The Cow Tipping Point

From "Unethical Contexts for Ethical Questions", a lecture by David Ehrenfeld that was given at Yale University last December, published in Harper's Magazine, October, 2002.

Our exploding technology and the resulting worldview that we can manage and tinker with everything on the planet have made these times the most complex in human history. Arriving at practical and ethical decisions about controlling technology has become difficult, especially for laymen, who often find themselves looking on, bewildered, while opposing scientists hurl incomprehensible jargon at one another. But in most of these controversies it is wrong to confine the debate to narrow technical subjects; the right context is usually much broader and far more accessible to the public. Widening the scope of inquiry lets us see truths that cannot be derived from scientific analysis alone. As the physicist and Nobel laureate Philip Anderson wrote in 1972, the more we learn " about the nature of the fundamental laws, the less relevance they seem to have to the very real problems of the rest of science, much less to those of society."

If we confine ourselves to the narrowest scientific context while trying to decide the critical issues of the moment, we are very likely to go astray. This is not a problem for everybody, however. There are those who, for one reason or another – usually for short-term profit – do not care to approach the truth too closely. For them, complexity is a godsend. Like a squid escaping its pursuers in a cloud of ink, they use complexity to obscure their movements, to hide the significance of what they are doing. By selecting the narrowest from the many available contexts in which to evaluate their own actions, and by cloaking those actions in a haze of technological intricacy, they can get away with behavior that society would not countenance if it were thinking clearly. Biotechnology, including genetic engineering, provides many examples of this kind of activity, from genetically modified food to cloning. Perhaps the most egregious is the story of rBGH.

Recombinant bovine growth hormone, rBGH for short, sometimes called recombinant bovine somatotropin, or rBST, is a growth hormone for cattle produced by taking the growth-hormone gene from cows, modifying it very slightly, and inserting it into bacteria, using the techniques of genetic engineering. The altered E. coli bacteria can be grown in vats, producing large quantities of rBGH, vastly more than could be obtained economically by extracting the unmodified growth hormone directly from cows. This rBGH, like its parent gene, is very slightly different from the natural product, having a substitution of just one amino acid for another at the end of the large molecule. In the United States, rBGH is marketed by Monsanto under the name of Posilac. When injected into lactating cows, it increases overall milk yields by approximately 10-15 percent, although greater increases are occasionally observed.

This is a dramatic kind of biotechnology, albeit dependent on a relatively rare phenomenon: a single gene coding for a product that is directly or indirectly commercially valuable. Not surprisingly, the marketing of rBGH has engendered a great deal of controversy, as is the case with all new technologies that cause radical changes in production systems, economics, and cultural systems.
From the beginning, the controversy swirled around two questions: Is the mild of cows injected with rBGH different from the mild of untreated cows: and, if so, is it harmful to the humans who drink it? Second: Does the injection of rBGH into lactating cows harm the animals in any way? Monsanto has no been able to provide an unequivocal no to either of these questions, and this may be part of the reason why Posilac has by many accounts proved to be something less than a cash cow for the company. Yet I imagine that Monsanto would prefer to keep the rBGH controversy confined to these issues, because the context of the questions is pleasingly narrow – in other words, most of the ethical concerns generated by the use of rBGH do not come up at all. Moreover, the two questions, because of their nature, can be drawn into a mire of complex and often contradictory technical and scientific details that make clear judgments difficult to achieve. This confusion works well for Monsanto, because the company wants sales, not judgments.

