nature biotechnology

Letters may be edited for space and clarity.
They should be addressed to:
Correspondence
Nature Biotechnology
345 Park Avenue South
New York, NY 10010-1707, USA
or sent by e-mail to biotech@natureny.com
Please include your telephone and fax numbers.

Database access crucial for developing countries

To the editor:

The Internet is often touted as a medium with the capacity to bring together researchers regardless of their financial and technological resources. Data collected from the Wellcome Trust Sanger Institute (Hinxton Hall, UK), as part of a report commissioned by the UK Government Commission on Intellectual Property Rights, indicate that commercial and academic scientists from developing countries lag behind their counterparts in richer nations in accessing freely available public genome databases. This situation does not bode well for the competitiveness of developing nations in commercializing and patenting discoveries from genome sequence data.

Despite efforts to ensure that "the vast potential of the publicly funded genome-sequence databases is fully exploited and freely available for all to use"[1] (such as the help desk newly established by the European Molecular Biology Laboratory; EMBL), the volume of hits from the developed world received by the EMBL website hosting genome databases (http://www.ensembl.org) is vastly higher than that from developing countries (Table 1). This, coupled with the nature of patent applications being filed, and in some cases granted, in Europe and the United States, could mean a substantial loss of access to discoveries for research purposes for academic and commercial communities in developing countries.

As the system stands now, multinational companies in the developed world can and do take out the bulk of patents on the freely available data. The need to build the bioinformatics capacity of developing countries is a desperate one because rapid progress in the study of genetic bases of diseases of particular concern to developing nations is likely only if this technology empowers their study[2]. Such capacity-building measures are indispensable but will take time. The alternative is to rely on incentives for research into diseases of the developing world, which have until now failed to deliver solutions to unmet medical needs in poorer nations.

Another, untried option may be to identify genetic information that is crucial for diseases that most affect developing countries and distribute it in such a way as to give research groups in the developing world preferential access. This would have to be done by an international body that has a vested interest in "affordable" healthcare. Keeping the regions of the world most affected by a certain disease as the locus of research into the disease would go some way toward ensuring that subsequent patents and product development were also locally based. This might be the only way to ensure the availability of genome sequence data as precompetitive information to promote the health needs of the world's poor.

Some rethinking of the direction of the patent system is also necessary. Despite differences in US and European public policy stance, recent trends are toward patents on genomic "inventions" that monopolize information important for future research. Judicial interpretation of the scope of patents to only those uses disclosed in their patent applications must be encouraged. For example, in a judgment given in December 2001, the UK Court of Appeals[3] invalidated a patent that claimed a vast class of compounds solely on the basis of the compounds' structure. In revocation proceedings, it was shown that many of the claimed compounds did not actually exhibit the technical effect described. Holding the patent invalid for insufficiency, the court pronounced that the claims extended beyond the invention or technical contribution that the inventors had made and provided to the public.

This could indicate that reversal of some of the developments in the patent system may be possible. The issue is whether it will come soon enough to enable greater access to information for genetic research in resource-poor nations.

Sivaramjani Thambisetty
Oxford Intellectual Property Research Centre,
University of Oxford,
Oxford, OX1 3DP, UK
(Shiva.Ramakrishna@law.ox.ac.uk)

1. Radda, G. *Nature* **412**, 9 (2001).
2. Sulston, J. *Workshop on Research Tools, Public partnerships and Gene Patenting*. Commission on Intellectual Property Rights, London, January 22 (2002).
3. *Pharmacia v. Merck*, WL 1612569 (CA) (2001).

Table 1. Domains that most access www.ensembl.org*

Domain suffix	Location of access	Number of times accessed per week
uk	United Kingdom	59,951.6
edu	US Educational	49,420.0
com	US Commercial	40,344.9
net	Network§	31,302.4
de	Germany	23,640.9
fr	France	19,464.3
org	Non-profit organization§	7,634.7
nl	Netherlands	6,716.9
ca	Canada	3,923.1
gov	US Government	3,825.2
es	Spain	3,723.9
dk	Denmark	1,472.6
za	South Africa	724.24
in	India	230.2
ar	Argentina	175.15
cn	China	111.02
co	Colombia	79.02
ph	Philippines	14.95
bo	Bolivia	0.53

*The data cover a weekly average, ranging from January 1, 2001 to the week ending November 14, 2001. Data were obtained from the web team, Wellcome Trust Sanger Institute (Hinxton Hall, UK). §Non-country-specific domain suffixes.

Terminator no solution to gene flow

To the editor:

In their commentary "Liabilities and economics of transgenic crops" in the June issue (*Nat. Biotechnol.* **20**, 537–541, 2002), Smyth *et al.* make a compelling case that the inability to control gene flow is the Achilles heel of the biotech industry. The authors offer two examples in which the inability to manage gene flow has had "disastrous consequences." Rather than placing the liability firmly on the industry and regulatory bodies that brought these products to market, however, they reach the astonishing conclusion that "plants and people [farmers who save proprietary seed] cannot be trusted to do what markets require."

