

Going Forward Cautiously **How do we d**

Back in the days when the U.S. Patent and Trademark Office would not allow living things to be patented, Ananda Chakrabarty, an Indian researcher working for General Electric, tried to patent a genetically engineered bacterium that could break down crude oil into a form that wouldn't pollute. He was refused, but on an appeal, in 1980, the Supreme Court ruled his bacterium could be patented because it constituted a "manufacture" or "composition of matter."

This decision made it worthwhile for other researchers to invest in developing innovations using genetic engineering. If you get a patent on a new technology of value, you can charge other people for 17 years to use it.

The bacterium trial was about patent law. The Supreme Court didn't decide anything about safety or whether modifying genomes is "right." Since then, plenty of other people have voiced their opinions about these issues!

From the beginning of molecular biotechnology, some people have argued that it is wrong to fiddle with, own, and make money from living organisms in this way. Others have worried that swapping genes around will have unexpected, unhappy consequences. On the other hand, people point out that humans have been doing genetic engineering for thousands of years when they were breeding new varieties of corn or rice or animals for farming. The crops we eat today bear little resemblance to their wild predecessors.

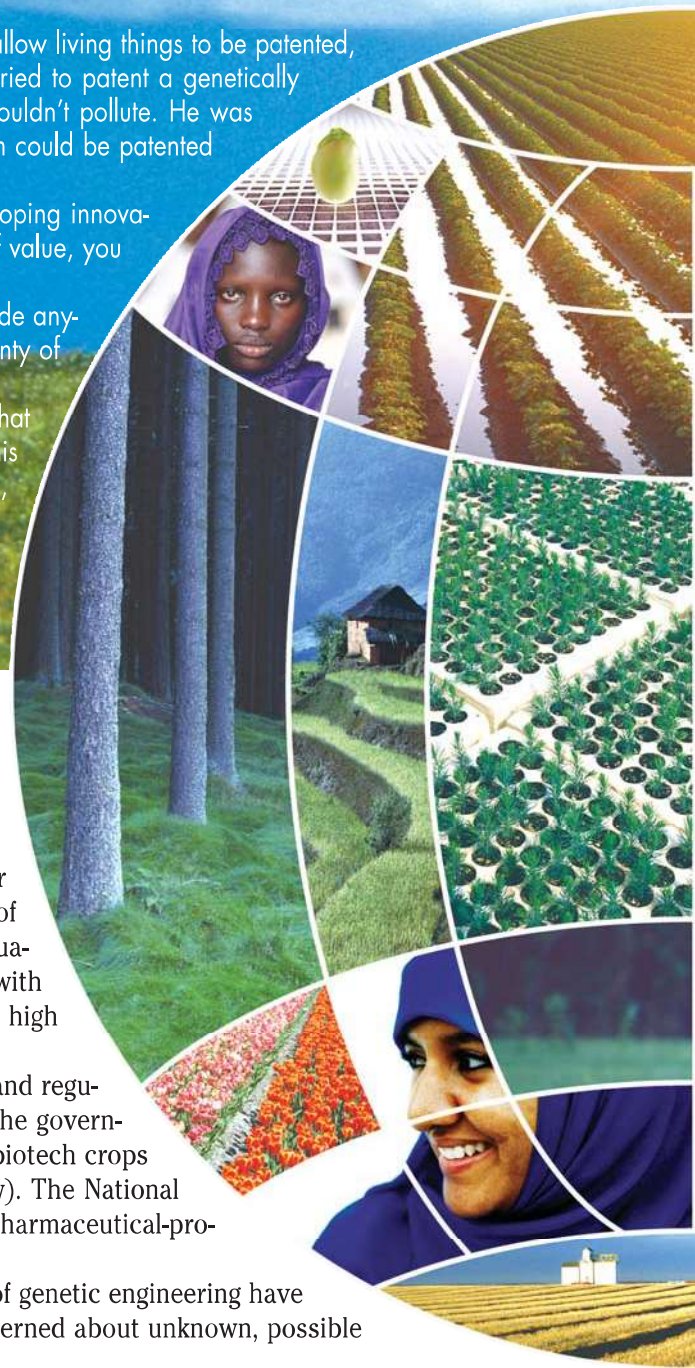
Divided Opinions

The first biotech-derived product on the market was insulin. So far, more than 250 biotech drugs are available to people, and overall people have approved of medical research.

The response to agricultural biotech has been much more mixed. In the United States, farmers have rapidly adopted biotech crops since their introduction in the 1990s. According to a survey by the Pew Institute of Food and Agriculture, Americans feel pretty comfortable with the situation—about half of those polled didn't know that groceries carry food with biotech-derived components. If a food has got soy or corn (including high fructose corn syrup) in it, odds are, it's biotech-derived.

In the United States, people have generally trusted federal agencies and regulations to make sure that what they can buy is safe. Many studies by the government and scientific organizations over the last 10 years have said that biotech crops are as safe as those developed by traditional methods (see box, below). The National Academy in 2004 did issue a precaution to keep some industrial and pharmaceutical-producing GM crops separate from conventional and GM food crops.

Across the Atlantic Ocean, though, very vocal European opponents of genetic engineering have dug in their heels against transgenic plants and animals. They are concerned about unknown, possible hazards to the environment and human health.



Safe? Says Who?

Organizations that have declared biotech foods and crops to be as safe as non-biotech counterparts: U.S. Food and Drug Administration, American Medical Association, U.S. National Academy of Sciences, Food and Agriculture Organization of the United Nations, World Health Organization, International Council of Science, French Food Agency, and the British Medical Association. The European Food Safety Authority has also said several biotech varieties are safe for humans and animals to eat. Plus, more than 3,000 individual scientists (see www.agbioworld.org/).