Is rBGH mild different from other milk? Yes and no. According to a paper published by Samuel Epstein in the International Journal of Health Services in 1996, and earlier reports summarized by T.B. Mepham in the Journal of the Royal Society of Medicine in 1992, rBGH milk contains elevated levels of Insulin-like Growth Factor-1 (IGF-1), a suspected cause of human breast and gastrointestinal cancers. Supporters of rBGH are quick to point out that IGF-1 also occurs in milk from untreated cows, and that its carcinogenic effect is not conclusively proved. Opponents respond that there is at least a three- to fourfold increase of IGF-1 in rBGH mild, and that more of it may be in an unbound, free form, which might be biologically more active. It also should be noted that rBGH itself present in the mild of treated cows, perhaps in elevated levels over the natural hormone, and it is possible that this unnatural protein could cause allergic reactions or, after partial digestion in the human gut, mimic the metabolic effects of human growth hormone. Lots of “mights” and “maybes”, credible suspicion but not proof, no smoking gun. The ink is swirling in clouds.
Let’s look at the second question: Does rBGH injection harm cows?
At first glance, rBGH does not come off so well. According to the manufacturer’s label, use of Posilac causes “feed intake increases over several weeks” after starting injections. No surprise there: the laws of thermodynamics hold for cows. The animals are producing more milk, so they must eat more food. Use of Posilac also “may result in reduced pregnancy rates”, “increases in cystic ovaries and disorders of the uterus”, “small decreases in gestation length and birth weight of calves”, “reductions in hemoglobin and hematocrit values”, periods of increased body temperature unrelated to illness”, “indigestion, bloat, and diarrhea”,

“increased numbers of enlarged hocks and lesions [of the knee]”, “and “disorders of the foot region.” But the biggest health problem for rBGH-injected cows in “an increased risk for clinical mastitis (visibly abnormal milk).” The label says that there is also an increased risk of “subclinical mastitis (milk not visibly abnormal).” “Visibly abnormal milk” means there is pus in the milk.

The label’s recommendations for how to cope with this constellation of problems see quite sensible. Be sure you are ready to deal with increased veterinary problems, presumably by keeping more veterinarians on staff or on call, be ready to differentiate between fevers caused by rBGH and fevers caused by disease: and for cows running a fever, control heat stress, I suppose by means of air conditioning, and implement a “comprehensive and ongoing herd reproductive health program”, whatever that means.

It is worth noting that none of the ailments listed as being associated with rBGH injection are unique to this treatment: cows can get mastitis, bloat, and sore knees even if they are raised under strict conditions of organic husbandry. And Monsanto has pointed out that the increase in mastitis may be a result of increased milk production itself, and thus only indirectly caused by rBGH injections. The clouds of ink thicken. Again, we are left with legitimate worries that have not been properly addressed by the Food and Drug Administration, but also left without an absolutely clear-cut mandate to condemn the technology. In a situation of this kind, what usually happens is a continuation of the status quo. The results of peer-reviewed research produced by independent scientists are contradicted by the results of peer-reviewed research sponsored by the company. Each study, regardless of authorship, is run in a different way under different conditions, making comparisons problematic. Some necessary analyses, such as distinguishing between natural BGH and rBGH in milk, prove difficult or impossible. The federal regulators, some of whom were formerly executives in the regulated industry, feel justified in keeping the product on the market. And the worries persist.

This is the time to widen the context of the inquiry, to reject efforts to keep questions confined to a narrow space where visibility can always be obscured by more convenient ink. I propose to widen the context gradually so that we always know the vantage point from which we are viewing the bioethical landscape. Eventually, the basic truths of the matter should be fairly clear, if they aren’t already; and the conclusions we ought to reach about the technology will be obvious.

The first small step to take is to see what happens when we merge questions one and two. The most solid finding from the inquiry into the effects of rBGH on the health of cows is that treated cows get significantly more mastitis than untreated ones. This is a finding admitted by Monsanto and confirmed by the FDA. Mastitis

in cows, like breast infections in humans, is usually treated with antibiotics, and these antibiotics may well find their way into the milk. In an ideal world, milk containing antibiotics is kept off the market. This is not an ideal world. Government agencies test milk for only a small number of antibiotics, and they do not test every batch; there are many antibiotics that can slip through into supermarket milk. Careless or unscrupulous milk producers may sell milk containing antibiotics, and some may be willing to deliberately treat their cows with antibiotics that they know are not going to be screened in government tests. When antibiotics get into the milk, antibiotic resistance can be transferred from the bacteria normally in the milk to the bacteria that normally live in the intestinal tract of humans, and this resistance can be transferred again during illness to the bacteria causing the disease. The result is that when antibiotics are given to sick people they do not work.

