

## What's wrong with Genetic Engineering?

Genetic engineering is a radical new technology, one that breaks down fundamental genetic barriers -- not only between species, but between humans, animals, and plants. By combining the genes of dissimilar and unrelated species, permanently altering their genetic codes, novel organisms are created that will pass the genetic changes onto their offspring through heredity. Scientists are now snipping, inserting, recombining, rearranging, editing, and programming genetic material. Animal genes and even human genes are being inserted into plants or animals creating unimagined transgenic life forms. For the first time in history, human beings are becoming the architects of life. Bio-engineers will be creating tens of thousands of novel organisms over the next few years. The prospect is frightening. Genetic engineering poses unprecedented ethical and social concerns, as well as serious challenges to the environment, human health, animal welfare, and the future of agriculture. The following is just a sampling of concerns:

- \* Genetically engineered organisms that escape or are released from the laboratory could wreak environmental havoc. Genetically engineered "biological pollutants" have the potential to be even more destructive than chemical pollutants. Because they are alive, genetically engineered products are inherently more unpredictable than chemical products -- they can reproduce, migrate, and mutate. Once released, it will be virtually impossible to recall genetically engineered organisms back to the laboratory. A report published by 100 top American scientists warned that the release of gene-spliced organisms "...could lead to irreversible, devastating damage to the ecology."
- \* Gene-splicing will likely result in unanticipated outcomes and dangerous surprises. Biotechnology is an imprecise science and scientists will never be able to ensure a 100 percent success rate. Serious accidents are bound to occur. Researchers conducting experiments at Michigan State University recently found that genetically altering plants to resist viruses can cause the viruses to mutate into new, more virulent forms, or forms that can attack other plant species. Some other scary scenarios: foreign genes from genetically engineered plants could be carried by pollen, insects, wind, or rain, and flow into other crops, as well as wild and weedy relatives. Disaster would follow if genetically engineered crop traits, such as insect and virus resistance, found their way into weeds, for instance. Genetically altered plants could produce toxins and other substances that might harm birds and other animals. Genetic engineering of plants and animals will almost certainly endanger species and reduce biological diversity. By virtue of their "superior" genes, some genetically engineered plants and animals will inevitably run amok, overpowering wild species in the same way that introduced exotic species, such as kudzu vine and Dutch elm disease which have created problems in North America. What will happen to wild species, for example, when scientists release into the environment carp, salmon, and trout that are twice as large, and eat twice as much food, as their wild counterparts? Another danger lies in the creation of new kinds of crops and domesticated animals. Once researchers develop what is considered to be the "perfect tomato" or "perfect chicken" these will be the ones reproduced in large numbers; "less desirable" species would fall by the wayside. The "perfect" animals and plants could then be cloned (reproduced as exact genetic copies), reducing even further the pool of available genes on the planet.
- \* Genetically engineering plants to be herbicide-tolerant will lead to increased use of chemicals in agriculture and further contamination of the environment. Biotech companies love to say that genetic engineering will end the use of dangerous chemicals in agriculture. But the leaders in biotechnology are the giant chemical companies like Monsanto, Du Pont, and Rhone-Poulenc; they aren't interested in losing profits from the sale of chemicals. These companies are genetically engineering plants to be resistant to herbicides that they manufacture so they can sell more herbicides to farmers who, in turn, can apply more

poisonous herbicides to crops to kill weeds. In fact, crops genetically engineered to be herbicide-tolerant account for nearly half of the applications for field testing submitted to the U.S. Department of Agriculture (USDA) since 1988. Even genetically engineering crops to produce their own pesticides presents dangerous problems. Pests will eventually evolve that are resistant, then stronger chemicals will be needed to get rid of the pests. And what will happen when the pesticide gene spreads to weeds and other unwanted plants?

\* The genetic engineering of crops and food-producing animals can produce toxic and allergic reactions in humans. Someone allergic to peanuts or shellfish, for example, would have no way of knowing if a tomato or other food had been altered with proteins from these substances, and could have a fatal reaction by eating such genetically altered foods. In addition, genetic engineers can take proteins from bacteria they find in the soil, the ocean --- anywhere --- and incorporate them into human food. Such substances have never been in the food supply before, so their toxic or allergenic characteristics are unknown.

\* Genetically engineered products do not have a good track record for human safety. In 1989 and 1990, a genetically engineered brand of L-tryptophan, a common dietary supplement, killed more than 30 Americans and permanently disabled or afflicted more than 5,000 others with a potentially fatal and painful blood disorder, eosinophilia myalgia syndrome, before it was recalled by the FDA. The manufacturer, Showa Denko K.K., Japan's third largest chemical company, had used genetically engineered bacteria to produce the over-the-counter supplement. It is believed that the bacteria somehow became contaminated during the recombinant DNA process. There were no labels on the product to identify the product as having been genetically engineered. The patenting of genetically engineered foods, and widespread biotech food production, will eliminate farming as it has been practiced since the beginning of humankind's appearance on the planet. If the trend is not stopped, the patenting of transgenic plants and food-producing animals will soon lead to tenant farming in which farmers will lease their plants and animals from biotech conglomerates and pay royalties on seeds and offspring. Eventually, within the next few decades, agriculture will move off the soil and into biosynthetic industrial factories controlled by chemical and biotech companies. Never again will people know the joy of eating naturally produced, fresh foods. Hundreds of millions of farmers and other workers worldwide will lose their livelihoods. The hope of creating a human, sustainable agricultural system will be destroyed.

