1. What is a disease? What is the difference between symptoms and signs?

A disease is the result of an infection that changes the state of health. Symptoms are subjective and signs are objective changes in body function as a result of disease.

2. How does our normal flora help protect us from disease? What types of symbiotic relationships do we have with the flora found in our GI tract?

Normal flora occupy all ecological niches, preventing infection by invading bacteria. We have a commensal relationship with most of the microbes in our GI tract, although mutualism occurs, as well.

3. What is a nosocomial disease? How might nosocomial infections be controlled?

A nosocomial disease is an infection that results from a hospital stay. Conditions in a hospital are ideal for the spread of infectious disease: compromised hosts and lots of pathogens. The only defense against nosocomial infections is scrupulous cleaning.

4. How is antibiotic resistance related to nosocomial diseases?

Due to the extensive use of antibiotics, many of the pathogens found in the hospital have become resistant to one or more of them.

5. What is the difference between pathogenicity and virulence? What are examples of virulence factors?

Pathogenicity indicates an ability to cause a disease and virulence is a measurement of how pathogenic an organism is. Virulence factors increase the virulence of a strain and include such things as capsules (to avoid phagocytosis), enzymes (to penetrate tissues and overcome host defenses), and toxins (to damage host cells).

6. What are the main portals of entry for pathogens and what are our defenses for each?

The main portals of entry for pathogens are our mouths and noses. (Other openings, natural or unnatural are also portals.) The primary defenses for these portals are mucous membranes that contain lysozyme and antibodies. Our GI tract is also protected by stomach acid.

7. How do pathogens harm the host? That is, what are some specific mechanisms of pathogenicity?

Pathogens harm the host directly through their metabolism (growth and breakdown of host cells), toxins, and by inducing hypersensitivity reactions.

8. How do exotoxins differ from endotoxin?

Exotoxins are secreted proteins, usually produced by gram positive organisms, that are very potent toxins. Endotoxin is the lipid A fraction of the gram negative outer membrane. Besides being more toxic, exotoxins are strong antigens while endotoxin doesn’t produce much of an immune response. As a cellular
component, endotoxin is present with the cell but exotoxins can be present without the cells.

9. How do non-specific host defenses differ from specific host defenses? What are some nonspecific host defenses?

Non-specific host defenses are general structures and mechanisms that prevent infection by pathogenic organisms. They include barriers like skin and mucous layers, lysozyme, stomach acid, and normal flora. Specific host defenses refers to the immune system which manufactures proteins called antibodies that are each designed for a specific bacterium, virus, or other foreign particle. The immune system is inducible and becomes active only if a pathogen overcomes the non-specific defenses.