

How It Happened That We Don't Regulate Biotech

by Donella Meadows

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Back in the 1970s scientists got their first inkling that they might actually be able to redesign genes. That awesome possibility started an ethical and regulatory flurry. Distinguished panels of scientists met to ask imponderable questions. Could some human-created form of life get loose and carry self-multiplying havoc into the world? How could we prevent such a disaster?

Back then biohazards were considered so dangerous and so likely that gene-splicing research was carried out in sealed labs. The citizens of Cambridge, Massachusetts, where many genetic pioneers worked, forbade such labs within their city limits. Congress debated dozens of bills to regulate genetic engineering.

Then, suddenly, the concern went away. Genetic engineering became routine in academia and a hot field of business competition. Now scientists and corporations create gene-spliced organisms and release them into nature with astounding little oversight.

I always wondered how that happened. It's not as if the serious questions about "genetic pollution" were ever answered. Our ignorance of the health and ecological and evolutionary impacts of gene-spliced crops and other products remains abysmal. But somehow the whole enterprise got a social and regulatory green light. No questions asked. Full speed ahead.

Why? How? When?

A partial answer to that question has appeared in the July issue of "Gene Watch," the bulletin of the Council for Responsible Genetics in Cambridge, Mass. Susan Wright, a science historian at the University of Michigan, happened to find in an MIT archive the transcript of a fateful meeting that took place in 1976 at the National Institutes of Health.

Then, as now, the greatest area of concern was microbes. Higher organisms carry their DNA around in discrete packages inside cell nuclei and release genes into the world only under relatively controlled acts of reproduction. Bacteria and viruses, on the other hand, slosh genes around in a shocking way. They pick them up and drop them off, shuffle them, trade them, and insert them into the supposedly organized genomes of higher forms of life. That's how viruses infect us. It's also one of the ways geneticists paste genes from one kind of critter into another. First they insert a snipped-out gene, from a flounder, say, into a virus or bacterium. Then they use the microbe to smuggle the flounder gene into, say, a salmon.

The problem is that once the gene has been loosened from the organized flounder into the messy microbial world, there's no telling where it might end up. One single-celled bug could pass it to another. For all we know, it could end up in a minnow or a tomato or our own guts.

So in 1976 an august committee of NIH virologists was asked to test this danger. They were to snip out from a virus a gene that causes tumors when the virus infects mice. They were to paste that gene into bacteria and then see whether the bacteria could cause tumors in other animals. If it could, that would not only be evidence that some kinds of gene-splicing might turn cancer into a communicable disease, it would also be evidence that genes unleashed into microbes could go out beyond anyone's recall.

The committee debated what kind of bacteria to use in the test. On scientific grounds the answer was obvious; you seek out the worst case; you use bacteria most likely to thrive and infect the test animals. But the virologists had more than science in mind. They worried about politics, about public controversy, about their own work being tightly regulated. So they chose to use weakened bacteria that were unlikely to do harm.

In short, they fudged the test. Here are some of the things they said, recorded in the transcript of the meeting. "By using known pathogens, it seems to me we go politically in the wrong direction even though scientifically it does make more sense." "If we want to get these experiments done so we can go about our work quickly, maybe one shouldn't introduce problems of this level." "It's molecular politics, not molecular biology, and I think we have to consider both, because a lot of science is at stake."

They wanted "a slick New York Times kind of experiment." But even the weakened bacteria did infect some test animals with tumors. That, says Wright, "had the NIH campus buzzing at the time."

So they fudged again. Those disturbing results were never published in a major scientific journal. To the contrary. A 1979 press conference announced that "this form of research is perfectly safe." The New York Times reported that "the risks are considerably less than had been feared." All through the 1980s and 90s, this study was cited as evidence that bioengineering poses no threats. Only in 1988, at a meeting of federal regulators, did one of them honestly articulate our government's actual policy: "If the American public wants progress, they will have to be guinea pigs."

Next time you hear a regulator or a scientist announcing that gene splicing is safe, think of this story. There is no scientific evidence for that conclusion. We are profoundly ignorant about what we are doing to the code that generates all life. And at least some scientists, particularly those most entrusted with the public safety, are willing to lie.