Let's widen the context a little more. I mentioned earlier that rBGH injection increases the food intake of cattle; they need more calories, particularly in the form of protein. One of the best and cheapest sources of high-grade protein is the carcasses of dead farm animals, including sheep, horses, cows, and others. For at least 100 years, the rendering industry has been converting dead animals into food supplements for livestock, but the advent of high-milk-yielding cattle and rBGH has increased the demand for this animal protein in cow fodder. Cows have been turned into carnivores, even cannibals. In recent years, we have become aware, however, that a terrible neurological disease, worse than Alzheimer's, called spongiform encephalopathy, is transmitted from individual to individual and even from species to species by eating brain, nerve, and other tissue from infected animals. In cattle, we call this mad cow disease; in deer and elk, chronic wasting disease; in humans it is Creutzfeldt-Jakob disease; and there is little doubt that it has been spread in England and the Continent by the practice of feeding rendered, processed carcasses of other ruminants to cattle. Here, then, is another serious worry caused by the use of rBGH: will it increase the incidence of spongiform encephalopathy in the United States, where this constellation of diseases already exists?

As we move further and further from the original narrow context, we gradually leave the realm of science and medicine and we enter the territory of ethics, economics, and social well-being. Our next consideration in this widening inquiry takes us to the rights of cattle. Apart from the ethical implications of increased disease caused by rBGH, there are other important questions. Do we have the right to treat cows as if they were mere machines for producing milk, with all the suffering and lack of respect that this implies? Do we have the right to burn them out, to shorten their useful and productive lives, which is what rBGH appears to do? According to the farmer and agricultural writer Gene Logsdon, dairy farmers used to be able to keep their cows on the milking line for twelve to fifteen years; now, with many cows being treated with rBGH, they frequently last only two or

three years. Accordingly, the price of replacement heifers has risen sharply, reflecting the increased demand.

Now we can widen the context again and look at the welfare and rights of dairy farmers, and, beyond that, at the welfare of the communities and larger society in which they live. Matthew Shulman, owner of a small farm in Lansing, New York, and former director of information for the New York State Grange, was one of the first to write on this subject, in 1987. He questioned the claim of proponents of rBGH that this technology is farm-neutral, that if used properly it will work as well on small farms as on large ones. He was concerned with the prohibitive cost of high-tech feed-management systems and high-protein rations, which would price rBGH right out of the market for small farmers. He also noted that the hormone was marketed primarily to large farms anyway.

Four years later, Charles Geisler and Thomas Lyson, professors of rural sociology at Cornell, confirmed Shulman's fears in an article on the social and environmental costs of dairy-farm industrialization. As Geisler and Lyson pointed out, large dairy farms have lower technological diversity, a higher rate of accidents, worse environmental impact, more labor strikes, decreased personal knowledge of individual animals, and finally, greater centralized control and more nonresident owners, with a consequent breakdown in "economic vitality and social cohesion in rural communities." A big part of the problem, they wrote, is debt; farm debt as a percentage of a farm's value increases dramatically as the size of its dairy her increases. And as the debt-to-asset ratio increases, partly to pay for the additional, expensive veterinary care, climate control for feverish cows, and high-priced feed supplements that go along with the use of rBGH, control of dairy farming shifts away from the farmer and the farm community to distant banks.

Once the small dairy farms are gone, the industrialized farms that remain will become completely dependent on the new milk-production technologies because they cannot produce milk any other way. This will lead to the same kind of corporate vertical integration that has placed a few oil, chemical, and pharmaceutical companies in control of much of the world's agricultural seed production, resulting in the rapid, irreversible loss of thousands of agricultural food varieties of great and irreplaceable value, and putting the world's food supply in jeopardy.

