

Introduction to Biotechnology, 3e (Thieman)

Chapter 1 The Biotechnology Century and Its Workforce

1) Scientists at the biotechnology company Genentech created the first recombinant DNA product for use in humans. Approved by the Food and Drug Administration in 1982, this product was _____.

- A) a gene chip
- B) chymosin
- C) insulin
- D) human growth hormone
- E) erythropoietin

Answer: C

2) Which area of biotechnology primarily involves using living organisms to process, degrade, and clean up environmental pollution?

- A) Genomics
- B) Bioinformatics
- C) Bioremediation
- D) Marine biotechnology
- E) Agricultural biotechnology

Answer: C

3) The use of computer hardware and software to analyze biological data, such as DNA sequence comparison data, is known as _____.

- A) genomics
- B) bioinformatics
- C) bioremediation
- D) nanotechnology
- E) recombinant DNA technology

Answer: B

4) Studying the entire complement of DNA in an organism's cells is known as _____.

- A) genomics
- B) bioinformatics
- C) bioremediation
- D) nanotechnology
- E) recombinant DNA technology

Answer: A

5) Combining DNA from different sources is an example of _____.

- A) genomics
- B) bioinformatics
- C) bioremediation
- D) nanotechnology
- E) recombinant DNA technology

Answer: E

6) _____ is customized medicine based on a person's genetics.

- A) Genomics
- B) Bioinformatics
- C) Bioremediation
- D) Pharmacogenomics
- E) Recombinant DNA technology

Answer: D

7) _____ involves farm-raising finfish, shellfish, algae, and other aquatic organisms.

- A) Biopharming
- B) Aquaculture
- C) Pharmacogenomics
- D) Bioremediation
- E) Transgenic technology

Answer: B

8) _____ is the use of genes for treating human genetic disorders.

- A) Genetics
- B) Genomics
- C) Pharmacogenomics
- D) Gene therapy
- E) Recombinant DNA technology

Answer: D

9) Selective breeding involves _____.

- A) genetic engineering of animals and plants to improve growth characteristics
- B) mating organisms with desirable characteristics
- C) the use of fermentation to produce biotechnology products
- D) combining sperm and egg cells from different species to produce hybrid organisms
- E) None of these choices

Answer: B

10) _____ is the use of living organisms or their products to clean up the environment, improve human health, and provide more nutritious and disease-free food.

- A) Bioremediation
- B) Biotechnology
- C) Genetic engineering
- D) Biodegradation
- E) Bioprocessing

Answer: B

11) Subtle differences in DNA sequences that vary from person to person are called _____.

- A) genomics
- B) chromosomes
- C) DNA microarrays
- D) pharmacogenomics
- E) single-nucleotide polymorphisms

Answer: E

12) Explain at least two differences between a traditional pharmaceutical product and a biotechnology product.

Answer: A traditional pharmaceutical product is typically a small molecule synthesized by chemists and made into a pill form, which can be orally administered to a patient

A biotechnology product is usually a large molecule that cannot be synthesized or taken orally. It must be produced in a cell line, purified from the cell line, and ultimately formulated to be administered to a patient by injection.

13) Discuss some examples of different fields of biotechnology and what they study (e.g., bioremediation, which is used to assist in the clean-up of chemical spills, etc.).

Answer: Answers can vary.

Some answers include:

- Microbial biotechnology, which is used in making food
- Animal biotechnology, which helps produce antibodies in the milk of the animal without doing harm to the animal
- Forensic biotechnology, which is useful in solving crimes and testing paternity
- Medical biotechnology, which involves producing products to diagnose, treat, or cure a disease

14) What are some nonscience job opportunities in a biotechnology company? Why would it still be useful to have some science background for these positions?

Answer: Some nonscience biotechnology jobs include working in regulatory affairs, marketing, sales, and the legal department of the company. Because the company products are ultimately biological in nature, employees will better understand how to do their jobs if they know the science as well. For example, if a sales representative does not understand any of the science behind the product they are selling, they cannot easily answer any questions the prescribing physician might ask them.