14.6C: Helminths

Parasitic worms, often referred to as helminths, are a division of eukaryotic parasites.

Learning Objectives

• List the four groups of parasitic worms (helminths), routes of transmission and risk factors

Key Points

• Helminths are worm-like organisms that live and feed off of living hosts, receiving nourishment and protection while disrupting the nutrient absorption of their hosts, which causes weakness and disease.

• Helminths that live inside the digestive tract are called intestinal parasites.

• Helminths often find their way into a host through contaminated food or water, soil, mosquito bites, and sexual acts.

• Response to worm infection in humans is a Th2 response in the majority of cases.

Key Terms

• helminth: A parasitic roundworm or flatworm.

• lymphatic system: In mammals, including humans, a network of lymph vessels and lymph nodes that transport fluid, fats, proteins, and lymphocytes to the bloodstream as lymph, and remove microorganisms and other debris from tissues.

Parasitic worms, often referred to as helminths, are a division of eukaryotic parasites. They are worm-like organisms that live and feed off of living hosts, receiving nourishment and protection while disrupting the nutrient absorption of their
hosts, which causes weakness and disease. Those that live inside the digestive tract are called intestinal parasites. They can live inside humans as well as other animals.

Figure: **Hookworms**: The hookworms attached to the intestinal mucosa.

Parasitic worms belong to four groups:

- Monogeneans
- Cestodes (tapeworms)
- Nematodes (roundworms)
- Trematodes (flukes)

Helminths often find their way into a host through contaminated food or water, soil, mosquito bites, and even sexual acts. Poorly washed vegetables eaten raw may contain eggs of nematodes such as Ascaris, Enterobius, Thichuris, and or cestodes such as Taenia, Hymenolepis, and Echinococcus. Plants may also be contaminated with fluke metacercaria, such as Fasciola. Schistosomes and nematodes such as hookworms (Ancylostoma an Necator) and Strongyloides can penetrate the skin. Finally, Wuchereria, Onchocerca, and Dracunculus are transmitted by mosquitoes and flies.

Populations in the developing world are at particular risk for infestation with parasitic worms. Risk factors include the following:

- Inadequate water treatment
- Use of contaminated water for drinking, cooking, washing food, and irrigation
- Undercooked food of animal origin
- Walking barefoot

Simple measures—such as use of shoes, soaking vegetables with 1.5% bleach, adequate cooking of foods (not microwaving), and sleeping under mosquito-proof nets—can have a strong impact on prevention.

Response to worm infection in humans is a Th2 response in the majority of cases. Inflammation of the gut may also occur, resulting in cyst-like structures forming around the egg deposits throughout the body. The host’s lymphatic system is also increasingly taxed the longer helminths propagate, as they excrete toxins after feeding. These toxins are released into the intestines and absorbed by the host’s bloodstream, making the host susceptible to more common
diseases such as seasonal viruses and bacterial infections.

Parasitic worms have been used as a medical treatment for various diseases, particularly those involving an overactive immune response. As humans have evolved with parasitic worms, proponents argue that they are needed for a healthy immune system. Scientists are looking to see if there is a connection between the prevention and control of parasitic worms and the increase in allergies such as hay-fever in developed countries. Parasitic worms may be able to damp down the immune system of their host, making it easier for them to live in the intestine without coming under attack. This may be one mechanism for their proposed medicinal effect.