1. Many bacteria can be classified as Gram-positive or Gram-negative because of differences in:

A. Outer membrane proteins;
B. Ribosomes;
C. Endotoxin and exotoxin layer;
D. Peptidoglycan layer;
E. Whether or not the genetic material encodes the Gram gene.

2. An endotoxin is:

A. Actively produced by an organism once inside the human body;
B. Specific for certain tissues, such as skin;
C. Produced by Gram-positive bacteria outside the body;
D. Produced by Gram-negative bacteria once inside a spore;
E. The toxin portion of the lipopolysaccharide.

3. Which of the following is the correct order for the solutions used in Gram staining?

1. Alcohol
2. Gram's iodine
3. Carbol fuchsin
4. Crystal violet
5. Methyl red
6. Methylene blue
7. Safranin

A. 1, 3, 4, 2;
B. 3, 7, 2, 4;
C. 4, 2, 1, 7;
D. 5, 4, 3, 6;
E. 4, 1, 2, 7.

4. Which of the following statements is true about complement?:

A. Complement is made by B lymphocytes;
B. Complement is made by T helper cells;
C. Complement is a type of immunoglobulin or Ig;
D. Complement what is left over once phagocytic cells have engulfed and destroyed bacterial pathogens;
E. Plasma proteins that work together to resist bacterial infections through a cascade of reactions.

5. M-protein is used to distinguish antigenic groups of which of the following bacteria?

A. Staphylococci;
B. Gram-positive bacteria;
C. Gram-negative bacteria;
D. Streptococci;
E. Lactic acid bacteria such as probiotics.

6. Important targets of antibiotics in bacteria are:

A. The cytoplasmic membrane;
B. DNA replication and transcription elements;
C. The cell wall;
D. All of the above;
E. Similar processes seen in the human body so that they are toxic or cause adverse reactions.

7. Which of the following factors are helpful in the prevention of microbial growth on the skin

1. High pH between 8 and 10
2. Dryness of the skin
3. Inhibitory substances

A. 1 only;
B. 2 only;
C. 3 only;
D. 1 and 2 only;
E. 2 and 3 only.

8. Resident flora can be found in all the following locations in the human body except the:

A. Female genital tract;
B. Lungs;
C. Skin;
D. Mouth;
E. Large intestine.

9. Non-specific immunity includes all of the following except:

A. Skin;
B. Acid pH (example, sebaceous secretions like sweat);

C. Mucous membranes;
D. Antibodies made by B cells;
E. Tears from the eye when viewing a sad movie.

10. Which of the following statements is false

A. Newborns lack an intestinal flora;
B. Most bacteria are not human pathogens;
C. Healthy, intact skin is normally impermeable to microorganisms
D. Normal flora bacteria never cause infection;
E. The absence of a normal flora would make an individual more susceptible to infection

11. A bacteria that rarely causes diease in healthy humans but may do so in situations were the immune system or other defense mechanism has been compromised by, for example, a burn, overuse of antibiotics or a stab wound, is known as:

A. Highly virulent;
B. Normal microflora;
C. Opportunistic;
D. Non-pathogenic;
E. A parasitic infection.

12. If the safranin step were omitted in the Gram-Staining procedure, what colour would you expect Gram-positive bacteria to stain and what colour would you expect Gram-negative bacteria to stain?

A. Gram-positive=colourless; Gram-negative=colourless;
B. Gram-positive=purple; Gram-negative=purple;
C. Gram-positive=purple; Gram-negative=colourless;
D. Gram-positive=pink; Gram-negative=pink;
E. Gram-positive=pink; Gram-negative=purple.

13. Which of the following statements about streptococcus pyogenes is false?

A. *S. pyogenes* can cause puerperal fever;
B. Some strains of S. pyogenes produce large amounts of hyaluronidase;
C. S. pyogenes produces streptolysins, toxic substances to macrophages;
D. S. pyogenes is commonly known as Group B Streptococci;
E. S. pyogenes is associated with scarlet fever.

14. Which of the following statements about MacConkey agar plates is incorrect?

A. It is both selective and differential;
B. Only staphylococci or streptococci can grow on this plate;
C. Lactose-fermenting bacteria appear as bright red colonies on this plate;
D. It is a useful tool for differentiating normal flora and human pathogens;
E. Bile salt and crystal violet are the selective components of this agar plate

15. Passive immunization:

A. Requires administration of pre-formed antibodies against a specific agent;
B. Is an efficient, routine way to protect against various types of infection;
C. Requires administration of pre-formed antibodies that are not specific so as to help you against an unknown infection;
D. Is when you inject someone with B-cells;
E. Is when you inject someone with T-cells.

16. Which of the following statements is false?

A. The primary response is usually associated with a lad period;
B. IgM has a "pentamer" structure;
C. Humoral immunity requires B cells and production of immunoglobulins;
D. Both the humoral and cell-mediated immune systems involve antigens;
E. Antibodies made against "self" antigens can lead to autoimmune diseases

17. Major mechanism(s) of resistance to an antibiotic include:
1. Changing the target of the antibiotic.
2. Making enzymes that change and/or inactivate the antibiotic.
3. Reducing or eliminating the uptake of an antibiotic.

