

# Introduction to Parasitology

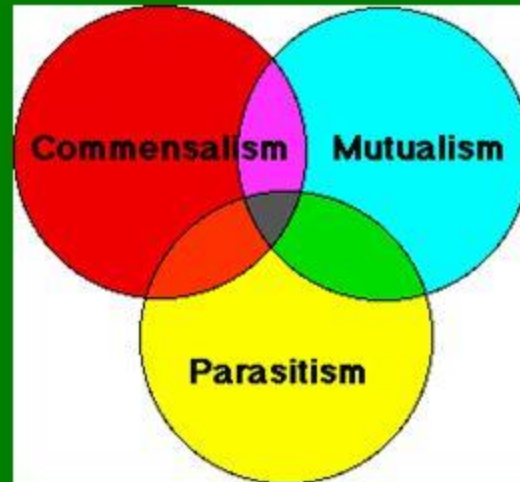
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# Symbiosis



A relationship where two organisms (of different species) live together.

## Symbiotic relationship may be

- **Commensalism:** Where an organism (**commensal**) is dependent on another (**host**) but does not harm it.
- **Mutualism:** Where shared benefits are present.
- **Parasitism:** Where one benefits (**parasite**) while the other is harmed (**host**).

INTERACTION	TYPE OF SYMBIOSIS
 <p data-bbox="266 525 479 558">Benefits</p> <p data-bbox="730 525 942 558">Benefits</p>	<p data-bbox="1302 339 1607 372"><b>Mutualism</b></p> <p data-bbox="1232 396 1676 429">Species A benefits</p> <p data-bbox="1232 444 1676 476">Species B benefits</p>
 <p data-bbox="266 858 479 891">Benefits</p> <p data-bbox="697 858 977 891">Unaffected</p>	<p data-bbox="1232 675 1676 708"><b>Commensalism</b></p> <p data-bbox="1232 732 1676 765">Species A benefits</p> <p data-bbox="1199 779 1709 812">Species B unaffected</p>
 <p data-bbox="266 1186 479 1219">Benefits</p> <p data-bbox="736 1186 938 1219">Harmed</p>	<p data-bbox="1296 1003 1613 1036"><b>Parasitism</b></p> <p data-bbox="1232 1061 1676 1093">Species A benefits</p> <p data-bbox="1232 1108 1676 1140">Species B harmed</p>

**Medical Parasitology** is the science  
studying the parasites that infect  
the humans.

# Terms used in Parasitology

## ❖ Parasite:

- Is an organism, which is dependent on another organism (**host**) for its survival and causes harm to it.

## ❖ Host:

- Is a living organism that harbours the parasite.

## Types of the parasites according to their **location** in the host

- **Ectoparasite:** A parasite that lives on the surface of the host (infestation).
- **Endoparasite:** A parasite that lives inside the body of its host (infection) either intracellular or extracellular.



## Types of the parasites according to their relationship with the host

- **Obligatory parasite:** A parasite that is completely dependent upon a host.
- **Facultative parasite:** A parasite that is capable of living both freely and as a parasite.
- **Accidental (Incidental) parasite:** A parasite found in other host different from its normal host.

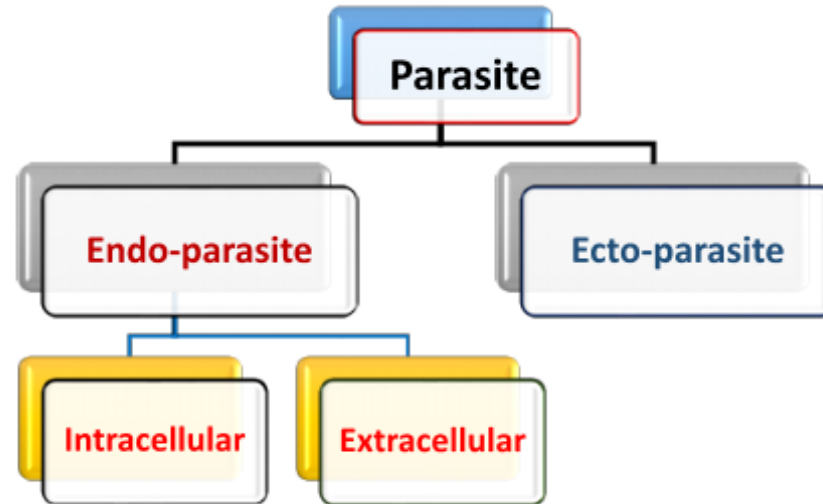
## Types of the parasites according to their **relationship** with the host

- **Permanent parasite:** A parasite that spends its life cycle on or in the body of its host.
- **Temporary or Intermittent parasite:** A parasite that visits its host only for a short period of time for its meal.

