

# Genetic Engineering: A Buddhist Assessment

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What might it be like to be a Buddhist in a future world where your life started with your parents designing your genes? In addition to screening for unwanted genetic diseases, they would have selected your genes for sex; height; eye, hair, and skin color; and, if your parents are Buddhists, maybe even for genes that allow you to sit easily in the full lotus position. Pressured by current social fads, they may also have chosen genes whose overall functions are not clearly understood but are rumored to be connected with temperament, intelligence, mindfulness, and perhaps psychic powers. (There is no longer any need to search for reincarnated lamas. They now clone themselves and get reborn in their own clones.) If your parents are poor, they may have been paid to design you with genes tailored for a particular occupation, together with a pre-birth contract for future employment. As in the film *Gattaca*, you probably belong to a clearly defined social class according to the degree of your genetic enhancement. Of course there may still be a few weird, unenhanced naturals-by-choice meditating in the mountains.

In this future world, from the very first milk you suckle, your food is genetically engineered. The natural world is completely made over, invaded and distorted beyond recognition by genetically engineered trees, plants, animals, insects, bacteria, and viruses—some planned, some running amok. Illnesses are very different too. Most of the old diseases are gone or mutated into new forms, yet now people are suffering from the onslaught of genetically engineered pathogens that were either used in biowarfare, or mistakenly released into the environment, or recombined in toxic form from originally harmless but rapidly mutating engineered organisms. Genetic engineering is so commonplace, you started your own simple experiments with it in elementary school.

That future is more plausible than you might think. From a Buddhist perspective, we need to analyze how current developments in genetic engineering are providing the causal seeds that will influence the worlds of the future. Because genetic engineering has the potential to radically transform both nature and human nature, it poses a much greater threat than other technologies.

According to Buddhist teachings, nature as we experience it is a label for the shared karma of sentient beings on the planet, and human nature is a karmic mixture of thought and emotion that has to be transformed on the path to enlightenment. Since karma—and suffering—will still be with us in the Brave New World, some have suggested that genetic engineering is not a big deal for Buddhists, that the work cut out for us now will, essentially, not change. But maybe we should take a deeper look.

What, for instance, is the relation of genetic engineering to our potential for enlightenment and its realization? The Buddhist view is that the condition of our bodies and nervous systems affects our minds and vice versa. That is why karmic-based ethics insists on purity of both mind and body as a prerequisite for spiritual progress. For example, when we meditate, subtle physiological changes take place in our bodies that resonate with our level of spiritual progress. The deeper our meditation, the more profound the body-mind transformation. Likewise, from the time of the Buddha, Buddhists have recognized that certain geographical locations have special natural energies that enhance progress in meditation and insight.

Genetic engineering has the potential for altering both our bodies and environments in ways that lessen their ability to support the process of personal transformation. For instance, when a person takes drugs, the bodily physiology becomes altered in a way that makes meditation more difficult; similarly, genetic engineering may impact our bodies in ways as yet unknown that will impede our progress on the Path. Even if there is only a relatively small possibility of genetic engineering affecting progress on the path to enlightenment, it is a serious cause for concern. Because science deals only with the physical realm, no scientific experiment can possibly assess this kind of risk.

Another key concept, which Buddhism cherishes and science ignores, is the first moral precept: the principle of non-harming and respect for all sentient life and for its potential for enlightenment. (Sentient beings have central nervous systems, so they are aware of pain. Plants are not considered sentient.) Important corollaries are the alleviation of suffering and the notion of selfless compassion as a guiding principle in our actions.

Buddhism, then, condemns any instrumental use of human or non-human sentient life by geneticists, or anyone else. That means Buddhists shouldn't treat sentient beings as objects or tools to be used without regard for their own wishes or aspirations. Thus, the Buddhist approach to genetic engineering begins with analyzing its effect on life, how it creates or alleviates suffering, and how it aids or cripples the efforts of sentient beings to realize their potential for enlightenment.

Some geneticists are well intentioned in their desire to use genetic engineering in altruistic ways. For example, in agriculture they are trying to increase yields and resistance to harmful insects. In the field of medicine they are trying to develop new genetic cures for cancer and inherited genetic diseases. Yet many get caught up in their own desires for profit, power, and fame.

Even well-intentioned efforts often look dubious from a Buddhist viewpoint. Animals are transformed genetically in ways that are often cruel, and humans are being treated as guinea pigs to test genetically engineered food. The basic health of ecosystems and the long-term health of life on the planet are also disregarded.

