

Introduction to parasitology

Host-parasite relationships:-

A parasite is an organism which has become adapted to living on or in some other organism, which is usually larger than itself. The relationship between any two living things in which each of them depends on the other physiologically. The first (symbiont) is the organism that lives inside the body of the second (host) is the organism or the body in which the symbiont lives.

Symbiosis

1- Mutualism is the relationship between the symbiont and the host in which both of them depend on each other from the physiologically. Ex. termite- protozoa relationship, the termite feeds on cellulose but its own digestive enzymes are incapable of digesting it. Protozoa living in termite digestive tract have the ability to do so. Thus termite gets benefits by digesting its food and the protozoa at the same time get nutrition, multiplication, protection, suitable environment for living and shelter. So this association is helpful both to parasite and host.

2- commensalism is the relationship in which symbiont gets benefit and host remains unaffected. Ex. Entamoeba coli inhabits the intestinal tract of human so gets nutrition, protection, suitable environment for living but does not cause any pathogenic effects for the host.

3- parasitism in this case the symbiont gets benefit but the host is affected .

Medical parasitology deals with the parasite which cause human infections and the diseases they produce. Parasitism is a more durable and intimate association in which the parasite established itself in or on the living body of the host, being physically and physiologically dependent on it for at least part of its life cycle.

Parasites which live in complete harmony with the host , without causing any damage to it are called commensals ,while those which cause disease are called pathogens.

Types of parasites

- ❖ **Endoparasites:-** the parasite lives inside the body of the host, ex. Malarial parasite ,Ascaris, Taenia saginata, Hydatid cyst.....

- ❖ **Ectoparasites**:- this type of parasite live outside (on the surface of)the host as on the skin(inhabits the body surface only without penetrating into the tissues), ex. mosquito, fleas, flies, scabies, lice and other haematophagous arthropods. They are important as vector transmitting pathogenic microbes. The term infestation is often employed for parasitisation with ectoparasite in place of the term infection used with reference to endoparasite.
- ❖ **Obligatory parasites** :- this parasite which cannot live without the host such as malaria, *Taenia saginata* and other helminthes.
- ❖ **Facultative parasites**:- this type of parasite that accidentally infest the host ex. Larval stage of house fly inside the ear ,this occur due to the discharge inflammatory pus which attracts flies to feed on and the latter may accidentally lay their eggs in the ear.
- ❖ **Permanent parasite** :- the parasite that remain in the host permanently ex. *Taenia saginata* which may live inside the body for long period may reach to 10 years or more.
- ❖ **Temporary parasite** :-the parasite that comes to the host for short time to obtain nutrition and leaves away ex. Mosquito, flies.
- ❖ **Pseudoparasite** :- a false parasite may be either commensal or temporary parasite in which accidentally ingested and leaves the host without causing any harmful effect.

Types of hosts:-

- ❑ **Final host** :- the host in which the parasite lives and reaches maturity, sometimes called definitive host ex. Human for *taeniasaginata* , *ascaris*.
- ❑ **Intermediate host** :- the host in which larval stage of the parasite lives or the asexual multiplication takes place for continue their life cycle ,so some parasite need intermediate host while others not ex.cow for *T.saginata* and snails for schistosomal parasites. Some parasites require tow intermediate hosts for complete their life cycle such as *P. westermani* and *D. latum*.

- ❑ **Reservoir host** :-the host in which the parasite can be found or develops an asymptomatic infestation until it travels to its own intermediate or final host . Ex. dogs and rodents in human leishmaniasis.
- ❑ **Transport host or vector** :- an organism that transmit the parasite by mechanical process without development of the parasite inside it ex. House fly. Also named as paratenic host

Sources of infection:-

Parasitic infection originate from various sources and are transmitted by various routes, the major sources of infection are:-

1- Soil :-

- Embryonated eggs which are presented in soil may be ingested ex. Round worm , whipworm.
- Infective larva present in soil may enter by penetrating exposed skin, ex. Hook worms.

2- Water :-

- Infective forms of some parasite present in the water may be swallowed ex. cyst of amoeba and giardia.
- Water containing the intermediate host for some parasite and may be swallowed ex. Infection with Guinea worm occur by drinking the water containing the Cyclops which is the intermediate host for this parasite.
- Infective larva in water may enter by penetrating exposed skin ex. Cercariae of schistosoma.
- Free-living parasite in the water may enter through vulnerable sites ex. Naegleria may enter through nasopharynx and cause meningoencephalitis.

3- Food:-

- Contamination with human or animal feces ex. Amoebic cysts, eggs of helminthes.
- Meat containing infective larva ex. *Taenia saginata* and *Trichinella spiralis*.

4- Insect vectors:-if the transmitter is not essential in the life cycle , called mechanical vector whereas if it's essential in the life cycle, it is a biological vector.

- Biological vector, ex. Mosquito in the life cycle of malaria and sand flies in the life cycle of *leishmania donovani*.
- Mechanical vector, ex. house fly in the transmission of amoebiasis.

5- Animals:-

- Cow in the life cycle of beef tapeworm.
- Dog in the life cycle of hydatid disease.
- Cat in the toxoplasmosis.
- Mollusks in the life cycle of liver flukes.

6- Other persons:-

Carriers and patients , ex. all anthroponotic infections, vertical infection (congenital infection).

7- Self-(autoinfection):- ex. finger to mouth transmission such as in the pin worm or internal reinfection such as in the strongyloides.

Modes of infection :-

The major mode of infection are :-

- 1- Oral transmission:- ex. *Entamoebahistolytica*.
- 2- Skin penetration:- ex. Schistosomiasis.
- 3- Vector transmission:- ex. malarial infection.
- 4- Direct transmission (sexual):- ex. in the trichomoniasis
- 5- Vertical transmission:- ex. toxoplasmosis