

Fooling With The Code

by Richard T. Ritenbaugh

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From all indications, Albert Einstein, the famous physicist best known for his Theory of Relativity, believed in a Creator God. He often spoke of God in very humble and reverent ways:

- » "I want to know God's thoughts; the rest are details."
- » "I am convinced that He does not play dice."
- » "God is subtle but He is not malicious."

What form Einstein's religion took is an entirely different matter; he very infrequently participated in organized religion. However, his attitude toward God was one of open-mouthed admiration and awe over His limitless creativity and attention to detail and order. Of all people, he understood the vast mind and power it takes to design, order, create, and sustain such a grand work as the universe. From huge galaxies to subatomic particles, God is the master of them all.

When mankind, led by Germany, the Soviet Union and the United States began meddling with atomic and nuclear power, Einstein felt dread, not necessarily just because of the destruction they could wreak. The great scientist also feared God's reaction to the opening of this Pandora's box. He is said to have mused that, the nuclear menace having been released, the Creator would appear at the conference table of the scientists, pull out His watch, and say, "Quitting time, gentlemen."

More than 50 years have passed since then, and it seems God has decided not to intervene to stop man's meddling with the atom. Now scientists, comfortable with their understanding of things nuclear, have turned with eager attention to breaking the code of life. We frequently hear of advances in DNA research, cloning, transgenics, gene therapy and other genetics-related fields. Each advance is greeted with acclaim and hope and only a handful of dissenting voices.

Yet some of these dissenters raise interesting, ethical questions. What are the long-range effects of genetic manipulation? What will it do to our food? If a human were cloned, would God recognize the result as human? Should humans even try to play God? How far will God let us go? What does He think about our incursion into His area of expertise, creation?

Hello, Dolly

In February 1997 the world was introduced to Dolly, a sheep cloned by transferring chromosomes from a donor cell (in this case a mammary cell) into a recipient cell (an unfertilized sheep egg cell). An electrical current then stimulated these cells to fuse. The resulting embryo was implanted into the uterus of a surrogate mother and allowed to mature normally. Dolly, then, is an identical copy of an adult sheep and an organism reproduced without a male or female parent. She is a clone.¹

Dolly was not the first organism to be cloned. Laboratories have been cloning plants and animals as diverse as corn and mice for about 25 years now. What made Dolly significant is that she was cloned from a specialized adult cell. Dr. Ian Wilmut and his colleagues, the scientists at the Roslin Institute near Edinburgh, Scotland, where she was cloned, somehow made the process work in reverse.

The Roslin Institute, along with many other research labs around the world, is funded by a pharmaceutical company interested in "pharming," that is, producing medicines in the bodies of genetically altered animals. Other labs are trying to grow organs in animals, particularly pigs, that could be transplanted into humans and not be rejected. Another area of interest is cloning animals, particularly mice and primates, with particular defects (for example, a high susceptibility to breast cancer) for study by scientists looking for cures for human diseases.

Biotechnology has also encroached significantly upon the plant kingdom. Certain food-producing plant species have been genetically modified for a number of reasons. Primarily, however, agriculture-related corporations, such as Monsanto and Archer-Daniels-Midland (ADM), have worked to produce disease- or pest-resistant strains of cultivated crops to increase yields. Other changes desired are cosmetic (uniform size, shape and color), size (larger or smaller), weather-resistance (to frost, wet or dry conditions), nutritional (higher levels of proteins, vitamins or minerals), faster growth and increased shelf-life.

Because this branch of science is so young, the relatively unknown long-term effects of fooling with the DNA of living organisms are the most troubling to the average observer. Though generations of plants and mice have shown no "Frankenstein" tendencies, how these changes will react in humans over several generations is not as certain. Whether they will increase the risk of cancer, disease, birth defects, allergies or toxic reactions has not been answered satisfactorily in all cases.

Environmental concerns are also justified. Some have raised such questions as:

- » Will the new organism cause the extinction of the natural one?
- » If it does not cause the natural organism's extinction, will the new one become dominant and "weed like"?
- » Will the target pest or disease develop a resistance to the new organism and become a "superbug"?
- » How will the new organism affect other natural organisms in the environment, such as predators, prey or others in a symbiotic relationship to it?

Though proponents of genetic engineering of food-producing plants and animals regard these concerns as fear mongering, the general public considers these questions relevant and responsible. The vast majority of people want assurances that their food and health are safe.

Salmon Strawberries

That some foods are already genetically engineered raises religious questions too, particularly from Jewish quarters. For instance, a laboratory has produced a freeze-proof strawberry by combining the fruit's DNA with a bit of salmon DNA that keeps the fish from freezing in icy waters. Those who have tasted the new strawberry say it does not have even a hint of a fishy taste. But a "salmon strawberry" is just plain unnatural.

Currently, the U.S. government allows 36 genetically engineered foods to be sold, up from none just three years ago.² One-third of American corn, soybeans and canola comes from altered, pest-resistant seed. This means that we are eating these foods already—primarily through additives, oils, corn sweeteners and livestock feed—as meat, sweets, soda, pasta, salad dressings, etc. The government does not require food manufacturers to warn consumers that their food contains genetically modified ingredients.

Because of this, Jewish, Muslim, Buddhist and some Christian denominations have banded together to sue the U.S. Food and Drug Administration to force the agency to perform extensive safety testing and mandate labeling of genetically modified food products. Doing so pits these groups against, not only the American government, but also such corporate heavyweights as the aforementioned Monsanto and ADM, as well as DuPont, Novartis and several other cutting-edge, multinational corporations. Despite the odds, the plaintiffs, supported by a growing list of doctors and scientists, are making headway.

