(or perhaps was exacerbated by) a UK government seen to be welcoming of GM foods and crops. Another negative was that it was major transnational corporations—another questionable community in the eyes of much of the public here—that were seeking to push their new products onto the public without previous debate and without there being any perceptible benefit. And finally, the potentially negative impact of GM crops on organic farmers—who are seen by some as crucially important for the sustainable future of food production—and the relatively small scale of agricultural production in the United Kingdom (and Europe) have also been important issues.

The question to be answered, therefore, is not how to force the EU to accept GM foods and crops against its own public opinion, but how to change public opinion in the EU. The UK government is currently conducting several exercises that it hopes will provide the facts to support a relaxation of the moratorium on growing GM crops. These include a major review of the costs and benefits of GM crops (just finished), a scientific review of the issues (also now finished), a series of crop trials (results in September) and a public debate on GM crops, 'GM nation' (just finished).

Whether these will change attitudes is moot: the costs-and-benefits review has concluded that the economic value of the few currently available GM crops that could be grown in the UK is likely to be limited because of negative consumer attitudes to GM foods.

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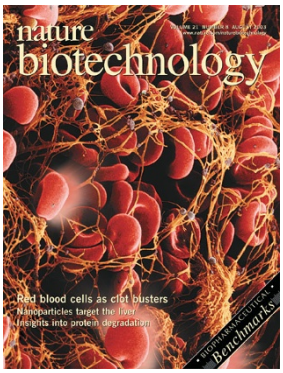
To the editor:

Several articles in the July and August issues of *Nature Biotechnology* (**21**, 735–738, 2003; **21**, 852–854, 2003) discuss whether the US strategy of forcing the European Union (EU; Brussels, Belgium) to accept GM foods by referring to World Trade Organisation (WTO; Geneva, Switzerland) rules will bear fruit. We do not believe so—rather the opposite.

A central claim in the arguments of both President Bush and US commerce representative Robert B. Zoellick is that the risk of GM foods is negligible. The veracity of that statement, however, depends on what is defined as risk. A common understanding is that risk relates to the environment and human health. On the other hand, recent studies have repeatedly shown that public hesitance also includes a number of ethical issues (*e.g.*, market dominance of a few large companies and GM crops threatening natural or divine orders, refs 1,2). Our worry is that the US government is neglecting widespread concerns of the European public that include more than environmental risk and human health.



Research carried out by our group in Denmark[1] indicates that, although many people are confident that the public authorities are able to manage the risks here and now, people are less confident about their ability to handle long-term effects because of the scientific uncertainty. Attempts to conceal these or other limits to scientific knowledge do not prevent controversies from arising; rather, the opposite happens because trust in business, scientific experts and public authorities is undermined (witness the handling of the BSE controversy in the United Kingdom).

In the long run, a policy of openness about the different dimensions of uncertainty would be more likely to increase trust in scientific risk assessment. Of course, this will not guarantee public acceptance of GM food, but experience in Europe shows that transparency and dialog are prerequisites for decreasing concerns about new technology.

The argument that the EU's resistance to GM food has had negative consequences for developing countries, denying them access to a technology that could alleviate food provision, is regarded sympathetically by many among the European public. Indeed, here most people abandon the simple dichotomy between 'unacceptable' GM food and the much more acceptable medical uses. This is because GM foods are seen as a means to help people in distress. Many counter such humanitarian uses, however, by the observation that, in general, GM crops are developed not to benefit people in the developing world, but to make money. Needless to say, according to those who point this out, making money is not in itself an acceptable objective. Thus, the fear is that the benefits will never accrue to those who are at present suffering.

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1. Lassen, J. *et al. Bioprocess Biosyst. Eng.* **24**, 263–271 (2002).
2. Wagner, W. *et al.* in *Biotechnology 1996–2000. The Years of Controversy* (Gaskel, G. & Baver, M.W., eds.) 80–95 (Science Museum, London, 2001)

Mining the literature and large datasets

To the editor:

In the accelerating quest for disease biomarkers, the use of high-throughput technologies, such as DNA microarrays and proteomics experiments, has produced vast datasets identifying thousands of genes whose expression patterns differ in diseased versus normal samples. Although many of these differences may reach statistical significance, they are not always biologically meaningful. For example, reports of mRNA or protein changes of as little as two-fold are not uncommon, and although some changes of this magnitude turn out to be important, most are attributable to disease-independent differences between the samples. Evidence gleaned from other studies linking genes to the disease is helpful, but with such large datasets, a manual literature review is often not practical. Thus, the power of these emerging technologies—the ability to quickly generate large sets of data—has challenged current means of evaluating and validating these data. One study from 1999, for example, reveals that a researcher would have to scan 130 different journals and read 27 papers per day to follow a single disease, such as breast cancer[1].

To address this need, my group at