

Classification of Helminths (worms)

NOTE:

This is just a review of the slides and is not enough
Important points are in **red**.

Flat Worms

Trematodes

Leaf-like, unsegmented worms



Previous lecture

Nematodes

Round worms

Elongated, cylindrical, unsegmented
Variable in size (<1 cm - 100cm)
with male smaller than female

• Intestinal nematodes

- *Enterobius vermicularis*
- *Trichuris trichiura*
- *Ascaris lumbricoides*
- *Ancylostoma duodenale* & *Necator americanus*
- *Strongyloides stercoralis*

• (Tissue nematodesX)

Cestodes

Tape-like, segmented worms

- *Taenia saginata*
- *Taenia solium*
- *Hymenolepis nana*
- *Echinococcus granulosus*

2 | Intestinal Helminths

- Enterobius vermicularis

*PATHOLOGY:

- Length from 0.5 to 1 cm (>> can be seen by naked eye)
- Adult worm **in lumen of cecum and appendix** from which adult female migrate to **rectum and anus** (*where their nasty action take place*)
- Transmission route is directly fecal oral (doesn't require animal host)
- Majority of infections are asymptomatic.
- Main clinical presentation **pruritus ani** (anal itch) & perianal excoriation
- In female, they invade vulva and vagina result in **valvovaginitis**.
- Usually accompanied by insomnia, anorexia, loss of weight and concentration (Side effect)



Worldwide distribution

- Enterobius vermicularis worms are commonly known as **pin worms** so remember pin >> itch

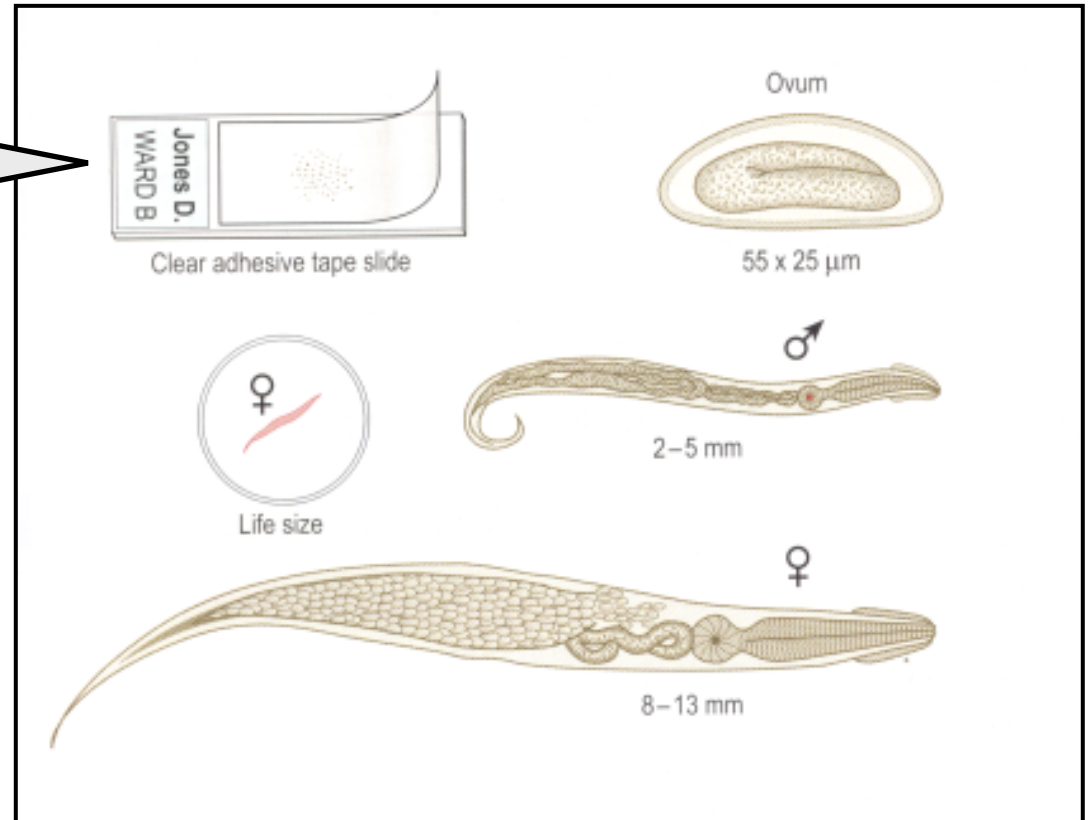
- also commonly known as **seat worm** so remember seat >> anus

- Enterobius Vermicularis

a.k.a. *Oxyuris*

This thingy is called **Scotch-tape** test and it's used to diagnosed Entrobius Vermicularis by direct visualization of their eggs under microscope.