The second moral precept is the prohibition against stealing. Yet, biotech corporations and even some universities are stealing our genes, the genes of indigenous peoples and of native herbs and plants, patenting them, and then charging for their use. The Buddhist approach is much different. The Buddha taught that, in interacting with others and with the environment, we should emulate the honey bee as it takes pollen from flowers. The advantage is mutual and there is no harm.

Furthermore, Buddhism understands the cosmos as an open system. In contradistinction, the scientific method usually operates within hypothesized artificial and closed systems that are assumed to have some meaningful, but incomplete and imperfect, correspondence with the “real” world. What seems to be the case in the laboratory may or may not be valid in the natural world. Scientific methodology cannot, because of its inherent limitations, assess the full extent of the possible effects of genetically engineered alterations on living creatures in a world that is an open system.

From the viewpoint of basic Buddhist morality, specific developments in genetic engineering are troubling and point to a future riddled with ethical uncertainty and complexity. Buddhist practitioners first need to know what is actually going on in the field, before they can do their own karmic analyses of how they and the world we all live in will be affected in ways that are important to them and what their appropriate responses might be. The following is a representative sampling of some of the areas of greatest ethical concern.

Plants and food continue to be subjects for genetic engineering. The Delta & Pine Land Company received a U.S. patent on a technique that genetically alters seed so that it will not germinate if replanted a second time. The seeds lose their viability unless sprayed with a patented formula, which contains primarily antibiotics. Monsanto Corporation wants to use this “Terminator Technology” to keep farmers from collecting genetically engineered seed, forcing them to buy it every year.

To avoid dependency on petroleum-based plastics, some scientists in the United States, Europe, and Canada have genetically engineered plants that produce plastic within their stem structures. They claim that it biodegrades in about six months. If the genes escape into the wild, we might find natural areas littered with the plastic spines of decayed leaves. Aesthetically repugnant, the plastic also poses a real danger since it has the potential for disrupting or killing entire food chains. It can be eaten by invertebrates, which in turn are eaten, and so forth. Dr. John Fagan, Professor of Molecular Biology at the Maharishi University of Management and formerly research group leader at the National Institutes of Health, has warned that the new constituents used in these plastics are oils that are probably toxic to animals.

Another distressing idea is to genetically engineer plants with scorpion toxin that would kill any insects feeding on the plants. The prominent geneticist Joseph Cummins, Professor Emeritus of Genetics at the University of Western Ontario, warned that such genes could be horizontally transferred to the insects themselves, thereby risking the creation of insects whose stings or bites would inject scorpion toxin into their victims, including us. Nonetheless, research and field-testing continue.

Many scientists have claimed that the ingestion of genetically engineered food is harmless because stomach acids break down the engineered substances. According to research, however, significant portions reach the bloodstream and also the brain cells. Furthermore, the natural defense mechanisms of the body’s cells are not entirely effective in keeping the genetically engineered substances out of the cells. Recent experiments show that genetically engineered organisms can mutate up to thirty times faster than normal ones, so they are a serious potential health hazard.

The creation of xenographs—genetically altered animals which often contain human genes—is one of the more horrendous uses of this technology. Often experiments result in horribly deformed animals that have to undergo terrible suffering. Even when experiments are “successful,” the scientific model is that of the animal as a factory which efficiently produces some substance—meat, milk, or pharmaceuticals—for human consumption. What Buddhists need to pay attention to here are the degrees of negative karma.

The killing of animals for meat violates the precept against killing. Factory farming adds incredible suffering to the lives of animals before they are killed. The creation of xenographs is an even more fundamental violation of the animals’ lives. Whether or not the genes inserted to create new animals are human ones, xenographs are created for human use and patented for corporate profit without regard for the suffering of the animals, their feelings, thoughts, natural life-patterns, or potential for enlightenment.

Recent examples of this type of genetic engineering include putting human genes into fish to make them grow faster. PPL Therapeutics, based in Edinburgh, Scotland; the Biotech companies Nextran and Alxion in the United States; and others are racing to place human genes into pigs in order to genetically match them to human individuals. In other words, you can have your own personal organ donor pig with your genes implanted. When one of your organs gives out, you can use the pig’s.

Of course, many would say that it is better to sacrifice the pig so that they or their loved ones can live, even though such thoughts and actions are not in accord with the ideal of the Bodhisattva. Yet, other more humane solutions are available. For instance, in some Western European nations, everyone is considered a potential organ donor unless they specifically file with the government not to be, so there is no shortage of organs for transplant there and no need for sacrificing genetically engineered pigs.

