

Introduction to Microbiology and

Introduction to Microbiology and Parasitology

Study guide – key concepts, definitions, and relationships

Parasitology

1. What Is Microbiology?

Aspect	Description
Definition	Science of microorganisms – organisms too small to be seen with the naked eye.
Scope	Bacteria, archaea, viruses, fungi, protozoa, and microscopic algae. - Bacteriology (bacteria) - Virology (viruses)
Branches	- Mycology (fungi) - Parasitology (protozoa & helminths) - Phycology (microscopic algae)
Importance	- Human health (pathogens, microbiome) - Food production & preservation - Biotechnology & industry - Environmental cycles (nitrogen, carbon)

1.1 Basic Microbial Characteristics

Feature	Typical Traits
Cellular organization	Prokaryotic (bacteria, archaea) vs. eukaryotic (fungi, protozoa).
Size	0.2µm – 10µm (most bacteria); viruses 20–300nm.
Reproduction	Binary fission, budding, sporulation, or viral replication cycles.
Metabolism	Aerobic, anaerobic, facultative, chemotrophic, phototrophic.
Genetic material	DNA (chromosome ± plasmids) or RNA (some viruses).
Motility	Flagella, cilia, pseudopodia, gliding.

2. What Is Parasitology?

Aspect	Description
--------	-------------

Introduction to Microbiology and Parasitology

Definition

Study of parasites – organisms that live on or inside a host, deriving nutrients at the host's expense.

- **Protozoa** (single-cell eukaryotes)

Major Groups

- **Helminths** (multicellular worms) – **Nematodes**, **Cestodes**, **Trematodes**

- **Ectoparasites** (lice, ticks, mites)

Life Cycle

Types

Direct (single host) vs. indirect (multiple hosts, often with intermediate vectors).

Relevance

Human & animal disease, veterinary health, zoonoses, public health control.

2.2 Key Parasitic Concepts

Concept	Explanation
Host specificity	Some parasites infect only one species; others have a broad host range.
Transmission routes	Ingestion, skin penetration, vector bite, sexual contact, vertical (mother to offspring).
Pathogenic mechanisms	Tissue invasion, toxin production, immune modulation, nutrient theft.
Diagnosis	Microscopy, serology, molecular methods (PCR), antigen detection.
Control	Hygiene, sanitation, vector control, chemoprophylaxis, vaccines.

3. Overlap Between Microbiology & Parasitology

Overlap Area	Example
Microbial parasites	Protozoa (e.g., <i>Plasmodium</i> , <i>Giardia</i>).
Microbial symbionts	Gut bacteria that affect parasite colonization.
Diagnostic techniques	Staining, culture, PCR, ELISA used for both bacteria and parasites.