A. 1 only;
B. 2 only;
C. 3only;
D. 1 and 2 only;
E. 1, 2, and 3.

18. Most organisms that cause human illness are considered:

A. Thermophiles;
B. Psychrophiles;
C. Mesophiles;
D. Halophiles;
E. Barophiles.

19. Laboratory media designed to illustrate the ability (or not) of a bacterial to ferment

sugars such as lactose are called:

A. Tissue culture;
B. Differential media;
C. Selective media;
D. Enrichment media;
E. Chemically defined media.

20. The immunoglobulin responsible for a person named Franco having symptoms of allergies (runny nose, teary eyes, etc.) during ragweed season is:

A. IgE;
B. IgM;
C. IgG;
D. IgA;
E. IgD.

21. Antigens are:

A. Substances capable of inducing a specific immune response;
B. Compounds made of proteins only and trigger production of antibodies;
C. Compounds made of carbohydrates only and trigger production of antibodies;
D. Bacteria only triggering the production of antibodies;
E. Viruses only triggering the production of antibodies.

22. Antibodies are produced by:

A. T-helper lymphocytes of class 1;
B. B lymphocytes;
C. T-helper lymphocytes of class 2;
D. Complement that has been activated;
E. Macrophages that have phagocytized a microbial pathogen.

23. Rheumatic fever may develop two or three weeks after a _____ infection

A. *Staphylococcus aureus;*
B. Group A streptococcal;
C. Group B streptococcal;
D. *Staphylococcus epidermis;*
E. *Neisseria meningitidis*.

24. *Staphylococcus epidermidis*:

A. Is part of the normal flora of the skin;
B. Is coagulase negative;
C. Can be considered a cause of opportunistic infections post-operatively;
D. A, B, and C are correct;
E. Gram negative pathogen of the skin.

25. *Neisseria meningitidis* is:

A. The causative agent for Waterhouse-Friderichsen syndrome;
B. A Gram-positive diplococci;
C. A common genital tract pathogen;
D. The most common sexually transmitted bacterial infection;
E. A problem seen in elderly populations only.

26. Anaerobic bacteria:

A. Are very useful for producing live attenuated vaccines;
B. Can not combat toxicity of oxygen and superoxide radicals;
C. Require hypotonic media in order to be grown outside the body;
D. Can grow under extreme pH environments;
E. Are important respiratory pathogens.

27. Which of the following statements is false:

A. Bacterial cellular morphology is visible without the use of a microscope;
B. Viruses are much smaller than bacteria and are not visible in a light microscope;
C. Staining is usually required in order to see bacteria under a microscope;
D. Most bacteria can be classified as either Gram-positive or Gram-negative;
E. Bacteria are prokaryotes.

28. The most common infection caused by beta haemolytic *Streptococcus* is:

A. Scarlet fever;
B. Rheumatic fever;
C. Meningitis;
D. Food poisoning;
E. Pharyngitis/tonsillitis.

29. Lower concentration of solutes in the environment leads to inflow of water and cell rupture. This type o solution is reffered to as:

A. Isotonic;
B. Isothermal;
C. Hypertonic;
D. Halophylic;
E. Hypotonic.

30. Which of the following is true about the normal microflora of the nervous system?

A. Only transient organisms are present;
B. Microorganisms are present only in portions of the central nervous system
C. The nervous system does not have a normal flora;
D. Only resident organisms are present;
E. Organisms are present only in the portions of the peripheral nervous system.

31. The most common route of infection with Streptococcus agalactiae is through:

A. Opportunistic mechanisms such as surgical procedures;
B. Ingestion of contaminated foods that were not cooked properly;
C. Blood and blood products that were not properly screened;
D. Inhalation of contaminated aerosols;
E. Contact in the female genital tract.

32. Complete hemolysis (i.e., destruction of red blood cells) is reffered to as:

A. Epsilon;
B. Gamma;
C. Delta;
D. Beta;
E. Alpha.

33. Generally, a direct ELISA:

A. Detects antibodies produced by the host;
B. Detects antibodies produced by the pathogen;
C. Detects the antigen in the sample;

D. Detects the B lymphocytes;
E. Detects the T helper cells.

34. Necrotising fasciatic, also known as “flesh-eating disease”, is caused by:

A. *Neisseria gonorrhoeae;*
B. *Staphylococcus aureus;*
C. *Streptococcus pyogenes;*
D. *Streptococcus agalactiae;*
E. *Neisseria meningitidis.*

35. A solid agar that contains blood from an animal source is known as:

A. Chemically defined media;
B. Chemically undefined media;
C. Selective media;
D. A Gram-positve only media;
E. A Gram-negative only media;

36. Which of the following pathogens causes neonatal infection such as conjunctivitis:

A. *Streptococcus pneumoniae;*
B. *Neisseria meningitidis;*
C. *Streptococcus agalactiae;*
D. Neisseria gonorrhoeae;
E. *Staphylococcus epidermidis.*

37. What is the most common entery route of a microbial pathogen into the human body?

A. Inhalation;
B. Ingestion;
C. Penetration of protective barrier;
D. Direct deposit in deep tissue;
E. Overuse of broad spectrum antibiotics.

38. Which of the following is not a mechanism of acquired antibiotic reisitance?

A. Mutation is ribosomal protein;
B. Production of inactivating enzymes;
C. Decreased permeability to antibiotics;
D. Over-prescription of antibiotics;
E. Efflux of antibiotics by bacteria.

39. Exotoxins are characterized by:

A. Being secreted by living bacteria;
B. Being thermostable;
C. Only being produced by Gram-negative bacteria;
D. Broad spectrum activity on many receptors;
E. Being mildly toxic in most cases.

40. For antibiotic therapy to be successful:

A. Pathogen processes not seen in humans should be targeted;
B. Knowledge of the site of infection is importsnt in deciding administration route(s);
C. Adverse effects should ideally be minimized;
D. The antibiotic must be taken even if the patient begins to feel better;
E. All of the above