

20 – Pathogenic Gram-Negative Cocci and Bacilli

Neisseria

1. *List three structural features of Neisseria that contribute to its pathogenicity.*

- a. Neisseria have fimbria, polysaccharide capsules, as well as a major cell wall antigen called lipopolysaccharide.
 - i. All of these enable the bacteria to attach and invade human cells.

2. *Compare and contrast the symptoms of gonorrhea in men and women. What is PID?*

- a. Gonorrhea is a sexually transmitted disease caused by *Neisseria gonorrhoeae*.
- b. In men, acute inflammation of the urethra and **penis** occurs two to five days after infection. (8====O ← inflammation)
 - i. This causes extremely painful urination and releases a pus-filled discharge. If left untreated, it can spread to the prostate and epididymis, rendering that man infertile.
- c. In women, the disease tends to have no symptoms. It is commonly mistaken for a bladder infection or a vaginal yeast infection.
 - i. Thus, infertility as a result of a gonorrheal infection most often occurs in women.
- d. Gonococci can infect deep in the uterus and even the uterine (Fallopian) tubes by “hitchhiking” to these locations on sperm.
 - i. In the uterine tubes they can trigger inflammation, fever, and abdominal pain—a condition known as **pelvic inflammatory disease (PID)**.

3. *What is the reservoir of *N. meningitidis*? How is it transmitted? How does it cause most of its damage?*

- a. Humans are the only reservoir for *N. meningitidis*.
- b. Transmission occurs via respiratory droplets (breathing, coughing, sneezing).
- c. The polysaccharide capsule of *N. meningitidis* resists lytic enzymes of the body's phagocytes, allowing phagocytized meningococci to survive, reproduce, and be carried throughout the body within neutrophils and macrophages.

Escherichia

1. *Describe the pathogenesis and diseases of *E. coli* O157:H7.*

- a. Context: There are several strains of *E. coli* with different antigens: O, H, or K antigen.
- b. Virulent strains, such as *E. coli* O157:H7 also have genes for fimbriae, adhesins, and a variety of exotoxins, enabling these strains to colonize human tissue and cause disease.
- c. **Gastroenteritis**, is often caused by toxins released from the bacterium.
 - i. The toxins bind to proteins on cells lining the intestinal tract and triggers a series of chemical reactions that cause the loss of ions, and subsequently, loss of water.
- d. *E. coli* is the most common cause of non-nosocomial Urinary Tract Infections.
 - i. Surprisingly, girls are less likely to acquire UTIs than are women, perhaps because of the hormonal influences of adulthood or an increased likelihood of UTIs following sexual intercourse (ha ya right, not teens these days!).
- a. In some cases, ingestion of *E. coli* can range from bloody diarrhea, to hemolytic uremic syndrome.