Unfortunately, the authors' shortsighted solution is to promote the terminator technology (genetic seed sterilization) as an environmental control mechanism. The authors fail to mention that 1.4 billion poor people depend on farm-saved seed as their primary seed source. The promotion of terminator seeds as a "green" solution to pollution by genetically modified (GM) crops is the Trojan Horse of agbiotech. If terminator wins market acceptance under the guise of biosafety, it will be used as a monopoly tool to prevent farmers from saving and reusing seed. The goal of terminator is now, and has always been, to maximize seed industry profits.

After more than 130 million acres of GM crops have been planted worldwide, we are told that we can prevent leaky genes by adopting an untested GM technology that has been widely condemned as an immoral

application of agricultural biotechnology. This is illogical and dangerous. Unwanted gene flow is a serious problem that must be addressed, but food security for poor people and Farmers' Rights must not be sacrificed to solve industry's genetic pollution problem.

It is erroneous to suggest that agriculture is dependent on genetic seed sterilization as a method for minimizing genetic pollution from GM plants. In his article entitled "Molecular strategies for gene containment in transgenic crops" (*Nat. Biotechnol.* **20**, 581–586, 2002) Henry Daniell reviews alternative strategies for gene-containment approaches. Clearly, much more research is needed. In the meantime, it is unacceptable to suggest that farmers and society should adopt an untested, immoral GM technology to fix the defects in biotech's first- and second-generation products.

Hope Shand
ETC Group (formerly Rural Advancement Foundation International; RAFI), Carrboro, NC 27510
(hope@etcgroup.org)

ES research and immorality

To the editor:

Biotechnology advocates are consistently mystified that the general public is wary of biotechnology and science in general. Your editorial "Turning back the clock" (*Nat. Biotechnol.* **20**, 411, 2002) provides one reason why. Although there can be no argument that the alleviation human suffering is a moral good, to many serious people the creation of an embryo is also the creation of a new human life. The subsequent destruction of that embryonic life for the purpose of research is therefore problematic. Apparently, a discussion of why the embryo is not a nascent human life (or, if its humanity is acknowledged, why it has no value other than as a means to an end for older human beings) wasn't worth mentioning, even though it is at the core of the stem cell debate. As a result, the editors of *Nature Biotechnology* come across as yet another group of technologists who believe that as long as science can do something, it should be done. In the case of stem cells, it's done under the false premise that ends (human disease) justify any means (the destruction of human life). If society accepts the idea that protecting human life is not an absolute good, then a potentially frightening slippery slope of other exceptions based on eugenics and other factors is a distinct possibility.

Jonas Alsenas
ING Furman Selz Asset Management, New York, NY 10017
(jalsenas@ifsam.com)

To the editor:

The poor reasoning in your editorial "Turning back the clock" (*Nat. Biotechnol.* **20**, 411, 2002) fails to advance the cause for nuclear transplantation research. In your second paragraph, you correctly observe that to many Americans "nuclear transplantation research is bad *per se* because it requires the creation and destruction of embryos." Then you draw from this premise the illogical conclusion that "scientists cannot be trusted to work with cloned human embryos." To those who hold that human embryos are morally equivalent to adult human beings, the issue is not trust; the issue is murder. No degree of potential medical progress can justify murder. Is it possible that you do not understand the pro-life stance? I doubt it, but this bit of caricature puts your entire argument in a bad light. When you have a good case, there is no need to misrepresent the opposing view.

Kenneth D. Pimple
Poynter Center for the Study of Ethics and American Institutions, Indiana University, 618 East Third Street, Bloomington, IN 47405-3602
(pimple@indiana.edu)

Nature Biotechnology responds:

Careful readers will realize that we have already outlined our views on why embryos consisting of about 100 cells with no nervous system are not comparable to people with devastating diseases (*Nat. Biotechnol.* **20**, 789, 2001). We do not share the view that a few microscopic cells are equivalent to a sentient human being just because they might become one some day. As the above correspondence testifies, many do believe this and their viewpoint should be respected.

Our editorial sought to highlight the flaws in the current legislation and the likely repercussions for biotechnology if it is passed in its present form. The moral stance currently taken by the Bush administration against embryonic stem cell research is inconsistent, particularly in the light that the US government currently provides federal employees with financial support for *in vitro* fertilization (IVF) programs. (Bush actually praised IVF in his August 9, 2001 television address on stem cell research.) It is important to remember that stem cell research does not cause the creation or destruction of a single additional embryo. It uses embryos that are discarded as part of IVF.

To say that a ball of cells no bigger than a pinprick should not be destroyed to allow a grown person to live is cruelly dogmatic. But it is equally clear that we should not let scientists create as many as embryos as they want for no good purpose. The area requires clear and consistent regulatory oversight, something that the present US administration has thus far failed to deliver.