

Chapter 24 Alimentary System Infections

Summary Outline

- 25.1 The alimentary tract is a tube from the mouth to the anus and comprises a major portal of entry for pathogens.
- 24.2 Normal flora
- A. The **mouth**: The species of bacteria that inhabit the mouth **vary with location**. **Dental plaque** contains bacteria attached to teeth or each other. Teeth allow for colonization by **anaerobic bacteria**.
 - B. The **intestine**: While the stomach is normally devoid of microorganisms, about one-third of the weight of feces is due to microorganisms, mostly **anaerobes**. The biochemical activities of microorganisms in the large intestine include **synthesis of vitamins, degradation of indigestible substances, competitive inhibition of pathogens, production of cholesterol, chemical alteration of medications and production of carcinogens**.
- 24.3 **Bacterial diseases of the upper alimentary system**
- A. **Dental caries** is caused mainly by *Streptococcus mutans* involved in formation of extracellular **glucans from dietary sucrose**. Penetration of the calcium phosphate tooth structure depends on **acid production** by cariogenic dental plaque. *S. mutans* is **not inhibited by acid** and stores fermentable intracellular polysaccharide. **Control of dental caries** depends mainly on supplying **fluoride** and **restricting dietary sucrose**.
 - B. **Periodontal disease** is caused by an inflammatory response to the plaque bacteria at the gum line.
 - C. **Trench mouth**, or **acute necrotizing ulcerative gingivitis (ANUG)**, can occur at any age in association with **poor mouth care**.
 - D. *Helicobacter pylori* predisposes the stomach and the uppermost part of the duodenum to **peptic ulcers**. Treatment with antimicrobial medications can cure the infection and prevent peptic ulcer recurrence.
- 24.4 **Viral diseases of the upper alimentary system**
- A. **Herpes simplex**, caused by an **enveloped DNA virus**, usually begins in the mouth and throat; esophageal infections suggest immunodeficiency. HSV persists as a **latent infection** inside sensory nerves; production of active disease occurs when the body is stressed.
 - B. **Mumps is caused by an enveloped RNA virus** that infects not only the **parotid glands**, but also the **meninges, testicles** and other body tissues. Mumps virus generally causes more severe disease in persons beyond the age of puberty; it can be **prevented using a live attenuated vaccine**.
- 24.5 **Bacterial diseases of the lower alimentary tract**
- A. **Cholera** is a severe form of diarrhea caused by a **toxin of *Vibrio cholerae*** that acts on the small intestinal epithelium.
 - B. **Shigellosis** is caused by species of *Shigella*, common causes of **dysentery** because they **invade the epithelium** of the large intestine.
 - C. *Escherichia coli gastroenteritis*: Virulence often depends on **plasmids**. Some strains, such as **O 157 B 7**, can cause **hemolytic uremic syndrome**.
 - D. **Salmonellosis**: Caused by strains of *Salmonella*, which is often **food-borne** and commonly found in **eggs and poultry**.
 - E. **Typhoid fever**, which only infects humans, is caused by *Salmonella typhus* and is characterized by **high fever, headache and abdominal pain**. **Untreated**, it has a **high morality rate**. An **oral attenuated vaccine** helps prevent the disease.

- F. **Campylobacteriosis**, caused by *Campylobacter jejuni*, is the **most common bacterial cause of diarrhea** in the United States.

24.6 **Viral diseases of the lower alimentary tract**

- A. **Rotaviral gastroenteritis** is the main diarrheal illness of infants and young children, but can involve adults, as in **traveler's diarrhea**.
- B. **Norwalk virus gastroenteritis** accounts for almost half the cases of gastroenteritis in the United States.
- C. **Hepatitis A** is usually **mild or asymptomatic in children**; some cases are prolonged, with **weakness, fatigue and jaundice**. Hepatitis A virus (HAV) is a **picornavirus spread by fecal contamination** of hands, food or water. An injection of **gamma globulin gives temporary protection** from the disease. An **inactivated vaccine** is available to immunize against the disease.
- D. **Hepatitis B (HBV)** is a hepadnavirus **spread by blood, blood products, semen and from mother to baby**; it is generally more severe than hepatitis A. **Asymptomatic carriers** are common and can unknowingly transmit the disease. **Chronic infection** is common and can lead to scarring of the liver (**cirrhosis**) and **liver cancer**.
- E. **Hepatitis C virus (HCV)** is a flavivirus transmitted mainly by blood; 60% of cases may be acquired from **needle sharing** by injecting drug abusers. **Hepatitis C is asymptomatic** in over 60% of acute infections; 80% of infections become **chronic**.

24.7 **Protozoan diseases of the lower alimentary tract**

- A. **Giardiasis** is caused by *Giardia lamblia*, a Mastigophoran, and is usually transmitted by **drinking water contaminated by feces**. It is a common cause of **traveler's diarrhea**.
- B. **Cryptosporidiosis** is caused by *Cryptosporidium parvum*, a member of the Apicomplexa. The **oocysts** are infectious, resist chlorination and are too small to be removed by most filters.
- C. **Cyclosporiasis** is caused by *Cyclospora cayentanensis*, which is transmitted by the fecal-oral, via water or produce such as berries; it causes **traveler's diarrhea**. There is no person-to-person spread; no hosts other than humans are known.
- D. **Amebiasis** is caused by *Entamoeba histolytica*; it is an important cause of **dysentery**; **often chronic**; infection can spread to the liver and other organs.