

[youtube:<http://www.youtube.com/watch?v=dJtVxwhGOfs>]

Comment by Dr Patrick Dixon on science of ageing, health care, life expectancy, medical advances, pensions, retirement, lifestyles and government policy.

Biotechnology is the use of the science of genetics: alteration of genetic code by artificial means, and is therefore different from traditional selective breeding.

Biotechnology examples include taking the gene for poison in the tail of a scorpion, and combining it with a cabbage - an experiment carried out in Oxford. These GMO cabbages kill caterpillars because they have learned to grow scorpion poison (insecticide) in their sap.

Biotechnology also includes adding human genes to sheep so that they secrete alpha-1 antitrypsin in their milk - useful in treating some cases of lung disease. Biotechnology promises huge advances in health care and cures for many diseases.

Biotechnology has created a chicken with four legs and no wings.

Biotechnology has created a goat with spider genes that creates "silk" in its milk.

Biotechnology works because there is one language of life: human genes work in bacteria, monkey genes work in mice and earthworms. Tree genes work in bananas and frog genes work in rice. There is no limit in theory to the potential of biotechnology.

[youtube:http://www.youtube.com/watch?v=P_UoReSgz84]Biotechnology has given us the power to alter the very basis of life on earth.

Biotechnology has been said to be no different than ancient breeding methods but this is untrue. For a start, breeding or cross-breeding, or in-breeding (for example to make pedigree dogs) all work by using the same species. In contrast biotechnology allows us to combine fish, mouse, human and insect genes in the same person or animal.

Biotechnology therefore has very few limits - except perhaps our imagination, and our moral or ethical code.

Biotechnology makes the whole digital revolution look almost as nothing. Digital technology changes what we do. Biotechnology has the power to change who we are.

Human cloning is a type of biotechnology, but is not the same as true genetic manipulation. In human cloning, the aim is to duplicate the genes of an existing person so that an identical set is inside a human egg. The result is intended to be a cloned twin, perhaps of a dead child.

Biotechnology in its fullest form would result in the child produced having unique genes - as a result of laboratory interference, and therefore the child will not be an identical twin.

Biotechnology could create crops that grow in desert, or without fertiliser. Biotechnology could make bananas or other fruit which contain vaccines or other medical products.

Biotechnology will alter the basis of life on earth - permanently - unless controlled. This could happen if - say - mutant viruses, or bacteria, or fish or reptiles are released into the general environment.

Dr Patrick Dixon lectures to biotech venture capital investors about future medicine and health care, gene therapy, biotechnology, and the [pharmaceutical industry](#) . Dr Dixon is a physician and trends analyst.