

Lesson 8 Study Guide

19. The technologies useful for the analysis of biological compounds were essential to the development of biotechnology and its applications. A 'Southern blot' is used for:

- (A) sequencing the individual amino acids of specific proteins
- (B) detection of proteins using antibodies as in a home pregnancy test
- (C) detection of specific DNA sequences
- (D) detection of specific RNA sequences
- (E) the most important diagnostic used in determining the forensic results of a crime scene

20. What is pharmacogenomics?

- (A) name given to researchers at large pharmaceutical companies who are mining the genetics of indigenous peoples
- (B) name given to the recent class of genetically engineered drugs
- (C) specialized pharmacies, which sell genetically manipulated foods like BT corn
- (D) name given to the study of genetic variation that results in disease susceptibilities and the differences in response to medications between people
- (E) a recent biotech start-up company specializing in homeopathic medicine

21. A National discussion had developed about the teaching in public schools of an alternative explanation, to evolution, for biological diversity called Intelligent Design. This idea suggests that that the world ecology and biology is so complex that this infers that there must be a creator much the same way that the complexity of a watch infers a watchmaker.

Intelligent Design:

- (A) is a theory that is well supported by scientific evidence
- (B) is currently a well-established, evidence-based alternative to theories of natural selection
- (C) is not currently a well-established, evidence-based alternative to theories of evolution by natural selection
- (D) has been determined by the Supreme Court as material that should be taught in public schools along with other theories of origin including all world wide mythologies and religions
- (E) there is insufficient information about evolution

22. The entire genomic sequences are now known for many species of bacteria, fungi, insects, plants and animals, including humans and chimpanzees. This vast amount of information has been published and is in the public domain. The genome databases aligned and the similarities and relations can be examined. Individual gene sequences can be searched to find striking similarities between species. These types of analyses have shown that humans are 98% similar in DNA sequence to the chimpanzee; 88% similar to mice and about 33% similar to the genes of a rice plant. This type of analysis is called:

- (A) transgenic analysis
- (B) comparative genomics
- (C) mutational analysis
- (D) functional genomics
- (E) DNA gold mining

23. The flow of information is one characteristic of life. The flow of biological information in life is studied using various techniques in biotechnology. A 'Northern blot' is used for:

- (A) detection of specific DNA sequences
- (B) detection of specific RNA sequences
- (C) detection of proteins using antibodies as in a home pregnancy test
- (D) sequencing the individual amino acids of specific proteins
- (E) determining the effects of arctic global warming

24. The code in DNA that we call a 'gene' is the code for a protein. Each specific gene therefore has a specific code for a specific protein. Different proteins can be distinguished from each other by:

- (A) their ATP molecules
- (B) the ribosomes that make them
- (C) the type of sugar molecules they generate
- (D) their amino acid sequence
- (E) PCR analysis

25. Proteins are molecules made from sequences of a number of:

- (A) twenty donuts
- (B) twenty amino acids
- (C) infinite different amino acids
- (D) four different ribonucleic acids
- (E) DNA triple helices

26. The 'cloning' of plants was demonstrated by Steward in 1958 at Cornell Univ. showing that plants could be grown back from a single cell. This ability is called "totipotency" and like the more recent examples of animal cloning, demonstrates:

- (A) that all biological scientists are unethical and fraudulent
- (B) that all of the DNA that codes for an entire organism is in every cell of that organism
- (C) Steward must have belonged to the group that calls themselves the 'Raeliens'
- (D) the necessity to ban all types cloning
- (E) the basis of intelligent design

27. Each gene codes for a messenger RNA that when translated produces a protein that was encoded by the sequences of bases in the DNA of its gene. A 'Western blot' is used for:

- (A) detection of proteins using antibodies as in a home pregnancy test
- (B) detection of specific RNA sequences
- (C) sequencing the individual amino acids of specific proteins
- (D) detection of specific DNA sequences
- (E) detection of nuclear weapons of mass destruction

28. Humans have over 3 billion base pairs of DNA. Some of these sequences code for proteins and are called genes. In humans, genes make up _____ of the DNA.

- (A) about 75%
- (B) 100%
- (C) less than 5%
- (D) about 10%
- (E) about 50%

29. Our understanding of the evolutionary relationships among species is made more accurate through analysis and comparison of their DNA. Different organisms have various amounts of DNA. Organismal complexity does not correlate with the amount of DNA. The full set of an individual organism's DNA is called its:

- (A) complement
- (B) genome
- (C) nucleosome
- (D) nucleotide
- (E) chromosome

30. Molecular techniques are often the 'unsung' heroes of biotechnology. Without the advancements in techniques over the past two decades, many of the applications of biotechnology would not be possible. Also, many of the observations of modern biology would not be possible. The polymerase chain reaction (PCR):

- (A) makes it possible to create huge numbers of copies of tiny pieces of DNA
- (B) enables researchers to determine the sequence of a complementary strand of DNA when they have only single-stranded DNA
- (C) utilizes RNA polymerase to build strands of DNA
- (D) can create messenger RNA molecules from small pieces of DNA
- (E) all of the answers are correct

31. ELISA is:

- (A) The name given to the first synthetic virus
- (B) A female name common in the 90's
- (C) a method for detecting proteins which is very precise and sensitive.
- (D) An acronym for a new genomics tool for detecting
- (E) All of the answers are correct

32. CRISPR stands for Clustered Regularly Interspaced Short Palindromic Repeats. CRISPR technology is capable of

- (A) Finding ancient life forms on exoplanets such as Mars
- (B) Synthesizing new subatomic particles
- (C) Producing new toasted breads
- (D) Making precise changes in DNA and used in genome editing
- (E) All of the answers are correct