

1. Bacterial restriction enzymes (restriction endonucleases) cleave foreign DNA that is
 - a. methylated in the same pattern as the bacterium.
 - b. unmethylated.
 - c. in plasmids.
 - d. going to be transferred during conjugation.

2. On and in a normal human body, Gram negative bacteria...
 - a. are rare on the skin, but more abundant deep in the nose.
 - b. dominate the skin, but are rare in the colon.
 - c. are usually pathogenic.
 - d. are represented by genera such as *Bifidobacterium*, *Escherichia* and *Actinomyces*.

3. Which parts of the human body do not have a normal microbiota?
 - a. tongue and nostrils
 - b. lower urethra and throat
 - c. heart and lungs
 - d. all of the above

4. Opsonization is the process by which.....
 - a. antigens coat the invader and make it easier for B-Cells to find.
 - b. holes are punched in invading cells.
 - c. invading cells are coated and therefore marked for destruction.
 - d. invading cells are surrounded by T_H-cells.

5. Foreign cells that invade the human body become coated with specific antibodies and are...
 - a. protected from further immune response.
 - b. ejected from the body in sweat and saliva.
 - c. destroyed by the complement system and/or phagocytes.
 - d. called antigen presenting phagocytes.

6. Virulence Plasmids can confer virulence to a bacterium by coding for the
 - a. production of one or more toxins.
 - b. production of siderophores.
 - c. ability to form a capsule.
 - d. production adhesions.
 - e. all of the above

7. The lipopolysaccharide (LPS) of the outer membrane of gram - bacteria is both an antigen and an endotoxin. The endotoxic properties are due to the _____ and the antigenic properties are due to the _____
 - a. protein / polysaccharide
 - b. lipid / polysaccharide
 - c. polysaccharide / lipid
 - d. lipid / protein

8. Immunization (vaccination) works because of the fact that specific memory B-cells are produced in response to the first exposure to specific foreign _____.
 - a. antibodies
 - b. antigens
 - c. T-cells

9. Probiotics refers to the inoculation of animals with benign bacteria in order to
- encourage the growth of beneficial bacteria such as *Salmonella*.
 - allow pathogenic bacteria to colonize parts of the organism that could be susceptible to attack by antibiotic resistant bacteria.
 - give harmless bacteria a head start in colonizing mucosal surfaces in areas such as the colon.
 - give a nutritional boost to young animals, because it is well known that bacteria are nutritious and aid animals in their digestive processes.
10. The nucleic acid from which type of virus is usually incorporated into a bacterial chromosome?
- lytic (= temperate phage)
 - lysogenic (= temperate phage)
 - Both lytic and lysogenic
 - all of the above
11. "Lysogenic conversion" refers to:
- changing the ability of a bacterium to cause disease (e.g. via phage that have genes for toxin production)
 - viral genes that change the phenotype of the host cell (e.g. converting a non-pathogen to a pathogen)
 - conversion of a non-pathogen to a pathogen via F-plasmids that carry toxin genes.
 - all of the above.
 - a and b.
12. There are many artificial ways to make bacterial cells competent for transformation, such as
- injection of the F-plasmid into the cells
 - electroporation.
 - killing the recipient cells with heat
 - all of the above
13. Match the mechanisms of horizontal gene transfer with the appropriate description
- | | |
|-------------------|--|
| A. Transformation | _____uptake of naked DNA |
| B. Conjugation | _____transfer of DNA by cell to cell contact |
| C. Transduction | _____transfer of DNA by viruses |
| D. Plasmids | |
14. Briefly describe the reservoir(s), vector and pathogen (Genus species) involved in epidemics of _____ (insert any disease we have discussed into blank). (50 words or less)
15. Briefly discuss why the incidence of West Nile Virus in Colorado dropped dramatically in 2004 compared to 2003. (50 words or less)