Spurred by potential profits, these huge companies make the pitch that biotechnology will produce heartier, more nutritious, longer-lasting strains, maybe even foods that will deliver vaccines. They say that the new varieties are in reality no different from ordinary fruits, vegetables and grains. The problem for them, however, is that their products do not yet live up to their billing. All that they have successfully—and profitably—produced is pest- and disease-resistant crops, and this is *prima facie* evidence that they are not "natural."

Jews are particularly uneasy about these genetically altered foods because of their kosher laws. Some critics are saying that such products violate *kilayim*, a set of Jewish laws prohibiting hybridization, that is, these foods break God's law against the intermingling of species. This is based on Jewish interpretation of Leviticus 19:19: "You shall not let your livestock breed with another kind. You shall not sow your field with mixed seed."

Surprisingly, the rabbinical authorities have ruled that genetically engineered foods are kosher, reasoning that the foreign material injected into the base organism is so minuscule as to be negligible. They have also concluded that, since the inserted material becomes part of its host species, it does not fit the kind of hybridization contemplated by Leviticus. Lastly, the rabbis have figured that the good that these new foods will do—for instance, feeding the poor, reducing pesticide use and someday introduce life-saving vaccines—far outweighs their harm.

Since then, however, some rabbis and their advisors have begun to rethink their conclusions. The catalyst for their change of heart is the increasing scientific and medical uncertainty about long-term effects. Genetically engineered species could introduce harmful, irreversible changes—and not just to their own species. One harrowing and possible example is that, since genetically engineered plants often contain the genes of antibiotic-resistant bacteria, in a human stomach the bacteria could be transformed into a pathogen resistant to current medicines. Though this is an extreme example, it is hypothetically possible.

Human Genes Too

Though President Clinton has banned scientists from cloning humans, the prohibition does not cover using human genes in animals. The Associated Press released a story on February 22, 1999, saying that a top-secret farm in the Northeast is growing pigs whose DNA has been altered with human genes. The goal is to produce pigs whose organs can be used in humans without rejection.

There are risks in this case as well. The greatest fear is that, not only will the organ be transplanted, but also pig diseases. Because a transplant patient's immune system is suppressed by drugs, it provides the ideal environment for a pig virus to mutate. Scientists, though, say they can now identify and screen out all retroviruses unique to pigs. Because of high demand for organs—more than 40,000 Americans are waiting for donor organs—the public seems willing to accept their claims.

Beyond these health concerns are ethical and moral ones, especially when human DNA is involved. A *Time* poll taken in March 1997 shows that a majority of people feel that "improving" or cloning plant and animal species is fine, but hesitate to endorse experiments using human genetic material. This is a humanistic double standard that allows man to "play God" with lower life forms but not with himself.

Obviously, because genetic engineering is such a modern concept, the Bible's argument is much simpler, though no less authoritative. It starts with the conviction that

... by Him [Jesus Christ] all things were created that are in heaven and that are on earth, visible and invisible. . . . All things were created through Him and for Him. And He is before all things, and in Him all things consist. (Colossians 1:16-17)

Malachi 2:10 asks, "Have we not all one Father? Has not one God created us?" Paul echoes this in Ephesians 2:6, "[There is] one God and Father of all, who is above all, and through all, and in you all." Only God is Creator and Lifegiver, and any man who presumes to take these divine prerogatives calls judgment upon himself.

Biotechnology Is Nothing

God asks through Isaiah:

"To whom then will you liken Me, or to whom shall I be equal?" says the Holy One. Lift up your eyes on high, and see who has created these things. . . . Why do you say, O Jacob, and speak, O Israel: "My way is hidden from the LORD, and my just claim is passed over by my God"? Have you not known? Have you not heard? The everlasting God, the LORD, the Creator of the ends of the earth, neither faints nor is weary. There is no searching of His understanding. (Isaiah 40:25-28)

Men are trying to bring God down to their level—or to raise themselves to His level—and God lets us know that He is aware. Yet He is also patient, and He will act only when it best suits His plan.

He continues in the next chapter, speaking of man's idols:

"Present your case," says the LORD. "Bring forth your strong reasons," says the King of Jacob. "Let them bring forth and show us what will happen; let them show the former things, what they were, that we may consider them, and know the latter end of them; or declare to us things to come. Show the things that are to come hereafter, that we may know that you are gods; yes, do good or do evil, that we may be dismayed and see it together. Indeed you are nothing, and your work is nothing; he who chooses you is an abomination." (Isaiah 41:21-24)

Many people have made science and technology into idols, believing that with just the right amount of research, funding, time and a little luck, they can solve all of mankind's problems. God's answer is clear: "You are nothing, and your work is nothing." He challenges them to produce, knowing that their attempts are futile and doomed.

They may indeed "do good or do evil" to some degree, but we should not be overly concerned. God sees their work, and He will send His Son to establish the Kingdom of God on earth before they can

do massive, irreversible harm. Then, in His wrath He will direct His armies to "destroy those who destroy the earth" (Revelation 11:18).

We have His promise that in the Millennium:

The wolf also shall dwell with the lamb, the leopard shall lie down with the young goat, the calf and the young lion and the fatling together; and a little child shall lead them. The cow and the bear shall graze; their young ones shall lie down together; and the lion shall eat straw like the ox. (Isaiah 11:6-7)

And none of them will be genetically modified, engineered or altered in any way!

¹ Dolly gave birth to her first lamb, Bonnie, on April 25, 1998, proving that clones are not sterile.

² These include, among others, milk, cheese, tomatoes, potatoes, squash, corn, soybeans, canola and yeast—along with their related products. As of August 1995, the FDA had reviewed more than 1,500 submissions for field trials of genetically engineered foods.