\* The genetic engineering and patenting of animals reduces living beings to the status of manufactured products and will result in much suffering. In January 1994, then-USDA Secretary Mike Espy announced that USDA scientists had completed genome "road maps" for cattle and pigs, a precursor to ever more experimentation on live animals. In addition to the cruelty inherent in such experimentation (the mistakes are born with painful deformities, crippled, blind, and so on), these "manufactured" creatures have no greater value to their "creators" than mechanical inventions. Animals genetically engineered for use in laboratories, such as the infamous "Harvard mouse" which contains a human cancer-causing gene that will be passed down to all succeeding generations, were created to suffer. A purely reductionist science, biotechnology reduces all life to bits of information (genetic code) that can be arranged and rearranged at whim. Stripped of their integrity and sacred qualities, animals who are merely objects to their "inventors" will be treated as such. Currently, more than 200 genetically engineered "freak" animals are awaiting patent approval from the federal government.

\* No one is regulating genetically engineered organisms adequately or properly testing them for safety. In 1986, Reagan-era policymakers stitched together a patchwork of pre-existing and only marginally appropriate statutes to ease the way for new biotechnology products. But these laws were created years ago to deal with chemicals -- not the unpredictable living products of genetic engineering. To date, no suitable government apparatus has been set up to deal with this radical new class of potentially

overwhelming environmental and health threats. The FDA's policy on genetically altered foods illustrates the problem. In May 1992, then Vice President Dan Quayle, and head of the Competitiveness Council, announced the U.S. Food and Drug Administration's newly developed policy on biotech foods: genetically engineered foods will not be treated differently from naturally produced foods; they will not be safety tested; they will not carry labels stating that they have been genetically engineered, nor will the government keep track of foods that have been genetically engineered. As a result, neither the government nor consumers will know which whole or processed foods have been genetically engineered. Vegetarians and followers of religious dietary restrictions face the prospect of unwittingly eating vegetables and fruits that contain genetic material from animals -- including humans. And health risks will be discovered only by trial and error -- by consumers. USDA oversight is no better. This agency has the conflicting task of both promoting and regulating agriculture, including genetically engineered plants and animals used for food. Indeed, the USDA is a primary sponsor of biotech research on plants and animals.

\* By patenting the genes they discover and the living organisms they create, a small corporate elite will soon own and control the genetic heritage of the plant. Scientists who "discover" genes and ways of manipulating them can patent -- and thus own -- not only genetic engineering techniques, but the very genes themselves. Chemical, pharmaceutical, and biotech companies such as DuPont, Upjohn, Bayer, Dow, Monsanto, Cib-Geigy, and Rhone-Poulenc, are urgently trying to identify and patent plant, animal, and human genes in order to complete their take-over of agriculture, animal husbandry, and food processing. These are some of the same companies that once promised a carefree life through pesticides and plastics. Would you trust them with the blueprints of life?

\* Genetic screening will likely lead to a loss of privacy and new levels of discrimination. Already, people are being denied health insurance on the basis of "faulty" genes. Will employers require genetic screening of their employees and deny them work on the basis of the results? Will the government have access to our personal genetic profiles? One can easily imagine new levels of discrimination being directed against those whose genetic profiles reveal them to be, for example, less intelligent or predisposed to developing certain illnesses.

\* Genetic engineering is already being used to "improve" the human race, a practice called eugenics. Genetic screening already allows us to identify and abort fetuses who carry genes for certain hereditary disorders. But within the next decade, scientists will likely have a complete map of the human genome to work with. Will we abort fetuses on the basis of non-life-threatening impairments such as myopia, because someone is predisposed towards homosexuality, or for purely cosmetic reasons? Researchers at the University of Pennsylvania have applied for a patent to genetically alter sperm cells in animals so traits passed down from one generation to the next can be changed; the application suggests that this can be done in humans too. Moving from animal eugenics to human eugenics is one small step. Everyone wants the best for their children; but where do we stop? Inadvertently, we could soon make the efforts of the Nazis to create a "superior" race seem stumbling and inefficient.

\* The U.S. military is building an arsenal of genetically engineered biological weapons. Although the creation of biological weapons for offensive purposes has been outlawed by international treaty, the U.S. continues to develop such weapons for defensive purposes. However, genetically engineered biological agents are identical whether they are used for offensive or defensive purposes. Areas of investigation for such weapons include: bacteria that can resist all antibiotics; extra-hardy, more virulent bacteria and viruses that live longer and kill faster; and new organisms that can defeat vaccines or natural human or plant resistances. Also being studied are the development of pathogens that can disrupt human hormonal balance enough to cause death, and the transformation of innocuous bacteria (such as are found in human intestines) into killers. Some experts believe that genetically engineered pathogens that can target specific racial groups are being developed as well.

\* Not all scientists are sanguine about genetic engineering. Among the doubters is Erwin Chargoff, the eminent biochemist who is often referred to as the father of molecular biology. He warned that all innovation does not result in "progress". Chargoff once referred to genetic engineering as "a molecular Auschwitz" and warned that the technology of genetic engineering poses a greater threat to the world than the advent of nuclear technology. "I have the feeling that science has transgressed a barrier that should have remained inviolate," he wrote in his autobiography, Heraclitean Fire. Noting the "awesome irreversibility" of genetic engineering experiments being planned, Chargoff warned that, "...you cannot recall a new form of life... It will survive you and your children and your children's children. An irreversible attack on the biosphere is something so unheard-of, so unthinkable to previous generations, that I could only wish that mine had not been guilty of it."

-----

BioDemocracy and  
Organic Consumers Association  
6114 Hwy 61, Little Marais, MN 55614, E-mail: Staff  
Activist or Media Inquiries: (218) 226-4164, Fax: (218) 226-4157