

Introduction to Parasitology

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Key concepts, terminology, and foundations for the study of parasites and their relationships with hosts.

1. What Is Parasitology?

Aspect	Description
Definition	The scientific discipline that studies parasites (organisms that live on or in a host) and their interactions with host organisms, vectors, and the environment. - Morphology & life cycles - Host-parasite ecology
Scope	- Pathogenesis & disease - Diagnosis, treatment, and control - Evolutionary relationships - Human and animal health (e.g., malaria, schistosomiasis)
Importance	- Veterinary and agricultural impact - Biodiversity and ecosystem dynamics - Emerging zoonoses

2. Basic Terminology

Term	Meaning
Parasite	An organism that obtains nutrients at the expense of a host, causing some degree of harm.
Host	The organism that harbors the parasite; can be definitive (sexual reproduction) or intermediate (asexual stages).
Vector	An organism (often an arthropod) that transmits a parasite from one host to another (e.g., mosquito for <i>Plasmodium</i>).
Reservoir	A species that maintains the parasite in nature, often without severe disease.
Helminths	Worm-like parasites: Nematodes (roundworms), Trematodes (flukes), Cestodes (tapeworms).

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Protozoa	Single-celled eukaryotic parasites (e.g., <i>Giardia</i> , <i>Trypanosoma</i>).
Ectoparasite	Lives on the surface of the host (lice, ticks).
Endoparasite	Lives inside the host (intestinal worms, blood parasites).
Pathogenicity	The ability of a parasite to cause disease.
Virulence	The degree of damage a parasite inflicts on its host.

3. Major Groups of Parasites

Group	Representative Examples	Key Features
Protozoa	<i>Plasmodium</i> spp., <i>Entamoeba histolytica</i> , <i>Trypanosoma brucei</i>	Unicellular, often with complex life cycles involving multiple hosts.
Nematodes	<i>Ascaris lumbricoides</i> , <i>Enterobius vermicularis</i>	Cylindrical, unsegmented, complete digestive tract, often soil-transmitted.
Trematodes	<i>Schistosoma mansoni</i> , <i>Fasciola hepatica</i>	Flattened, leaf-shaped, usually have a fluke body; require snail intermediate hosts.
Cestodes	<i>Taenia solium</i> , <i>Echinococcus granulosus</i>	Segmented (proglottids), lack a digestive system, absorb nutrients through tegument.
Ectoparasites	<i>Pediculus humanus</i> (head louse), <i>Ixodes scapularis</i> (deer tick)	Attach externally; can be vectors for other pathogens.

4. General Life Cycle Concepts

1. **Direct (Simple) Cycle** – One host species; transmission occurs via environmental stages (e.g., *Enterobius* eggs on hands).
2. **Indirect Cycle** – Two or more host species; transmission occurs via intermediate hosts.