

**Parasitology:** is the study of parasites, their hosts, and the relationship between them.

**Medical Parasitology** is the branch of medical sciences dealing with organisms (parasites) which live temporarily or permanently, on or within the human body (host).

\***Human parasites** are either unicellular (protozoa) or multicellular (helminthes and arthropods).

\***The parasites** may live inside the host (endoparasites) or on the host surface (ectoparasites).

**The parasite is a living organism that** lives in (endoparasite) or on (ectoparasite) another organism, termed its host. It obtains nourishment and protection while offering no benefit in return. Consequently, the host suffers from various diseases, infections, and discomforts. However, in some cases, the host may show no signs at all of infection by the parasite.

**Types of Parasites: According to the nature of the host-parasite interactions and the environmental factors, the parasite may be one of the following types;**

1. **An obligatory parasite** that is completely dependent on its host and can't survive without it e.g. hookworms.
2. **A facultative parasite** that can change its life style between free-living in the environment and parasitic according to the surrounding conditions. e.g. *Strongyloides stercoralis*
3. **An accidental parasite** that affects an unusual host e.g. *Toxocara canis* (a dog parasite) in man.
4. **A temporary parasite** that visits the host only for feeding and then leaves it. e.g. Bed bug visiting man for a blood meal.

5. A **permanent parasite** that lives in or on its host without leaving it e.g. Lice.

6. An **opportunistic parasite** that is capable of producing disease in an immune-deficient host (like AIDS and cancer patient s). In the immunocompetent host, it is either found in a latent form or causes a self limiting disease e.g. *Toxoplasma gondii*.

7. A **zoonotic parasite** that primarily infects animals and is transmittable to humans. e.g. *Fasciola* species.

**Types of Hosts: Hosts are classified according to their role in the life cycle of the parasite into:**

1. **Definitive host (DH)** that harbours the adult or sexually mature stages of the parasite (or in whom sexual reproduction occurs) e.g. man is DH for *Schistosoma haematobium* , while female *Anopheles* mosquito is DH for *Plasmodium* species (malaria parasites).

2. **Intermediate host (IH)** that harbours larval or sexually immature stages of the parasite (or in whom asexual reproduction occurs) e.g. man is IH of malaria parasites.

3. **Reservoir host (RH)** harbours the same species and same stages of the parasite as man. It maintains the life cycle of the parasite in nature and is therefore, a reservoir source of infection for man. e.g. sheep are RH for *Fasciola hepatica*.

4. **Paratenic or transport host** in whom the parasite does not undergo any development but remains alive and infective to another host. Paratenic hosts bridge gap between the intermediate and definitive hosts.

5. **Vector** is an arthropod that transmits parasites from one host to another, e.g. female sand fly transmits *Leishmania* parasites.

## Host-Parasite Relationship

The term refers to the relationship between the host and the parasite and the competition for supremacy that takes place between them.

Disease should not be confused with infection; a person may be infected without becoming diseased. In biology, the relationship between two organisms is mainly in the form of **symbiosis**, defined as "life together", i.e., the two organisms live in an association with one another. Thus, there are at least three types of relationships based on whether the symbiont has beneficial, harmful, or no effects on the other .

### Types of Symbiotic Association:

1. **Mutualism** is a relationship in which both partners benefit from the association. Mutualism is usually obligatory, since in most cases physiological dependence has evolved to such a degree that one mutual cannot survive without the other.
2. **Commensalism:** a kind of association between two organisms in which one partner is benefited (commensal) and the other is neither benefited nor harmed (e.g. *Entamoeba coli*)
3. **Parasitism:** in which one of the participants, the parasite, either harms or lives at the expense of the host.