There is one more context in which I want to evaluate rBGH. In the eastern states from North Carolina to Massachusetts and beyond, small dairy farms have long given a particular look and character to the rural countryside. Typically, such a farm comprises 80-95 percent upland pasture and 5-20 percent wet grazing areas. The whole is divided into small fields through which the cattle are rotated. It has become clear in recent years that the cows on these small dairy farms

accomplish much more than just milk production. They have serendipitously replaced, in the wetland areas, other large eastern grazing mammals, the mastadons, elk, and bison, which have been progressively eliminated by waves of human settlers, starting eleven or twelve thousand years ago. Like these former native grazers, cows eat and therefore control the invasive, often exotic species that are modifying and eliminating wetland species and plant communities. They eat red maples and alders, phragmites, reed canary grass, purple loosestrife, and similar invasives that otherwise choke out wetland vegetation all over these eastern states. Thus, if you want to find the tiny bog turtle, the fen buck moth, the showy lady's-slipper orchid, or the spreading globeflower – all of them rare and endangered – you will have to go to a small dairy farm, or land that was a small dairy farm until recently; you probably will not find them anywhere else. So here is yet another effect of rBGH: the big, industrialized dairy farms that rBGH promotes, with cows being fed high-protein food supplements in temperature-controlled buildings, do not serve the smaller farms' unexpected function of maintaining the flora and fauna of wetlands.

Given this disturbing roster of direct and indirect problems stemming from the milk-hormone injections, and considering that prior to the introduction of rBGH billions of taxpayers' dollars were spent to buy surplus milk and slaughter surplus dairy cows, why has the government been pushing rBGH so hard? And how have they gotten away with it? The first question is easy to answer: Monsanto has been a major contributor to both the Republican and the Democratic parties. The second question is easy to answer, too. The government has gotten away with it because it has confined the ethical debate to the narrowest possible context, where the waters were muddy and the larger issues lay hidden.

Yet in spite of its conveniently narrow context, the government's case for rBGH is so weak, that only the most skilled political damage control has kept it on the American market. Canada and the European Union have both declined to approve rBGH, primarily because of animal health. Alimentarius, the food safety standards organization of the Food and Agricultural Organization and the World Health Organization of the United Nations, refused to certify rBGH as safe. It effectively tabled the rBGH issue as a way of saving face for the United States, which would have lost a formal vote.

In summary, we must look at the entire picture of the effects of rBGH: not only IGF-1 in the milk and animal health but antibiotic resistance, spongiform encephalopathy, animal rights, the welfare of farmers and farm communities, the well-being of agriculture, and the maintenance of whole ecosystems. Is it legitimate to widen the context so broadly when evaluating a new technology? Yes, it is more than legitimate. It is practically and ethically essential if the truth is to emerge, for the message produced by these overlapping and widened

contexts is really quite simple to understand: rBGH is a very bad technology indeed.

With so many ethical stalemates occurring in agricultural and medical biotechnology, why do we fail to widen the context when we debate these critical issues affecting society? It is not just because we are being kept to a narrow, controllable venue of debate by vested interests, though that is usually the case. Nor is it just that much of the public, dumbed and numbed by television and advertising, is incapable of digesting anything more complicated than a sound bite. I think the deeper problem is that more than two hundred years of potent scientific discoveries and technological inventions – from the steam engine to the laser scalpel – have taught us to believe that science and technology, the fruits of our own reason, constitute the highest power we need consult in our daily lives. In our euphoria we forget that technology is unable, both in theory and in practice, to resolve most of the practical problems that it itself creates. We also forget that science and the exercise of reason cannot by themselves provide the moral framework we need to judge our own inventions. If we restrict the context of our ethical inquiries to a narrow review of selected scientific facts, if we respect only technical information, we will never reach the sources of wisdom best suited to guide us on a just and sustainable path.