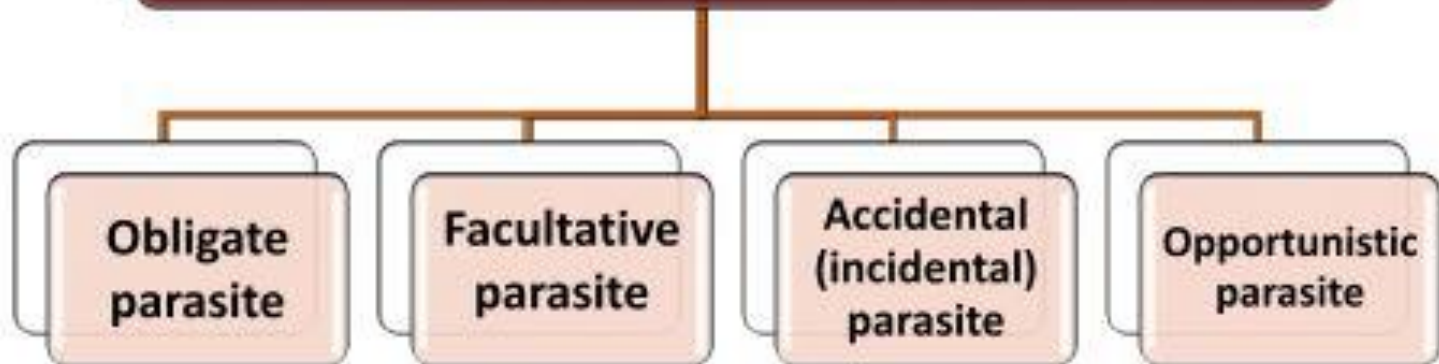
## Types of the parasites according to their **relationship** with the host

- **Opportunistic parasite:** A parasite that causes disease only in immunodeficient patients (AIDS, cancer patients), while in immunocompetent individuals, the parasite may exist in a latent form producing no or mild symptoms.

**PARASITES** are classified according to their **LOCATION** in the host into:



**PARASITES** are classified according to their **RELATIONSHIP** to the host into:



# Types of the hosts

- **Definitive host (D.H):** It is the host which harbours the **mature (adult) stage** of the parasite or in which sexual reproduction of the parasite takes place.
- **Reservoir host (R.H):** It is an animal that harbours the **mature (adult) stage of the parasite** as in human. It acts also as a source of infection to man and maintains the parasite in nature.

# Types of the hosts

- **Intermediate host (I.H):** It is the host which harbours the **immature (larval) stage** of the parasite or in which non-sexual reproduction of the parasite takes place
- **Complete host:** which acts as both definitive and intermediate host.
- **Vector:** An arthropod that carry the parasite to the host

# Kinds of hosts



## Main Kinds

Definitive Host

Intermediate Host



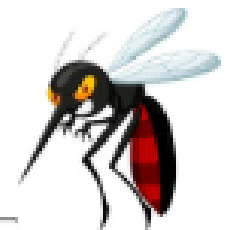
## Other Hosts

Reservoir Host

Accidental Hosts

Complete Host

Vector



❖ **Infective stage (I.S):** The stage by which the infection takes place.

❖ **Diagnostic stage (D.S):** The stage by which we can diagnose the parasitic infection (disease).



