

The many "faces" of biotechnology

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Abstract

Science of biotechnology is a combination of biology and technology. Modern biotechnology includes the industrial use of recombinant DNA, cell fusion, novel bioprocessing techniques, and bioremediation. Futurists predict that in the 21st century biotechnology will outgrow its academic roots and become a key commercial technology, doing more for mankind than the semiconductor chip has done during the 20th century. The mutation may be considered as science fiction, which is a "mixture" of what can happen in the future, of fantasy and of entertainment. Will it be possible to create a Clinton-Kennedy combination or similar ones? The answer is not clear, but the challenge is completely in the hands of biotechnology. [Life Science Journal. 2007; 4(2): 76 – 77] (ISSN: 1097 – 8135).

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The science of biotechnology is a combination of biology and technology to make or modify products, improve plants or animals, or develop microorganisms for specific uses. Modern biotechnology includes the industrial use of recombinant DNA, cell fusion, novel bioprocessing techniques, and bioremediation. Future biotechnology may be engaged in human creation. The pictures on the back page, demonstrating the above interaction, aim at illustrating the major objective of this series of Art & Science articles, that Art can be a tangible means to illustrate Science. It aims also to educate people to see Science through the 'eyes' of Art and vice versa.

Modern biotechnology, surprisingly, is very ancient, about 5700 years. The first biotechnologist was God, as indicated in Genesis 1:27: "So God created man in his own image, in the image of God he created him ...". Is not this what modern biotechnology is striving at? Regarding this point, President Bill Clinton said on June 2000 after the announcement that the first draft of the Human Genome Project was completed: "Today we learn the language by which God created life." The second example from Biblical times is related to the first wine production by Noah in Genesis 9: 20 – 21: "Noah, a man of the soil,

proceeded to plant a vineyard. When he drank some of its wine, he became drunk and lay uncovered inside his tent." It is quite clear, although not elaborated, that Noah manufactured the wine by some biotechnological process.

Futurists predict that in the 21st century biotechnology will outgrow its academic roots and become a key commercial technology, doing more for mankind than the semiconductor chip has done during the 20th century. We are now after the most important breakthroughs of all times: deciphering the human genome, the 100,000 gene encoded by 3 billion chemical pairs in our DNA. With that information we may someday be able to create an artificial human brain, which one will use as his modified extra brain. The cloning of Dolly in 1997 in Scotland by embryologist Ian Wilmut was the first step towards human cloning. He took a cell nucleus from a six-year-old ewe, inserted it to another oocyte, passed an electric charge through the composite cell to get it growing, and eventually created the twin Dolly. On October 4th 2000 one could read in the newspaper that parents in USA have agreed to the genetic design of their second baby in order to provide the suitable medulla ossium for his sick sister because no appropriate donor could be found. The design of babies and human cloning is confronting the world so rapidly that doctors, ethicists, religious leaders and politicians are just starting to grapple

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with the implications and trying to decide how they feel about it all, and how the thoughts belonging to different disciplines can be translated into policy decisions.

Most of the pictures on the back page demonstrate the idea that Biotechnology = Biology + Technology. For example, the Spanish surrealist Salvador Dali (1904 – 1989) demonstrates this interaction in his “Lobster Telephone” (1936), while Mark Dixon (1961), American, does it in his “Polar Bears and Toucans” (1991) where technology is symbolized by a Sony sports cassette player. Other examples are “The Elephant of the Celebes” (1921) by the German surrealist Max Ernst (1891 – 1976) and the “Attack at Down” (1989) by the Polish Jacec Yerka (1952), where a metamorphosis from an animal to a car takes place. In all these examples the artists did not intent to demonstrate biotechnology, however, their works of art do illustrate the idea in a most powerful way.

Francis Crick, who in 1953 together with James Watson discovered the double helix structure, said that “DNA is such an important molecule that it is almost impossible to learn too much about it.” DNA, deoxyribonucleic acid, carries the genetic code and has been likened to a twisted rope-ladder. The “Godfather” of biotechnology, is demonstrated by Salvador Dali in his “Butterfly Landscape, The Great Masturbator in Surrealist Landscape with DNA” (1957 – 8). The other demonstration of DNA, dice-constructed, may indicate that its complete construction remains, to a certain extent, random.

Giuseppe Arcimboldo (1527 – 1593), Italian, is particularly famous for assembling fruits, flowers, vegetables, or animals, into playfully bizarre portraits. Such combinations are interpreted by our brain as a face because they contain characteristic elements such as eyes, nose, and mouth in their natural position. Arcimboldo understood this psychology almost 450 years ago. “The Librarian” (1566) is composed of realistically painted books which create the face of a librarian. Books are knowledge and knowledge is the source for technological and biological developments.

Finally, the combination $1/2$ Clinton + $1/2$ Kennedy = ClinDy, creating one totality. Experiments conducted by the author of this article indicate that people will identify the complete figure from its half if the complete figure has been previously stored in the brain (Figure 1). It is also based on the assumption that a face is symmetrical, which in most cases is incorrect.

At present, the above mutation may be considered as science fiction, which is a “mixture” of what can happen in the future, of fantasy and of entertainment. Atom

bombs, spacecrafts, and gene splicing, for example, all appeared in science fiction first well before showing up in reality. The creation of other mutations is also very interesting. The one of two heads on a single body does exist! Siamese twins, two bodies that are connected, also exist. However, will it be possible to create a Clinton-Kennedy combination or similar ones? The answer is not clear, but the challenge is completely in the hands of biotechnology.

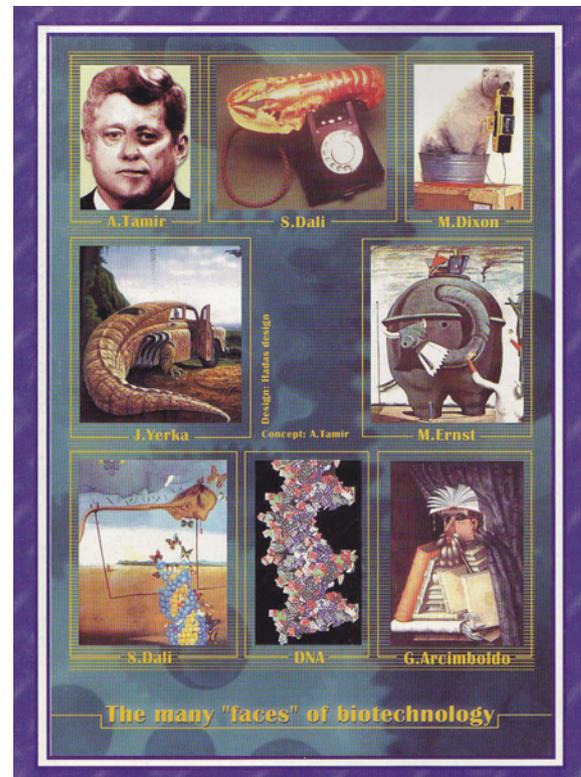


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