

Glossary

adult stem cells

Undifferentiated cells in a tissue. These cells can grow into any of the types of specialised cells in that tissue.

amino acid

The basic building block of a protein. There are about 20 different amino acids. Long chains of amino acids make up a protein.

antibodies

Proteins produced by the immune system of humans and other vertebrates in response to the presence of a specific antigen.

antigen

A substance that stimulates the production of antibodies. Examples can include: pollen grains, dust, bacteria or viruses and most proteins.

Bacillus thuringiensis (Bt)

A species of soil bacterium that possess genes for a group of insecticides, the Bt toxins. Different strains of the bacterium produce different Bt toxins. Some organic farmers use these bacterium as an alternative to using chemicals to control pest insects. The genes for Bt toxins have been genetically engineered into cotton plants so that the plants produce the insecticides.

base

Part of four types of simple molecules or nucleotides (adenine, thymine, and guanine) that are the sub-units (building blocks) of DNA and RNA.

bioremediation

The use of plants and micro-organisms to consume or otherwise help remove materials (such as toxic chemical wastes and metals) from contaminated sites (especially from

soil and water) A natural process in which environmental problems are treated by the use of bacteria or other micro-organisms that break down a problem substance, such as oil, into less harmful molecules.

biotechnology

1. A broad term generally used to describe the use of biology in industrial processes such as agriculture, brewing and drug development. The term also refers to the production of genetically modified organisms or the manufacture of products from genetically modified organisms.
2. The use of plants, animals and micro-organisms to create products or processes. Traditional applications include animal breeding, brewing beer with yeast, and cheese making with bacteria. Recent developments include the use of enzymes or bacteria in a wide range of applications, including waste management, industrial production, food production and remediation of contaminated land. Modern biotechnology also includes the use of gene technology, which allows us to move genetic material from one species to another.

Bt crops

Crop plants that contain genes for Bt toxins. Examples are Bollgard® cotton and Ingard ® cotton.

Bt toxins

Insecticidal proteins produced by the soil micro-organism called *Bacillus thuringiensis*. Bt is an abbreviation of the name *Bacillus thuringiensis*.

cell

The smallest functional unit of a living organism (this excludes viruses). Most animals, plants and fungi are made up of many cells. A cell contains a number of functional parts called organelles as well as DNA.

chromosome

A threadlike component in cells that consists of a single long molecule of DNA coated with proteins. Genes are carried on the chromosomes.

clone

A group of genes, cells or organisms derived from a common ancestor. Each clone is genetically identical.

cloning

The process of production of a group of genes, cells or organisms that are genetically identical, from a common ancestor.

DNA

Acronym for deoxyribonucleic acid. A molecule of DNA consists of a long chain of nucleotides that are composed of deoxyribose, a 5-carbon sugar, a phosphate group linked to the bases (nucleotides) adenine, thymine, cytosine and guanine. DNA contains the genetic code that controls the production of proteins in living organisms.

embryonic stem cells

Undifferentiated cells in an embryo that are able to multiply and become differentiated into any type of cell in the body.

gene

A sequence of DNA, located on a chromosome, which codes for the synthesis of a specific protein or has a specific regulatory function.

gene therapy

The addition of a functional gene or groups of genes to a cell using recombinant DNA techniques (see gene splicing) to correct a hereditary disease.

genetic engineering

A term used to cover all laboratory or industrial techniques used to alter the genetic material of organisms. These techniques assist organisms to produce new substances or perform new functions, for example increase yields of compounds already produced by the organism, form new compounds, or allow organisms to adapt to drastically altered environments.

genetic modification (GM)

Any process that alters the genetic material of living organism. Examples include the duplication, insertion, or deletion of genes from another species, in situ in either microbes, plants or animals (humans included). Where this is done in humans, it is gene therapy, and only human genes are used.*

genetically modified organism(s) (GMO)

An organism (plant, animal, bacteria, or virus) that has had its genetic material altered, either by the duplication, insertion or deletion of one or more new genes, or by changing the activities of an existing gene.*

*for a full definition see the *Gene Technology Act 2000* and the *Gene Technology Regulations 2001*.

genome

The total genetic material of an individual or species.

herbicide

A substance that kills plants. Herbicides are used in agriculture, horticulture and gardening to control unwanted plants. Herbicides can be selective, and kill selected species, or non-selective (broad spectrum), and kill all plants.

insecticide

A chemical that kills insects.

mutation

The process by which a gene undergoes a change in the base sequence. Some mutations result in the gene no longer coding for the correct protein, or producing a reduced amount of the protein.

nuclear transfer technology (cloning)

The process that involves the removal of the nucleus of a cell followed by the transfer of a nucleus from another cell into it.

nucleotide

The sub-unit of DNA and RNA.

nuclei

Plural of nucleus, the structure within the cell that contains the chromosomes.

organism

A living thing which contains DNA and is capable of cell replication by itself, from bacteria to mammals.

pesticide

A chemical that kills pests.

pharming

The process of farming genetically engineered plants or animals to be used as living pharmaceutical factories. The practice has used cows, sheep, pigs, goats, rabbits and mice to produce large amounts of human proteins in their milk. Plants are being used to produce vaccines and diagnostic reagents.

protein

A long-chain molecule consisting of amino acids. The type and order of the amino acids in a protein is specified by the DNA in the cell that produces them.

recombinant DNA

The DNA formed by combining segments of DNA from different genes or different types of organisms.

RNA

Ribonucleic acid, a single-stranded nucleic acid that transmits genetic information from DNA to the cytoplasm and controls certain chemical processes in the cell, such as the synthesis of proteins.

transgenic

Refers to an organism with one or more genes that have been transferred to it from another organism using recombinant DNA techniques. An organism whose gamete cells contain genetic material from another organism, or contain genetic material that has been altered in some other way (e.g. using gene silencing techniques).

virus

A group of particles that do not have a cellular structure cannot replicate outside of a host cell. They consist of a molecule of DNA or RNA surrounded by a protein coat. Viruses can only reproduce in living cells.