous abortions. Of the expected 100 fetuses, there would be at most about 14 with no visible signs of maceration (autolysis) that could be considered possible candidates for transplantation.

A population of at least 10,400 pregnant women (*4*) is needed to yield the numbers required to participate in the tissue bank feasibility study. In most locations, therefore, ascertainment will require the collaboration of several medical centers, compounding the challenges of rapid identification of emergency admissions and screening before women have left the hospital or physician's office. This herculean effort is projected to cost $500,000 in each of six banks—all to yield 14 specimens per bank which may or may not prove acceptable for transplantation research.

Allowing the induced abortion debate to influence issues of fetal tissue research comes at great cost. We believe that the present NIH plan cannot be expected to produce sufficient numbers of usable specimens. There will be a significant loss of time in advancing transplantation research and of funding dollars that might be used for other research proposals with significant public health implications.

Jennie Kline
Ann Kinney
Zena Stein
New York State Psychiatric Institute and
Sergievsky Center,
Columbia University,
New York, NY 10032
Mervyn Susser
Sergievsky Center,
Columbia University