- ❖ **Habitat:** The natural site or location where the parasite lives.
- ❖ **Carrier:** A host in a state of equilibrium with parasite **without or with minimal symptoms** of the disease, but he is **infective to others.**
- ❖ **Zoonosis:** Transmission of an infection from animal to man either **directly or indirectly via intermediate host.**

# Classification of Medical Parasitology

# Medical Parasitology is classified into

**Medical helminthology**

**Deals with parasitic worms**

**1-Phylum :  
Platyhelminthes  
(flat worms)**

**2-Phylum :  
Nemathelminthes  
(round worms)**

➤ **Class: Trematoda**  
➤ **Class: Cestoidea**

➤ **Class: Nematoda**

**Medical protozoology**

**Deals with unicellular parasites**

**1-Class: Rhizopoda:**

(move by pseudopodia)

**2- Class: Ciliata**

(move by cilia)

**3-Class: Zoomastigophora**

(move by flagellae)

**4-Class: Sporozoa**

(move by gliding movement)



**Trematoda**

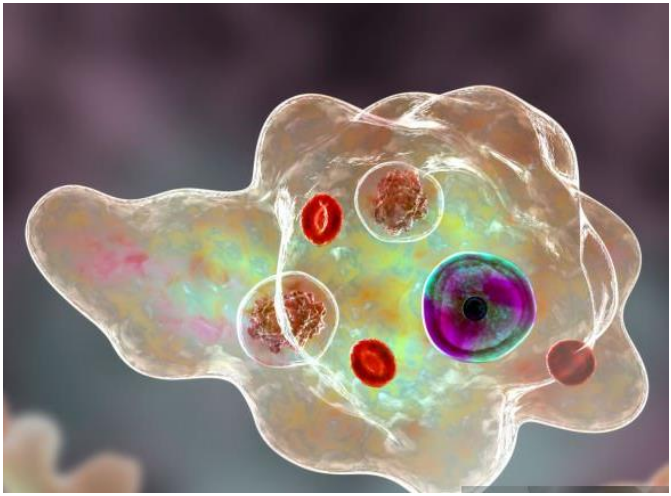


**Cestoda**

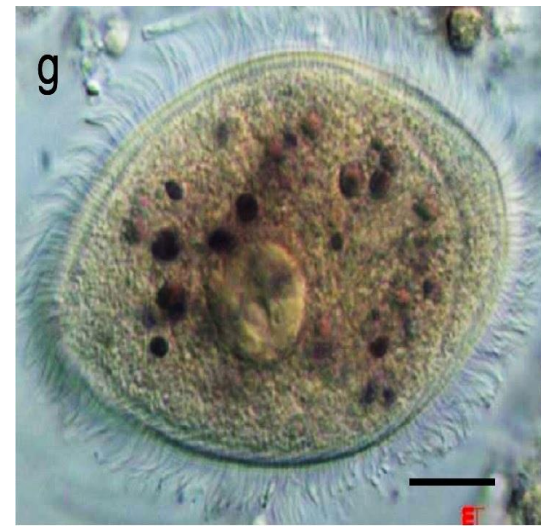


**Nematoda**

**Helminthology  
worms**



**Rhizopoda**



**Ciliata**



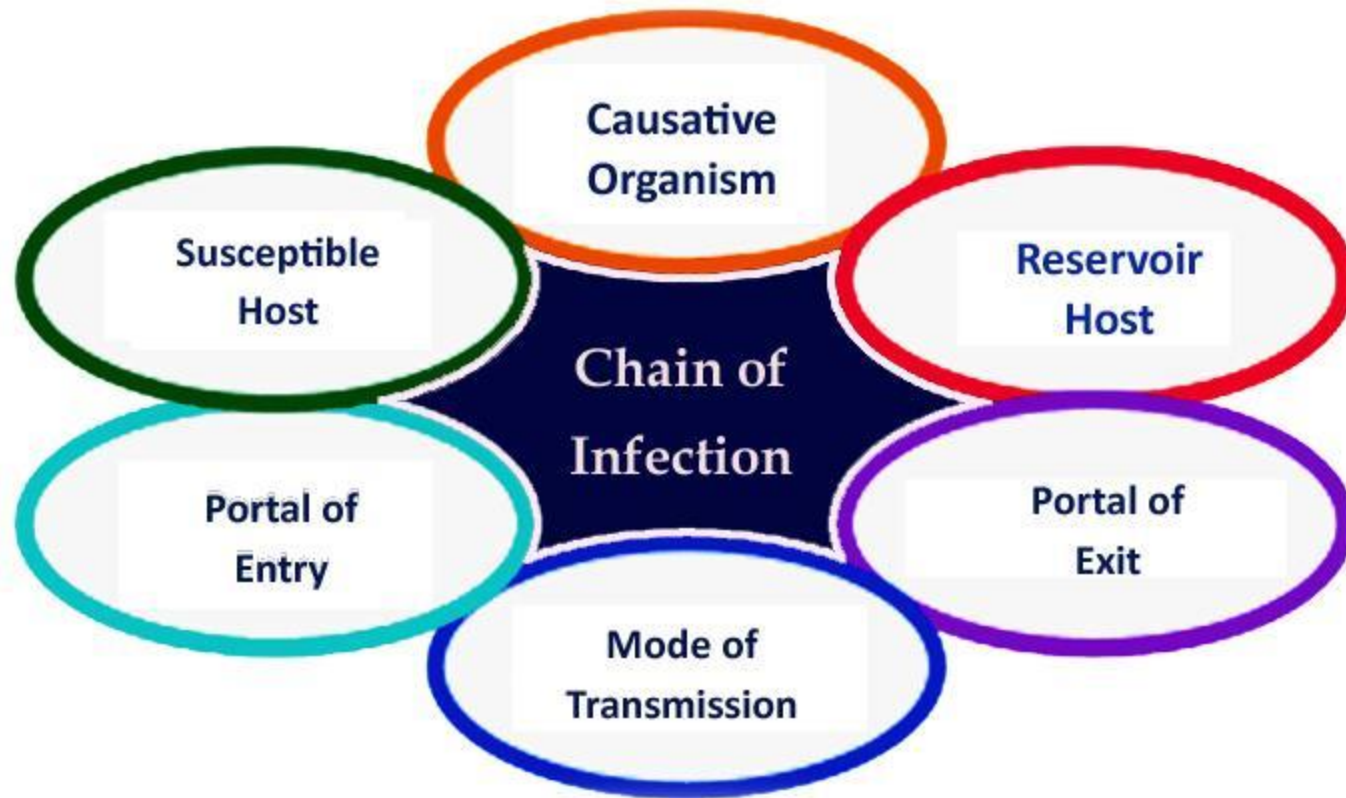
**Zoomastigophora**

**Protozoology**  
**Unicellular organisms**

## **The chain of infection**

The sequence of parasitic disease transmission is called "the chain of infection".

Transmission occurs when the causative organism leaves its "reservoir host" through a "portal of exit" then transmitted by some "mode of infection" then enters through an appropriate "portal of entry" to infect a "susceptible host".



