MEDICAL HELMINTHOLOGY

Bushehr University of Medical Sciences
Department: Microbiology and Parasitology
Module: Medical Parasitology (Introduction)
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• HELMINTH - a multicellular organism (metazoa)

• Among the common parasitic causes of human suffering

• Cause of high morbidity and mortality of people worldwide

• Cause different diseases in humans, but few helminthic infections cause life threatening diseases

• Medical Helminthology is concerned with the study of helminthes or parasitic worms.
Classification

1. Platyhelminths (Flatworms)
   - Cestoda (Tapeworms)
   - Trematoda (Flukes)
   - Turbelaria (Free living, Rarely parasite)

2. Nematohelminthes
   - Nematoda (Roundworms)

3. Nematomorpha (Rarely human parasite, mail and female separate, threadlike, Unsegmented, symmetrical)

4. Acantocephala (Unsegmented, Rarely parasite, mail and female separate)

5. Annelida (Segmented, symmetrical, Leech, earthworm)
METAZOA (HELIMINTHS)

Platyhelminthes

Trematodea

(a) Genus *Fasciola* E.g. *F. hepatica*
(b) Genus *Schistosoma* E.g. *S. hematobium*

Cestoda

(a) Genus *Taenia* E.g. *T. saginata*
(b) Genus *Echinococcus* E.g. *E. granulosus*
(c) Genus *Hymenolepsis* E.g. *H. nana*
(d) Genus *Diphyllotrema* E.g. *D. latum*

Nemathelminthes

Nematodes

(a) Intestinal Nematodes E.g. *Ascaris lumbricoides*
(b) Somatic Nematodes E.g. *Wuchereia bancrofti*
Characteristics

- Helminthes do not multiply within hosts; severity of disease depends on parasite burden and immunologic response to parasites
- Multicellular
- Well developed organ systems
- Worldwide
  - Tropical, subtropical
    - Survival of eggs, larval stages
- Less developed
  - Sanitation, intermediate host survival
Modes of transmission

- Exposure of humans to the parasites may occur in one of the following ways:
  
1. Contaminated soil (*Geo-helminthes*)
2. Blood sucking insects or arthropods (as in *filarial worms*)
3. Food (*Taenia saginata* in raw meat)
4. Water-snail (cercariae of *blood flukes*)
5. Person to person (as in *Enterobius vermicularis, Hymenolopis nana*)

- They enter the body through different routes including: 
  
mouth, skin and the respiratory tract
Classification based on modes of transmission

- Soil-transmitted helminths (*Ascaris*, *Hookworms*)
- Arthropod-transmitted helminths (*Filaria*, *Dracunculus*)
- Food and animal-transmitted helminths (*Taenia*)
- Snail-transmitted helminths (*Fasciola*, *Schistosoma*)
- Direct or contagious-transmitted helminths (*Enterobius*, *Hymenolopis*)
Pathogenesis

- Direct Damage
  - Blockage
    - Worm size
    - Worm migration
    - Granulomas
  - Pressure
  - Anemia
  - malnutrition
  - Tissue
    - Necrosis

- Indirect Damage
  - Host response
    - Inflammation
    - Hypersensitivity

- Clinical manifestation
  - Asymptomatic
  - Symptomatic
Diagnosis

- **Parasitological**
  - Qualitative and Quantitative

- **Sample**
  - Stool, blood, tissue biopsy, duodenal aspiration, sputum, urine

- **Diagnostic stage**
  - Adult
  - Proglottid or segment
  - Eggs
  - Larvae (cysticercus, rabditiform, filariform and microfilariae)

- **Naked eye, microscopy**

- **Others:**
  - Stool culture
  - Concentration techniques
  - Scotch tape
  - Histopathological findings

- **Non parasitological**
  - Clinical
  - Serum
    - ELISA
  - Molecular

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Control and Prevention

- **Primary prevention** – before infection occur
  - Health education
  - Environmental improvement, e.g. Sanitary control of drinking water and food; Proper waste disposal
  - Specific protection

- **Secondary prevention** – when infection occur
  - Early diagnosis – history, clinical, lab
  - Prompt treatment – symptomatic, antihelminthic
طرح بندی و خصوصیات کرم‌ها (پزشکی)

واثق کرم «ورم» به جانوران کرم‌مانندی اشاره دارد که متعلق به سه شاخه ی زیر هستند:

1- کرمهای نخی (کرمهای گرد) یا نماتودا

2- کرمهای پهن (کرمهای تخت) که شامل دو رده است:

1- سستودا (کرمهای نواری)
2- ترماتودا (کرمهای پرگی شکل)