Murray: Medical Microbiology, 6th Edition

Chapter 03: Bacterial Metabolism and Genetics

Test Bank

MULTIPLE CHOICE

1. Ambient air, which contains 21% oxygen (O_2) and a small amount (0.03%) of carbon dioxide (CO_2), is the environmental condition that best suits which type of organism?
   a. Aerobes
   b. Anaerobes
   c. Capnophiles
   d. Microaerophiles

   ANS: A

2. From 5% to 10% hydrogen (H_2), 5% to 10% CO_2, 80% to 90% nitrogen (N_2), and 0% O_2 is the environmental condition that best suits which type of organism?
   a. Aerobes
   b. Anaerobes
   c. Capnophiles
   d. Microaerophiles

   ANS: B

3. Which of the following is not generated during anaerobic metabolism of glucose?
   a. Acetyl CoA
   b. Citrate
   c. Glucose-6-phosphate
   d. Glyceraldehyde-3-phosphate
   e. Pyruvate

   ANS: B

4. How many more ATP molecules are produced by aerobic respiration than by glycolysis?
   a. 2
   b. 4
   c. 10
   d. 36
   e. 100

   ANS: D

5. Which of the following intermediates is generated upon metabolism of lactose by fermentation, aerobic respiration, and anaerobic respiration?
   a. Succinate
   b. Pyruvate
   c. Lactic acid
   d. Malate
   e. Citrate

   ANS: B

6. What is the term for pieces of DNA that move from one genetic element to another and contain genes for movement, as well as genes for other features?
   a. Transposons
   b. Insertion sequences
   c. Plasmids
   d. Chromatoids

   ANS: A

7. What is the term for "miniature" chromosomes composed of several genes in double-stranded, closed, circular structures?
   a. Transposons
   b. Insertion sequences
   c. Plasmids
   d. Chromatoids

   ANS: C

8. A DNA sequence that encodes for a specific product (RNA or protein) is defined as which of the following?
   a. Gene
   b. Genome
   c. Nucleotide
   d. Deoxyribonucleic acid

   ANS: A

9. What are the enzymes that add nucleotide bases to each growing daughter strand in the replication process called?
   a. Replication enzymes
   b. DNA polymerases
   c. Insertion sequence enzymes
   d. Transcriptases

   ANS: B

10. Genetic change in bacteria is accomplished by which of the following?
    a. Mutation
    b. Genetic recombination
    c. Gene exchange between bacteria
    d. All of the above

    ANS: D

11. Analysis of the DNA from methicillin- and vancomycin-resistant, gram-positive, coagulase-positive cocci isolated from a furuncle on a diabetic patient's toe indicated the presence of DNA sequences from enterococci. Which of the following processes generated these new bacteria?
    a. Lysogeny
    b. Restriction enzyme cleavage
    c. Transduction
    d. Transformation
    e. Transversion

    ANS: D

12. Development of new strains of bacteria from the DNA of killed bacteria can occur by which genetic mechanism?
    a. Complementation
    b. Conjugation
    c. Transformation
    d. Transduction
    e. Transposition

    ANS: C

13. Which of the following would promote the metabolism of galactose by *E. coli*?
    a. Binding of CAP to the operon
    b. Binding of cAMP to CAP
    c. Binding of galactose to CAP
    d. Binding of glucose to the repressor
    e. Binding of galactose to the promoter

    ANS: B

14. Why would a frameshift mutation in the gene for topoisomerase 1 be lethal for *E. coli* but not *C. albicans*?
    a. *C. albicans* is lysogenic.
    b. *C. albicans* is diploid.
    c. For *C. albicans*, topoisomerase 1 is encoded on a plasmid.
    d. Frameshift mutations are corrected by heterologous recombination in *C. albicans*.
    e. Topoisomerase 1 is not important for *E. coli*.

    ANS: B

15. An *E. coli* with a mutation in topoisomerase 1 can grow at 28° C but not at 37° C. Which of the following changes in the protein would explain this temperature sensitive mutation?
    a. Frame shift mutation
    b. Nonsense mutation
    c. Missense mutation
    d. Null mutation
    e. Silent mutation

    ANS: C

16. Unlike for eukaryotes, excessive tryptophan can down-regulate production of the enzymes for tryptophan production in bacteria by:
    a. Binding to a repressor for protein synthesis
    b. Binding to a promoter for protein synthesis
    c. Activation of cAMP production
    d. Attenuation of transcription of operon mRNA

    ANS: D