Find Out ...

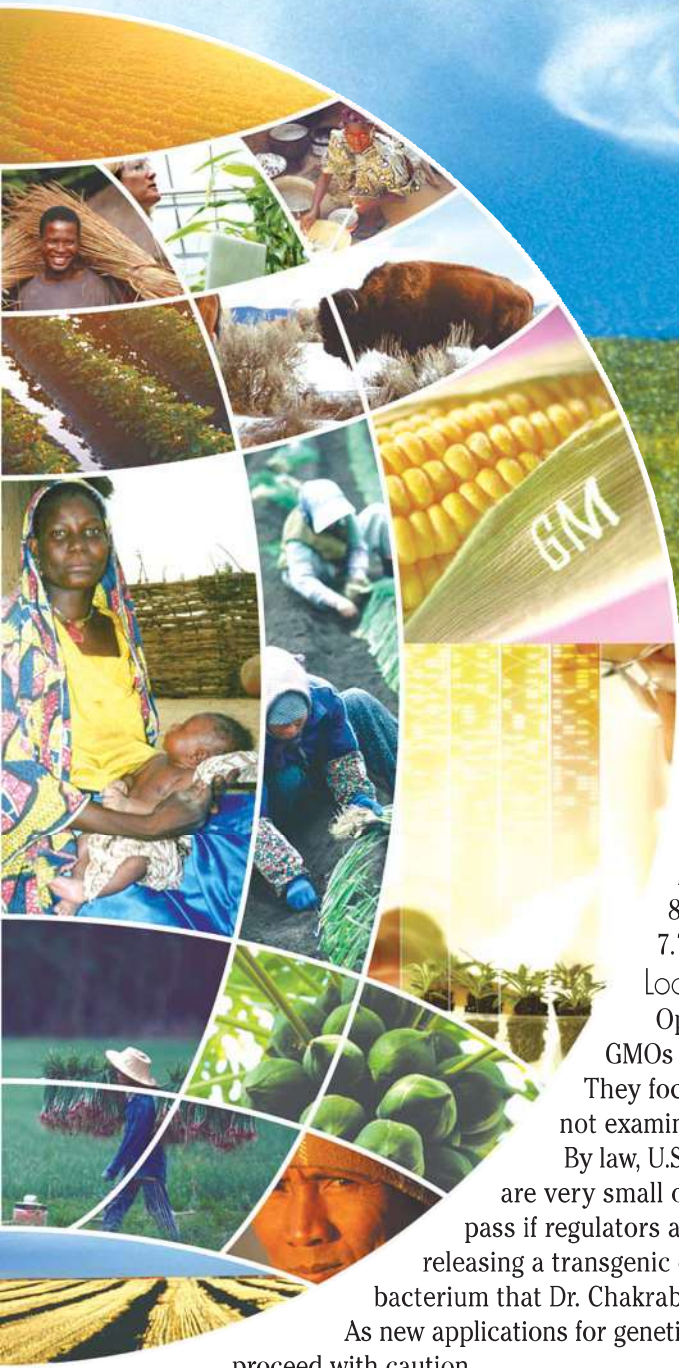
Why Science Can't Prove Who Is Right

<http://aqbiosafety.unl.edu/science.shtml>

How to Assess Risk

<http://aqbiosafety.unl.edu/paradiqm.shtml>

Decide whether changes in the genome are appropriate or not?



Who Benefits?

One criticism lobbed at agricultural biotechnology is that it benefits huge corporations in industrialized countries. North American companies have concentrated on crops with big markets, like corn and soybeans.

But according to the International Service for the Acquisition of Agri-Biotech Applications, biotech crops were grown by approximately 8.5 million farmers in 21 countries last year. In 2005, approximately 7.7 million poor subsistence farmers benefited from biotech crops.

Looking for Trouble

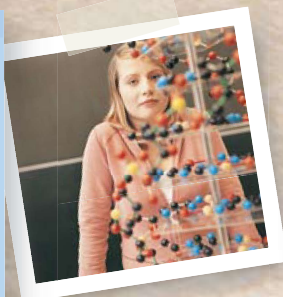
Opponents of GMOs often lump together the potential risks of experimental GMOs with approved GMOs that have successfully passed a safety assessment. They focus only on the risks as if products available for sale to the public were not examined for safety before they are allowed on the market.

By law, U.S. regulators must decide that all potential risks have been examined and are very small or manageable before a product can go on the market. Products don't pass if regulators are not satisfied on this score and are uncertain what long-term effect releasing a transgenic organism into the wild may have. In fact, that's why the crude-oil-eating bacterium that Dr. Chakrabarty made has never been used.

As new applications for genetic transfer become possible, industry and government will continue to proceed with caution.

—Elise LeQuire

In discussions of biotech safety, people often mention the precautionary principle, which is a complicated variation of "look before you leap." Many definitions have been offered, and much has been written on it. To learn more, visit www.cid.harvard.edu/cidbiotech/comments/, http://en.wikipedia.org/wiki/Precautionary_principle, and www.unep.org/Documents.multilingual/Default.asp?DocumentID=78&ArticleID=1163.



To Think About Should biotech foods be labeled?

In Europe, GMOs must be labeled, and caution prevails. The consumer makes the choice. In Canada and the United States, labeling is optional. If a biotech-derived crop is essentially equivalent to a conventional food, as government reports have said, why label it?