

# WHAT IS BIOTECHNOLOGY?

**1** Read What is biotechnology? and decide which of the words below can be used instead of those underlined in the passage.

all over the world – at the beginning of – based on practical experience – beer production – before – bread making – examinations – includes – increase – innovations – innumerable – medicines – modify – qualities – safe – so far – which have existed for

Biotechnology is not something new but represents a developing and expanding series of technologies dating back thousands of years, to when humans first began to use microbes to produce food and beverages such as bread and beer and to modify plants and animals through progressive selection for desired traits. Biotechnology encompasses many traditional processes such as brewing, baking, wine-making, cheese production and sewage treatment where the use of microorganisms has been developed somewhat empirically over countless years.

The new biotechnology revolution began in the 1970s and early 1980s, when scientists learned to alter precisely the genetic constitution of living organisms. This 'genetic engineering' permitted breakthroughs in medicine and agriculture. Some of the most exciting advances will be in new pharmaceutical drugs and gene therapies to treat previously incurable diseases, to produce healthier foods, safer pesticides, innovative environmental technologies and new energy sources.

Exciting new medical treatments and drugs based on biotechnology are appearing with ever-increasing regularity. Prior to 1982 insulin for human diabetics was derived from cow and pig pancreases. The gene for human insulin was then isolated, and cloned into a microorganism, which was then mass-produced by fermentation. This genetically engineered human insulin, identical to the natural human hormone, was the first commercial pharmaceutical product of recombinant DNA technology and now supplies millions of insulin users worldwide with a safe, reliable and unlimited source of this vital hormone. Biotechnology has also made it easier to detect and diagnose human, animal and plant diseases. In clinical diagnosis, there are now hundreds of specialised kits available for simple home use or for complex laboratory procedures. Biotechnology methods can now improve the nutrition, taste and appearance of plants and various food products, enhance resistance to specific viruses and insect pests and produce safer herbicides. For food safety, new probes can rapidly detect and accurately identify specific microbial pathogens in food.

**2** Answer these questions about What is biotechnology?

- a. What foods and beverages have traditionally been produced using microbes?
- b. What did the new biotechnological revolution concern and when did it begin?
- c. What are the main fields of application of genetic engineering?
- d. What was human insulin derived from until the early eighties?
- e. What was the breakthrough which made possible to produce genetically engineered human insulin?
- f. What are the advantages of biotechnological methods applied to agriculture?
- g. How can biotechnology help food safety?