As more and more human genes are being inserted into non-human organisms to create novel forms of life that are genetically partly human, new ethical questions arise. What percent of human genes does an organism have to contain before it is considered human? For instance, how many human genes would a green pepper have to contain

before you would have qualms about eating it? This is not merely a hypothetical query. The Chinese at Beijing University are now putting human genes into tomatoes and peppers to make them grow faster. For meat-eaters, the same question could be posed about eating pork with human genes. And what about the mice that have been genetically engineered to produce human sperm?

What about humans, themselves? A few years ago Granada Biosciences of Texas applied to the European Patent Office for a patent on a so-called “pharm-woman,” the idea being to genetically engineer human females so that their breast milk would contain specialized pharmaceuticals. Work is also ongoing to use genetic engineering to grow human breasts in the laboratory. Not only would they be used for breast replacement needed due to cancer surgery, but could easily foster a vigorous commercial demand by women in search of the “perfect” breasts. Geneticist Jonathan Slack of England’s Bath University has recently proposed genetically engineering headless humans to be used for body parts. Some prominent geneticists, such as Lewis Wolpert, Professor of Biology as Applied to Medicine at University College London, have supported his idea.

Gene therapy for replacement of “defective” human genes that are associated with the risk of contracting diseases involves the intentional introduction of new genes into the body in an attempt to modify the genetic structure of the body. Since genes easily move from one organism to another, introduction of a new gene can have unforeseen effects. Gene therapy is also subject to the slippery slope that leads to “designer genes.” One indication that the slope is becoming more slippery is the experimental administration of genetically engineered growth hormone to healthy children who are simply shorter than average but whose parents would like them to be taller.

When considering the potential of genetic engineering for curing illness, we should remember that, according to Buddhist teachings, we get sick for one of two main reasons. Our “four elements” may become imbalanced, which may be roughly interpreted in modern terms as “we are run-down and our resistance to pathogens is low.” And sickness or a shortened lifespan may in some instances be karmic retribution for the taking of life. As Buddhists, we should be especially sensitive to geneticists’ degradation of what it means to be a human being. Do we want a “cure” at any price? We may want to ask ourselves whether the karma from the harming of life involved in the development and application of the gene therapy is going to cause us even heavier karmic problems down the road. Or how are transgenic animal body parts in our bodies going to affect the human quality of our everyday awareness?

Viruses pose special dangers when they interact with genetically engineered organisms. Plant, animal, and human viruses play a major role in the ecosystems that comprise the biosphere and are thought to be one of the primary factors in evolutionary change. Viruses have the ability to enter the genetic material of their hosts, to break apart, and then to recombine with the genetic material of the host to create new viruses. Those new viruses then infect new hosts, transferring new genetic material to the new host. When the host reproduces, genetic change has occurred. We can presume that ordinary viruses, no matter how deadly, if naturally produced, have a role to play in an ecosystem and are regulated by that ecosystem.

If cells are genetically engineered, then when viruses enter cells—whether human, animal, or plant—this material can also be transferred to the newly created viruses and spread to the viruses’ new hosts. Since viruses with genetically engineered material could never naturally arise in an ecosystem, there is no guarantee of natural defenses against them. This alone might lead to widespread death of humans, animals, or plants, thereby temporarily or even permanently damaging the ecosystem. Widespread die-off of a plant species can affect its whole ecosystem, and the possibility of widespread die-off of human beings should command our attention.

The notion that ecosystems can ultimately deal with any threat, however extreme, is without scientific basis. No evidence exists that the life and welfare of human beings have priority in those self-organizing systems. Nor is there any evidence that anything in those systems is equipped to deal with all the threats that genetically engineered organisms may pose.

Genetic engineering can affect the whole of nature, as well. In Buddhist terms, “nature” refers to the patterns of causes and conditions that reflect the karma of sentient beings. In terms of respect for life, which is the foundation of all Buddhist practice, nature can also be understood as the sum total of ecosystems that support life; it is the essential condition for preserving living beings from harm. Humans, animals, and other sentient beings are dependent upon a wholesome environment for a healthy life. Harming that environment causes those sentient beings to suffer, and, ultimately, to die prematurely. Harming life energy itself, even on the level of microorganisms, can have deleterious effects on more complex organisms because of the interconnectedness of all life.

