Indian-born weapons for infectious diseases

To the editor:

Your editorial, "Weapons of mass protection" (*Nat. Med.* **9**, 239; 2003), highlights a serious issue confronting the developing countries of the world. Pharmaceutical companies in the developed world do not find vaccine production to be an economically viable proposition. Unfortunately, the world is divided into (among other things) those with rich and poor men's diseases. Those who live in developing countries have the dubious distinction of being afflicted with both. In particular, children below the poverty line face grave diseases ranging from measles to HIV, without adequate protection.

The death toll of each of these diseases, including those that have been completely eradicated in some countries, runs from tens of thousands to millions. Several suggestions—tax relief, patent protection, public-private partnerships and incentives to pharmaceutical companies through subsidies from governments, philanthropic foundations and the United Nations—have been made in your editorial and other write-ups. The crux of the problem is to make vaccines affordable to developing countries and still generate enough profit to sustain the effort.

One solution that needs to be considered is shifting global vaccine manufacture to developing countries such as India, which has invested in the research and development of vaccines. In India, an immunomodulation vaccine against leprosy is available; a live vaccine against rotavirus, a genetically engineered live vaccine against cholera and a DNA vaccine against rabies are all at advanced stages of trials; and there are substantial efforts to develop vaccines against tuberculosis and malaria. India is also collaborating with international agencies to test candidate HIV vaccines. Indigenous manufacture of recombinant hepatitis B vaccine has led to a ten-fold drop in the price of this vaccine in a span of two years.

Compared with investments in developed countries, the Indian efforts are primarily a result of modest government funding—by the Department of Biotechnology and the Indian Council of Medical Research—and public-private partnerships. Several Indian vaccine companies that manufacture conventional vaccines now fulfill requirements of the World Health Organization (WHO) and the US Food and Drug Administration.

In short, India has the scientific capability and modern infrastructure to eventually assume leadership in global vaccine manufacture. With international help and supervision, it should be possible for India and a few other developing countries to make conventional and modern vaccines at prices affordable to developing countries. Augmentation of vaccine manufacturing facilities; the evolution, through WHO intervention, of a softer Intellectual Property Rights regimen specific to vaccine manufacture; and differential pricing for poor nations will sustain this weapon of mass protection and save the lives of millions.

G. Padmanaban
Department of Biochemistry
Indian Institute of Science
Bangalore 560012, India
e-mail: geepee@biochem.iisc.ernet.in

How to submit microarray data

Nature Medicine has implemented a new policy regarding microarray experiments as of 1 December 2002. As discussed in a recent editorial in *Nature* (**419**, 323; 2002), *Nature Medicine* will now require authors to submit microarray data in accordance with the Minimal Information About a Microarray Experiment guidelines issued by the Microarray Gene Expression Data society. The guidelines include a checklist of relevant information that should be included with every new microarray submission, and can be found online at http://www.mged.org/Workgroups/MIAME/miame_checklist.html. The supplementary information must be supplied with the manuscript on five compact discs, at the time of submission, in a format compatible with commonly available software packages. We will also require that data central to the paper's conclusions be deposited in a public database for microarray data and accession numbers provided, where available, at or before acceptance for publication. By adopting this policy, we hope that the explicit description of experimental design and methods will facilitate the review and replication of microarray results.