How can the developing world protect itself from biotech patent-holders?

Sir — Biotechnology offers great potential for improving health and food production in the developing world, and achieving both will require significant cooperation between the public and the private sectors.

Such cooperation is being made more difficult by the accumulation of intellectual property rights (IPRs). These include in particular patents on genomic information, and on the basic tools of agricultural biotechnology such as important genes, promoters, and transformation methods. Patent considerations have already had to be taken into account in arranging dissemination of the new vitamin A-enriched rice (see discussions at www.agbioworld.org; archive message 503 gives the details). Not surprisingly, IPRs in biotechnology are highly controversial. Yet there is a dearth of knowledge about their impact, and about appropriate responses.

A concerned group of scientific, legal and economic experts in both agriculture and medicine, from the developed and developing worlds, met at the Rockefeller Foundation's centre at Bellagio in Italy earlier this year to discuss this matter. A number of priorities emerged: the first is to discover whether there really is a problem. Systematic study is needed, for example, of the 'platform' and enabling technologies that are most likely to be valuable to developing nations, to find out whether current IP practices present a barrier to access.

Allegations of direct infringement, such as those made in recent claims lodged by the University of Rochester against pharmaceutical firms marketing Cox-2 inhibitor drugs[1], are not the only concern. We need to know whether the increasing emphasis on IPRs has led researchers to focus on areas likely to maximize royalty income, rather than address developing-world needs.

Information is also needed on whether research institutions, concerned about their relations with donors, are avoiding technologies that they are legally free to use in a limited context. Will international agricultural research institutes, for example, distribute crop varieties containing a *Bt* gene that is unpatented in developing countries, but patented in donor countries?

If there is a problem, the second need is to explore the potential to fine-tune IPR systems. Adjusting standards for granting patents might limit the scope for restricting access to basic or enabling technologies. We need to examine concepts such as 'experimental use' and 'dependency licences', which permit use for certain experimental purposes and for develop follow-on inventions. These could avert problems such as those faced by the US National Institutes of Health in gaining access to Cre-*lox* technology[2]. The evaluation will include an economic analysis and the implications for health care and agriculture. Important lessons may be learnt from examining past changes in national IP systems.

Other changes also deserve attention. There is an urgent need to examine the legal remedies available to developing countries that find their access to important technologies and products restricted by IPRs — highlighted, for example, by the recent debate over HIV/AIDS drugs in South Africa. Compulsory licences are frequently mentioned in this context. But other approaches exist, such as the public funding of licences, technology exchanges, anti-monopoly mechanisms, and creative use of the leverage available to major donors.

Better understanding of how to manage and license intellectual property in the public sector is also required. When should inventions be licensed exclusively and when non-exclusively? When should inventions originating in the public sector be put in the public domain without legal protection? Some major research organizations such as the International Maize and Wheat Improvement Centre are trying to keep their resources freely available by patenting them before private companies can seize the chance to do so[3].

The adoption of the Trade-Related Aspects of Intellectual Property agreement (TRIPs) means the roles of international institutions in area of trade and intellectual property are changing significantly.

The development of international policy needs to be closely studied. This research is likely to lead to proposals for strengthening the participation of developing nations, and modifying procedures for negotiation and resolving disputes.

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Cost of institute was small change to Roche

Sir — I find the News report about the sudden closure of the Basel Institute for Immunology (BII) by the Swiss-based drug company Roche (*Nature* **405,** 605; 2000) very sad. Not only is one of the world's leading immunology institutes closing, but also my home town is losing possibly its best scientific institution.

It is surprising that a giant company such as Roche is not willing to continue to support an institute that has for 30 years helped to establish and maintain the company's scientific reputation. Running the BII costs Fr40 million ($24 million) a year. This is a small amount compared with the record sales income Roche claimed for 1999: consolidated sales up 12% to Fr27.6 billion and net income up 31% to Fr5.8 billion (see www.roche.com).

It is frustrating that other Swiss academic institutions such as Basel University, Eidgenössische Technische Hochschule or the Swiss National Foundation could not convince Roche to secure an independent existence for the BII through a joint venture.

It is only a partial relief that Roche will replace the BII with a new centre for applied genomics. This will be supervised by Roche's research director, so the institute will lose its independent status. Nobody questions the importance of medically oriented genome research, but closing one of the best immunology institutes in the world is too big a sacrifice. Basel does not have large space resources, but even so Roche could surely have found a site for an additional world-class institute there.

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How neptunium led to the birth of plutonium

Sir — I read with interest the material from the 13 May 1950 issue of *Nature* reported in "50 Years Ago"[1]. However, the statement "In 1940 the first isotopes of the elements 93 (neptunium) and 94 (plutonium) were produced…" is not quite correct.

The uranium sample that ultimately yielded element 94 was bombarded with deuterons in the Berkeley 60-inch cyclotron on 14 December 1940. From the bombarded sample, Glenn Seaborg and co-workers isolated a chemical fraction of element 93 (neptunium) for subsequent studies. To quote Dr Seaborg, "Element 94 was born at last, on the night of February 23–24, 1941."[2] Actually, element 94 was not named 'plutonium' until March 1942.

Seaborg's interest in element 94 was stimulated by Edwin McMillan's isolation of element 93 in 1940.

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