

# nature biotechnology

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## Who pulls the strings in biotechnology?

People who spend a good portion of their days and weeks exploring any field will almost inevitably feel a deep commitment to it. And so for those of us who have spent long days watching the useful tools of biotechnology take their nascent shape, our first reaction is to recoil with surprise at the extent to which they are now caricatured only as capitalist tools coopted by transnational corporations for their own profit-driven ends.

Biotechnology, like many other information-based technologies, is evolving at an astonishing pace, but some aspects of its developmental history are not unique. For one thing, developments in significant technologies almost invariably spin out of a culture long before it has the ability to comprehend the why and the what of how any particular technology will change the world we humans constantly shape and reshape for ourselves. And the makers of these technologies, as with most technologies, in turn can almost never themselves predict exactly how society will end up using their creations. But, as Sagar et al. point out in their commentary “the tragedy of the commoners” (p. 2), biotechnology is seemingly unique in its ability to inspire both acceptance and rejection simultaneously, in that its innovations appear to offer both the opportunity for independence and individuality and the possibility of centralization and the concentration of power in the hands of a very few.

What seems clear is that, even though it is only early days for biotechnology—our manipulation of biological material in pursuit of therapeutics and agricultural improvements is simply primitive—many people, whether they understand what it is and how it works or not, believe that it is a high stakes game. And although the battle cries are about safety and risk, in fact most of the core issues center on control and political power—who will get to decide how to use these technologies and by what right will they gain the

authority to do so? The demonstrations at the World Trade Organization meetings last November featuring protesters dressed as beleaguered Monarch butterflies and oversized killer corn may appear at first sight to be detrimental to biotechnology’s future development, and may truly be so in the short term. Ultimately, however, they may help ensure that these tools end up being used for the purposes for which they were first intended—healthier people, better and more readily available food, a less-traumatized environment. The demonstrations are part of the debate—making people focus now on how the products of biotechnology will impact what it means to be a person, a citizen, a community, a nation or a world in this very new century. The more people there are pulling strings, the fewer puppets there will be.

## A Y3K bug

When you consider that we look and sometimes behave much as our hunter-gatherer forebears did, it seems fair to say that as a robust means of transmitting information through millennia, DNA can’t be beat. By contrast, information stored and transmitted by human means has only rarely transcended even a fraction of that time because of the rapid mutability of technology and language. If you’re not convinced, reflect on all that was lost when the library at Alexandria burned. Or try reading the Old English version of Beowulf. Find an eight track tape player and pop in that Bee Gees tape. Or for a more maddening exercise, try to devise a sure-fire way to back up those precious data files so they survive a few operating system upgrades.

The fidelity of Nature’s design, and the tendency for human technologies to drift toward the obsolete, has not escaped virtual-reality innovator Jaron Lanier, Columbia University professor David Sulzer, and conceptual illustrator Lisa Haney. Invited to submit an entry to a *New York Times Magazine* contest for designing a time capsule to reach earth’s inhabitants in the year 3000, their entry did not win (though in our opinion it should have). They did, however, come up with, in the words of one judge, “the most disgustingly brilliant” entry in the competition.

Reminiscent of the speculations of Leslie Orgel and Francis Crick some 30 years ago about alien-directed panspermia using the cosmically robust T2 bacteriophage, in the time capsule proposed by Lanier and colleagues, the contents of every 1999 issue of *The New York Times Magazine* would be converted from the two-digit binary to the four-character genetic code, and spliced into the introns of cockroaches. Then, through a rigorous breeding program, the cockroaches of New York City would be transformed into scurrying little time capsules, copulating madly, and certainly giving earth’s inhabitants of the future at least one product of biotechnology that is guaranteed to survive.

### Some news about research

*Nature Biotechnology* is pleased to announce the establishment of a new publication format for contributions of original research, to be called “Technical Reports.” The aim of this new section is to publish shorter papers (two to three figures; 2000 words) that describe significant technical advances in methodology that promise to enhance its efficiency, utility, or reliability. A second criterion is that the work be of sufficient general interest to appeal to our multidisciplinary audience. Details of the format requirements can be found in the Guide to Authors available on the *Nature Biotechnology* website ([http://biotech.nature.com/info/guide\\_authors/](http://biotech.nature.com/info/guide_authors/)). Presubmission enquiries regarding the suitability of a manuscript for consideration for publication as a Technical Report can be emailed to [biotech@nature.com](mailto:biotech@nature.com) or delivered online via (<http://biotech.nature.com/info/presubmission-form.html>).