Furthermore, nature as wilderness provides an effective place for meditation, one where rapid progress can be made. In self-cultivation, harmony with nature involves the ability to find a place for practice where the natural energy is auspicious. Nature acts as a mirror for seeing the deep workings of our own body-minds. When we are alone in the wilderness, the distinctly human afflictions of others are absent, and so cannot reinforce our own afflictions. Imagine what would happen if we genetically engineered ourselves so that we could no longer resonate with the natural patterns of nature. These are not the kinds of concerns that can be laid to rest by any scientific data.

Biogenetic warfare is the most serious short-term threat of genetic engineering to human life. Because Buddhism is a fundamentally pacifist tradition, it should be gravely concerned with the use of genetic engineering in warfare as an efficient means for causing widespread suffering and death. International terrorists have already begun seriously considering the deployment of genetically engineered viruses. This use is almost impossible to regulate because the same equipment and technology that are used commercially can easily be transferred to military application. During the late 1980s, the former Soviet Union had 60,000 people working on biowarfare, including genetically engineered

pathogens. In one of their more frightening projects, they attempted to combine smallpox virus with Ebola virus. No one knows for sure where most of the scientists have gone, or what they have taken with them.

In June, 1997, U.S. Secretary of Defense William Cohen warned about “certain types of pathogens that would be ethnic specific so that they could eliminate certain ethnic groups.” Several countries have reportedly already been genetically engineering viruses that target specific ethnic groups.

Despite the benefits of genetic engineering trumpeted in the media—primarily to repair genetic flaws, cure disease, and increase food production—in the overwhelming number of cases, I believe the price is too high to pay. To insure megaprofits for multinational corporations well into the next century, we will have to mortgage the biosphere, seriously compromise life on the planet, and maybe even harm our potential for enlightenment. Genetic engineering poses serious risks to human health and to the environment. It raises serious ethical questions about the right of human beings to alter life on the planet, both sentient and non-sentient, for the benefit of a few.

What makes genetic engineering special is both its power and its irreversibility. Its ability to harm human, animal, and plant life is a quantum leap greater than most other technologies and does not leave room for mistakes. Results of flaws in this technology cannot be recalled and fixed, but become the negative heritage to countless future generations.

If there are some areas of genetic engineering that can safely benefit humanity while respecting other forms of life, then efforts need to be redoubled not only in the area of scientific risk assessment and use of the precautionary principle, but also in developing broad ethical guidelines. Since the scientific establishment is acknowledging the need for public input, there is a window of opportunity for introducing the perspective of Buddhist ethics to current moral questions about proposed research in genetic engineering. It is also important for the public to demand scrutiny and regulation of the industry’s revolving-door relations with academia and government.

Can we really have an influence? Even slowing the inexorable progress of the current trends will be extremely difficult. Yet there is hope. Fortunately, a vocal minority of well-trained scientists in the field, such as Prof. Stuart Newman of the Council for Responsible Genetics, Prof. Richard Strohmann of the University of California at Berkeley, Dr. Mae-Wan Ho of Open University, Drs. Margaret Mellon and Jane Rissler of the Union of Concerned Scientists, to name just a few, see the dangers of what is occurring and are brave enough to voice their consciences. Clearly the key is educating the public about what is happening. We need to have confidence that ordinary citizens working together can build a foundation of collective wisdom that can show us the way through the incredibly complicated maze of issues surrounding genetic engineering. Can we make the problems go away? Probably not. But successes are possible: The Third World Network, under the leadership of Prof. Vandana Shiva, has mobilized India and other underdeveloped nations to resist multinational corporations in search of genetic profit. In Europe, heightened public awareness of the dangers of genetically engineered foods has recently forced the major corporate players to back off from plans for their widespread introduction there. Here in the United States, the organic food lobby, the Mothers for Natural Law, and others have orchestrated a public education campaign about the dangers of such food, so that attempts to include genetically engineered food as organic under the National Organic Standards Rule have not succeeded.

From a Buddhist perspective, the problems with genetic engineering are no different in principle from most other problems we face in our daily life. They are all the result of afflictions—desire, anger, ignorance, and so forth. What makes the situation with genetic engineering unique is the difference in the degree of damage it can do to life on the planet and the irreversibility of its effect on us and on the environment. There is probably not a single answer to the question of what Buddhists should do about these problems. Some may decide to work actively with the many groups trying to raise public awareness and stop the most blatant dangers. Others may prefer to work directly on the mind ground and try to generate the wisdom and compassion that transforms the minds of all sentient beings toward awakening. Yet others will undoubtedly put their heads in the sand and let the karma fall where it may.

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