Protists and Humans

Section 12-3

Protists and Disease

Key Idea: Protists cause a number of human diseases, including giardiasis, amebiasis, toxoplasmosis, trichomoniasis, cryptosporidiosis, Chagas disease, and malaria.

- The word rarely means not very often.

Giardiasis

Cause: an intestinal parasite of the genus *Giardia.*

Symptoms: As the protists move through the intestine, they cause severe diarrhea and intestinal cramps that may last for two to six weeks.

- Animals and humans can contaminate water with feces that contain cysts.

Amebic Dysentery

Cause: Parasite *Entamoeba histolytica* causes two forms of diarrheal illness.

Symptoms: Pain, bloody diarrhea, and fever. In rare cases, amoebas travel to the liver, lungs, or brain and can be fatal.

- transmitted in contaminated water, most commonly in countries that have poor sanitation or transmitted on fruits, vegetables, and other foods that have been washed with contaminated water and eaten raw.

Toxoplamosis

Cause: the protist *Toxoplasma gondii,* is spread by cats and by eating undercooked meat that contains cysts.

Symptoms: Adult humans who have a healthy immune system are usually not affected. A small number of people develop flulike symptoms.

- To avoid toxoplasmosis, cook meat fully and wash hands thoroughly after gardening or changing a cat's litter box. Pregnant women should avoid changing cat litter.

Trichomoniasis

Cause: one of the most common sexually transmitted infections in the United States. It is caused by *Trichomonas vaginalis*.

Symptoms: Women who are infected typically experience discolored discharge, genital itching, and the urge to urinate.

- If a pregnant women is infected, her infant may be born prematurely or with low birth weight.

Cryptosporidiosis

Cause: protists of the genus *Cryptosporidium.*

Symptoms: severe cramps and diarrhea that may last up to two weeks.

- It can be spread by contaminated water or objects and in uncooked food.

Chagas Disease

Cause: the protist *Trypanosoma cruzi.*

Symptoms: The early stage of infection has few or no symptoms. The chronic stage can result in heart disease, abnormal heartbeat, heart failure, heart attack, and enlargement of the esophagus and the large intestine.

Malaria

Cause: several types of sporozoans of the genus *Plasmodium.*

- Malaria is spread by the bite of the *Anopheles* mosquito.
- When an infected mosquito bites a human, it injects saliva containing the parasite.
- The first stage of the malaria parasite, called a *sporozoite,* infects the liver.

- The second stage, called a *merozoite,* infects red blood cells.
- As red blood cells die, malaria causes anemia and cycles of fever.
- If left untreated, malaria can cause rupture of the spleen, kidney failure, coma, brain damage, and death.
- Malaria kills up to 3 million people every year.

Protists and the Environment

Key Idea: Protists produce oxygen, take up carbon dioxide, are important producers in aquatic food webs, can produce deadly blooms, serve as nutrient recyclers, and have symbiotic relationships with many animals and plants.

- An algal bloom is a rapid increase in the population of algae in an aquatic ecosystem.

Protists and the Environment

- Plantlike protists, along with photosynthetic cyanobacteria, produce at least half of Earth's oxygen.
- Plantlike protists also consume carbon dioxide, a greenhouse gas.
- Photosynthetic protists, along with cyanobacteria, form the base of almost all aquatic food chains.

- A *red tide* is caused by a bloom of dinoflagellates that produce powerful toxins. Humans can become ill if they eat fish or shellfish during a red tide.
- Some photosynthetic protists live with corals. The protists supply the coral with nutrients. The coral provides a stable environment, nitrogen, and minerals.

Reading Check

What are three ways in which protists affect ocean ecosystems?

They are the base of food chains, they produce deadly blooms, and they are parts of corals.

Protists and Industry

Key Idea: Protists are important in many foods, in industrial and consumer products, and in scientific research.

Protists and Industry

- Carrageenan, agar, and alginate substances produced by algae.
- These substances are used as thickening agents in foods such as ice cream, salad dressings, and gelatin desserts.
- The empty shells of diatoms are used as abrasives in cleaning agents, such as toothpaste.

- Diatoms are also used in diatomaceous earth as a natural product to control insect pests.
- Protists are important in biological research such as to study ribosomes, cell aging, cell communication, and cell cycle control.