CHAPTER 14
PARASITIC AND FUNGAL INFECTIONS

PARASITES AND THEIR INFECTIONS

- Parasites can be protozoans or helminths (although not all protozoans and not all helminths are parasites)
- Parasitic infections affect hundreds of millions of people throughout the world and cause millions of deaths each year
- There are three classes of helminth that infect humans: nematodes (roundworms), cestodes (tapeworms), and trematodes (flukes)
- Some parasites have a life cycle that involves a single host, whereas others use more than one host
- Pathogenic mechanisms for both protozoan and helminthic infections vary and depend on the specific parasite
EXAMPLES OF PROTOZOAN INFECTIONS

- Protozoan parasitic diseases include malaria, toxoplasmosis, amebiasis, trichomoniasis, and trypanosomiasis
- Protozoan parasites may use humans as an intermediate host and another animal as their definitive host

EXAMPLES OF PROTOZOAN INFECTIONS

- Malaria (caused by *Plasmodium* species) is spread by the bite of *Anopheles* mosquitoes
- Toxoplasmosis (caused by *Toxoplasma gondii*) is spread by housecat feces
- Amebiasis (caused by *Entamoeba histolytica*) is acquired by ingestion of fecal-contaminated water

EXAMPLES OF PROTOZOAN INFECTIONS

- Trichomoniasis (caused by *Trichomonas vaginalis*) is a sexually-transmitted disease
- Trypanosomiasis (caused by *Trypanosoma* species) is spread by the bite of tsetse flies and kissing bugs
EXAMPLES OF HELMINTHIC INFECTIONS

- Nematodes (roundworms) cause tissue, blood, and lymph infections and can be caused by intestinal nematodes, such as Enterobius and Ascaris, or by tissue nematodes, such as Trichinella spiralis
- Cestodes (tapeworms) are the largest intestinal parasites and have a scolex, which incorporates both muscular sucking disks and in some cases attachment hooks called a rostellum
- Trematodes (flukes) can infect the blood, liver, and lungs

FUNGAL INFECTIONS

- Fungi are mostly harmless free-living or commensal organisms that cause no problems for humans
- Fungi are eukaryotes that have the sterol ergosterol incorporated in their plasma membrane and the polysaccharides mannan, glucan, and chitin in their cell walls
- Fungi are heterotrophic, metabolically diverse, and either aerobic or facultatively anaerobic
- Fungi reproduce either sexually or asexually
Fungal growth can be in a mold or yeast form, but some fungi are dimorphic and can grow in either form depending on the environmental conditions. Medically important fungi can be distinguished by their morphology or ribosomal RNA typing.

Medically important fungi can be divided into four categories of mycoses (diseases caused by fungi):

- Superficial mycoses do not involve tissue responses and include infection of the hair shafts and superficial skin.
- Mucocutaneous mycoses are associated with the skin, eyes, sinuses, oropharynx, external ears, or vagina.

Subcutaneous mycoses are localized infections of the subcutaneous tissues.

Deep mycoses can be localized or systemic, and are usually restricted to patients who are immunocompromised.

The pathogenesis of fungal infections involves adherence, invasion, and tissue injury.