**Knowledge of the chain of infection provides a basis for determining appropriate control measures.**

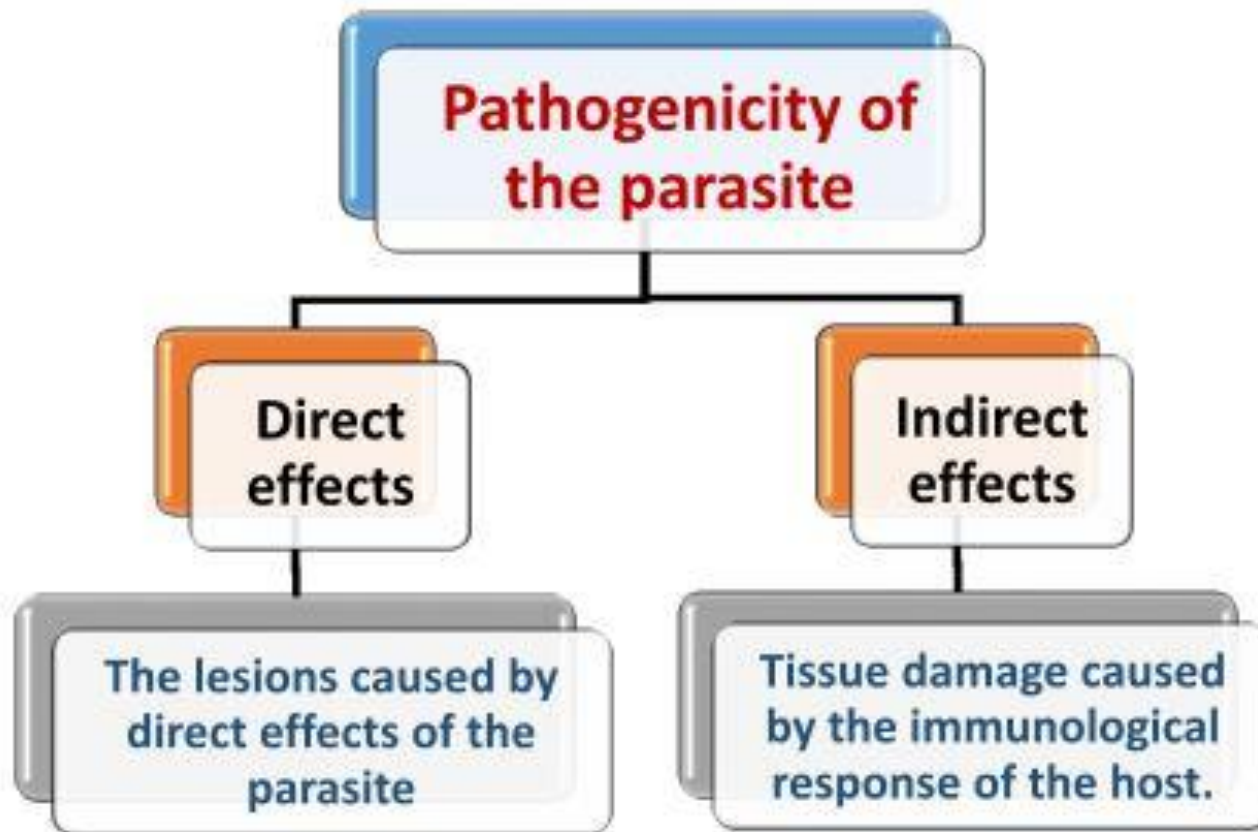
# Effect of the parasite on the host (pathogenicity)

- The effect depends on the number, size and morphology of the parasite, its activity (movement and migration), site (habitat), specific toxin and host reaction



# Pathogenicity

*Q: What are the mechanisms of host tissue damage caused by the parasite?*



*Q; What are the direct effects of the parasite on the host?*



- 1) Impairing nourishment.
- 2) Tissue damage.
- 3) Toxic effect.

**Q:** Define the host Tissue damage caused by immune response to infection?

**Generalized**

Fever, malaise and weakness.

Anaemia, eosinophilia, leucocytosis, leucopenia.

Allergic reactions.



**Localized**

According to the tissue or organ affected, e.g.:

Gastrointestinal (colic, dyspepsia, diarrhoea ...)

Neurological(headache,convulsion,paralysis)

Respiratory(cough,dyspnea,wheezes)

Cutaneous(itching,rashes,ulceration)



J.S.A

## Geographical distribution of parasites



- ♃ Parasites have more or less **cosmopolitan distribution**.
- ♃ Parasites survive mostly in **tropical and subtropical regions**.
- ♃ Parasites distribution depends upon both **host factors** and **environmental conditions**

## Host factors

- 👤 **Host specificity**, as some parasites require man as a host where others require dogs or cats.
- 👤 **Host habits**, e.g. consumption of raw or undercooked meat or fish and raw vegetables.
- 👤 **Host occupation**, e.g. farmer, fisherman or
- 👤 The presence of an appropriate **vector or I.H.**
- 👤 The presence of an appropriate **reservoir host.**



**Environmental conditions** favoring survival outside the body of the host, as;

- ⚙️ The presence of water,
- ⚙️ Temperature,
- ⚙️ Humidity etc..





Test Knowledge

Match each Type of parasite (I) with its most probable Definition (II)

(I)	Type of parasite	(II)	Definition
1	Opportunistic:	A	A parasite that lives on the surface of the host's body.
2	Accidental:	B	A parasite which is capable of living both freely and as a parasite.
3	Ectoparasites:	C	A parasite which is completely dependent on the host.
4	Endoparasites:	D	A parasite occurs in patients with impaired defense mechanisms .
5	Obligatory:	E	A parasite found in a host other than its normal one.
6	Facultative:	F	A parasite that lives within the body of the host.

THANK

YOU

