

Medical parasitology

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INTRODUCTION

Medical parasitology is the science that deals with organisms living in the human body (the host) and the medical significance of this host-parasite relationship; so it is the study of the parasites of man and their medical consequences.

ASSOCIATION BETWEEN PARASITE AND HOST

▶ Type of parasites :

- ▶ parasite is a living organism, which takes its nourishment and other needs from a host; the host is an organism which supports the parasite. The parasites included in medical parasitology are protozoa, helminthes, and some arthropods.
- ▶ 1-Ectoparasite - a parasitic organism that lives on the outer surface of its host, e.g. lice, ticks, mites etc.
- ▶ 2-• Endoparasites - parasites that live inside the body of their host, e.g. Entamoeba histolytica.
- ▶ 3-• Obligate Parasite - This parasite is completely dependent on the host during a segment or all of its life cycle.

- ▶ 4-• Facultative parasite - an organism that exhibits both parasitic and non-parasitic modes of living and hence does not absolutely depend on the parasitic way of life, but is capable of adapting to it if placed on a host.
- ▶ 5-• Accidental parasite - when a parasite attacks an unnatural host and survives.
- ▶ 6-• Erratic parasite - is one that wanders in to an organ in which it is not usually found. E.g. *Entamoeba histolytica* in the liver or lung of humans.

Type of Host:

- ▶ Host: organism harboring a parasite.
- ▶ Definitive host - a host that harbors a parasite in the adult stage or where the parasite undergoes a sexual method of reproduction.
- ▶ • Intermediate host - harbors the larval stages of the parasite or an asexual cycle of development takes place. In some cases, larval development is completed in two different intermediate hosts, referred to as first and second intermediate hosts.
- ▶ • Paratenic host - a host that serves as a temporary refuge and vehicle for reaching an obligatory host, usually the definitive host, i.e. it is not necessary for the completion of the parasites life cycle.
- ▶ • Reservoir host - a host that makes the parasite available for the transmission to another host and is usually not affected by the infection. • Natural host - a host that is naturally infected with certain species of parasite.
- ▶ • Accidental host - a host that is under normal circumstances not infected with the parasite

Sources of Infection

- ▶ 1-Contaminated soil and water: Soil polluted with embryonated eggs (roundworm, whipworm) may be ingested or infected larvae in soil, may penetrate exposed skin (hookworm)
- ▶ 2- Food: Ingestion of contaminated food or vegetables containing infective stage of parasite (amoebic cysts,) Ingestion of raw or undercooked meat harboring infective larvae (the larval stage of *Taenia solium*).
- ▶ 3- Insect vectors: A vector is an agent, usually an arthropod that transmits an infection from man to man or from other animals to man, e.g. female *Anopheles* is the vector of malarial parasite.

- ▶ 4- Vectors can be:
 - ▶ **A-** Biological vectors: The term biological vector refers to a vector, which not only assists in the transfer of parasites but the parasites undergo development or multiplication in their body as well. Example of true vectors are:
 - Mosquito—Malaria.
 - **B-** Mechanical vectors: The term mechanical vector refers to a vector, which assists in the transfer of parasitic form between hosts but is not essential in the life cycle of the parasite. Example of Mechanical vectors is: Housefly—amoebiasis
- ▶ 5- Animals:
 - **A-** Domestic: Cat, e.g. Toxoplasma,
 - **B-** Wild: □ Wild game animals, e.g. trypanosomiasis
- ▶ 6- Self (autoinfection):
 - Finger to mouth transmission, e.g. pinworm

EFFECT OF PARASITES ON THE HOST

- ▶ The damage which pathogenic parasites produce in the tissues of the host may be described in the following two ways;
- ▶ **(a) Direct effects of the parasite on the host**
- ▶ • Mechanical injury - may be inflicted by a parasite by means of pressure as it grows larger, e.g. Hydatid cyst causes blockage of ducts such as blood vessels producing infraction.
- ▶ • Deleterious effect of toxic substances- in *Plasmodium falciparum* production of toxic substances may cause rigors and other symptoms.
- ▶ • Deprivation of nutrients, fluids and metabolites -parasite may produce disease by competing with the host for nutrients.
- ▶ **(b) Indirect effects of the parasite on the host:**
- ▶ Immunological reaction: Tissue damage may be caused by immunological response of the host, e.g. nephritic syndrome following Plasmodium infections.

Prevention and control

- ▶ measures may be taken against every parasite infecting humans. Preventive measures designed to break the transmission cycle are crucial to successful parasitic eradication. Such measures include:
 - ▶ □ Reduction of the source of infection- the parasite is attacked within the host, thereby preventing the dissemination of the infecting agent. Therefore, a prompt diagnosis and treatment of parasitic diseases is an important component in the prevention of dissemination.
 - ▶ □ Sanitary control of drinking water and food.
 - ▶ □ Proper waste disposal - through establishing safe sewage systems, use of screened latrines, and treatment of night soil.
 - ▶ □ The use of insecticides and other chemicals used to control the vector population.
 - ▶ □ Protective clothing that would prevent vectors from resting in the surface of the body and inoculate pathogens during their blood meal.
 - ▶ □ Good personal hygiene.
 - ▶ □ Avoidance of unprotected sexual practices.

CLASSIFICATION OF MEDICAL PARASITOLOGY

- ▶ Parasites of medical importance come under the kingdom called protista and animalia. Protista includes the microscopic single-celled eukaryotes known as protozoa. In contrast, helminthes are macroscopic, multicellular worms possessing well differentiated tissues and complex organs belonging to the kingdom animalia. Medical Parasitology is generally classified into:
- ▶ Medical Protozoology - Deals with the study of medically important protozoa.
- ▶ Medical Helminthology - Deals with the study of helminthes (worms) that affect
- ▶ man.
- ▶ Medical Entomology - Deals with the study of arthropods which cause or transmit disease to man.

