Public opinion on gene patents

SIR — In connection with the two patent applications by the US National Institutes of Health for numerous human genes (*Nature* **354**, 171-2, 174; 1991; **355**, 103, 104, 292; 1992), there are ethical arguments that the human genome is the common property of all human beings, and no one should be able to patent mere sequences of it. These include the principle of distributive justice and the shared possession of the sequence by all members of the human race[1].

PUBLIC OPINION OVER PATENTING IN JAPAN AND NEW ZEALAND

	Public		Scientists		High-school biology teachers	
Country:	NZ	Japan	NZ	Japan	NZ	Japan
Sample:	2,034	470	258	479	277	227
Subject matter						
New inventions	93	91	95	94	88	92
Books, information	85	73	81	82	72	77
New plant varieties	71	60	66	78	49	61
New animal varieties	59	49	63	74	51	60
Genetic material from plants/animals	51	37	53	46	34	38
Genetic material from humans	—	29	—	35	—	29

The knowledge that is applied to obtaining a DNA sequence is the result of the efforts of numerous past and present scientists throughout the world and the research involved in developing the various techniques was paid for by people of many countries. Legal principles consistent with the underlying ethical arguments are to be found in article 27 of the United Nations Declaration of Human Rights, that has been signed by most countries of the world[2]. There are two 'rights' that everyone should share in: (1) "in scientific advancement and its benefits", and (2) "protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is an author". One can debate whether possession of a DNA sequence makes a person an author of it (albeit, a joint author), but we cannot call a DNA mapper or sequencer an author.

Most countries will exclude matter from being patentable if it offends "public morality". A randomly selected nationwide mail response opinion survey was conducted in Japan in late 1991 among different groups of the population[3]. Included was the question "In your opinion, for which of the following should people be able to obtain patents and copyright?" The subject matter as shown in the table was listed with three responses, "approve", "disapprove", "don't know". The results (see table) are compared with those of a May 1990 survey in New Zealand (also conducted using mail response, except for the public sample which was obtained by face-to-face interviews)[4].

Especially at the time when policy is being decided, international public opinion studies should be conducted to find eligibility criteria for patenting genetic material which are more acceptable to public, scientists and industry worldwide. In light of the results of this survey, it is clear that people (including scientists) may not agree with the patenting of human genetic material.

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1. Macer, D. *Bioethics* **5** 183-211 (1991)
2. Sieghart, P. *The Lawful Rights of Mankind* (Oxford University Press, Oxford, 1985).
3. Macer, D. *Attitudes to Genetic Engineering: Japanese and International Comparisons* (Eubios Ethics Institute, Christchurch, 1992).
4. Couchman, P.K. & Fink-Jensen, K. *Public Attitudes to Genetic Engineering in New Zealand* (DSIR, Christchurch, 1990).

Natural selection

SIR — Over the past few decades, Sir Karl Popper's work at the interface between philosophy and biology has given birth to a small school of philosophy that emphasizes the continuity of information structures across the biological and cultural realms[1]. This effort grew out of the recognition of the similarities between mutation and natural selection in biology, trial and error in learning, and conjecture and refutation in science[2,3]. In science, however, parsimony (improbability in Popper's terminology[4]) is needed along with hypothesis, deduction and experimental test. William of Occam's dictum that "What can be done with fewer assumptions is done in vain with more" must be heeded if one wishes to have a scientific process with any hope of stable convergence in the vicinity of the truth[5,6].

It is interesting to note that there is a perfect analogue to Occam's razor in the biological world of evolution; the pressure to optimize metabolic efficiency. Given a new catalytic 'problem' to solve within a cell, a very large number of candidate 'solutions' will arise via mutation. They will involve polypeptides of varying lengths and synthetic pathways of varying complexity, just as for a given set of observational data there will be an ensemble of models of varying complexity that 'fit the data'. In the biological world, natural selection will, in the long run, favour the metabolically less expensive solution — usually the shortest polypeptide that can do the job — just as Occam's razor requires that preference be given to the simplest hypothesis that 'fits the data'. This will come as no surprise to the Scots, who will recognize the general principle as simple frugality.

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1. *Evolutionary Epistemology, Rationality, and the Sociology of Knowledge* eds. Radnitzky, G. & Bartley III, W. W. (La Salle: Open Court, 1987).
2. Popper, K. R. *Objective Knowledge* (Oxford University Press, London, 1972).
3. Campbell, D. T. *Evolutionary Epistemology* in *The Philosophy of Karl Popper*, ed. Schilpp, Paul A. (La Salle: Open Court, 1974).
4. Popper, K. R. *Conjectures and Refutations* (Harper and Row, New York, 1963).
5. Jeffreys, H. *Theory of Probability* (3rd Edn 1983) (Clarendon, Oxford, 1939).
6. Jefferys, W. H. & Berger, J. O. *Am. Scient.* **80**, 64–72 (1992).

Mistaken view

SIR — Daniel N. Robinson (*Nature* **357**, 187; 1992) misstates the view of National Institutes of Health (NIH) scientists in his gratuitous commentary on our ethical sensibilities. Contrary to his claims, I know of no one who expressed "surprise" or objection to the "speed with which [NIH Director] Bernadine Healy ordered an inquiry" into allegations of animal abuse. On the contrary, the charges raised serious ethical issues and required investigation. Many NIH scientists did, however, object to the fact that uncorroborated allegations precipitated the hasty suspension of approved research projects.

An NIH investigation eventually discredited the charges, showing that the "catalogue of horrors" cited by Robinson was imaginary.

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