

biotechnology

new horizons in medicine

Biotechnology is the use of biological organisms or enzymes in the synthesis, breakdown or transformation of materials in the service of people. People have used biotechnology for thousands of years in the making of bread, cheeses, wine and beer, but in the last century things have moved on rapidly. At the beginning of the 21st century, the medical developments with the greatest potential to improve human health are all linked to biotechnology.

Developing medicines



Results from the Human Genome Project are being used to design specifically targeted therapeutic molecules. Genetically modified bacteria can make the lung surfactant needed for premature babies to live. In many different ways, biotechnology plays a vital role in the development of new medicines.

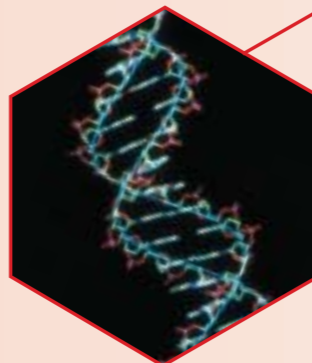
Making medicines



Biotechnology has given us genetically engineered organisms ranging from bacteria to cows and sheep, producing life saving medicines which include vaccines, insulin and blood-clotting factors. Hundreds of thousands of people benefit from the chemicals these 'pharmed' organisms produce.

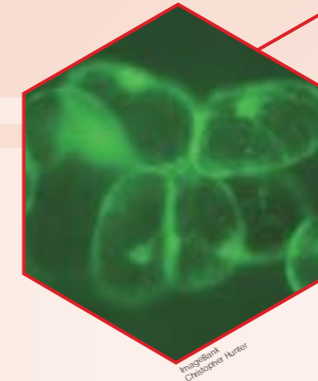


Reading the genes



Knowledge of the human genome has resulted in the development of gene probes to test for genetic diseases. In future they may be used to diagnose genetic tendencies towards problems like cancer or heart disease. It also holds out the hope of individually designed medicines. These will interact with our personal genetic combinations enabling doctors to treat disease more effectively and to minimise any side effects.

New parts for old



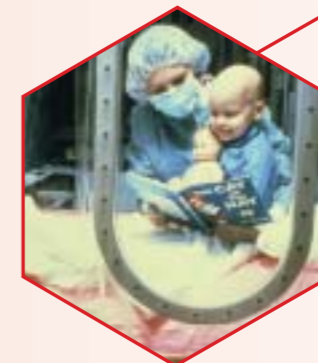
The latest developments in biotechnology involve stem cells, derived from embryos or adults. They have the potential to grow and develop into new tissues or organs which can be used to replace others which are worn out or diseased. The technology is still at a very early stage but the potential for medical advances is enormous.

Testing, testing



Medicine benefits from many sensitive tests which indicate the presence or absence of substances like sugar or hormones in body fluids. Biotechnological advances in the use of immobilised enzymes and monoclonal antibodies mean these tests have become very rapid and accurate in recent years. A pregnancy test used to take weeks – it now takes minutes!

Mending the genes



Gene therapy is one area of medical biotechnology which is still in the very early stages of development. The hope is that gene technology will help scientists develop ways to correct the mistakes in the DNA code which lead to genetic diseases such as cystic fibrosis or Severe Combined Immunodeficiency (SCID).