So, **diagnostic stage** >> **eggs**
BTW, **infective stage** is also **eggs**



Albendazole or Mebendazole for whole family

- Trichuris Trichiura

a.k.a. whipworm

*PATHOLOGY:

- World wide, common in poor sanitation.
- It coexists with Ascaris because of similar requirement.
- Adult live in large intestine especially caecum and appendix. the whole length of large intestine affected.
- Male and female worm have narrow anterior portion penetrate the intestinal
- Route of transmission: Fecal oral (no animal host) (eggs need 3-5 wks to become infective)
- Clinically, light infection is asymptomatic heavy infection causes abdominal pain ,bloody diarrhea >> Rectal prolapse in children (common complication)



- Trichuris Trichiura

a.k.a. whipworm

*DIAGNOSIS

- Detection of eggs in stool.

Eggs are barrel shaped with mucoid plugs at each pole

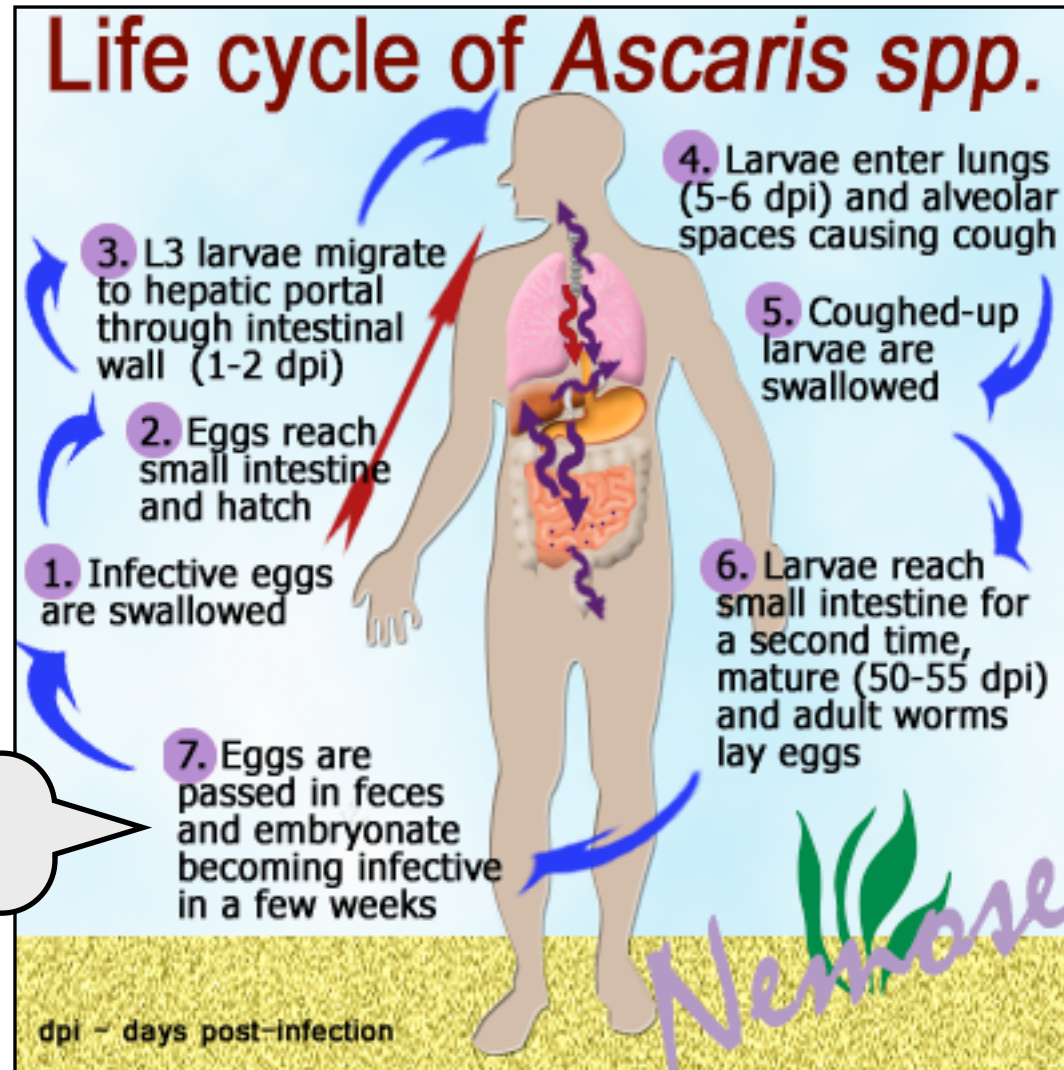


Albendazole

- Ascaris Lumbricoides

a.k.a. roundworm

*LIFE CYCLE:



Eggs need 1-2 weeks to become infective

NOTE:

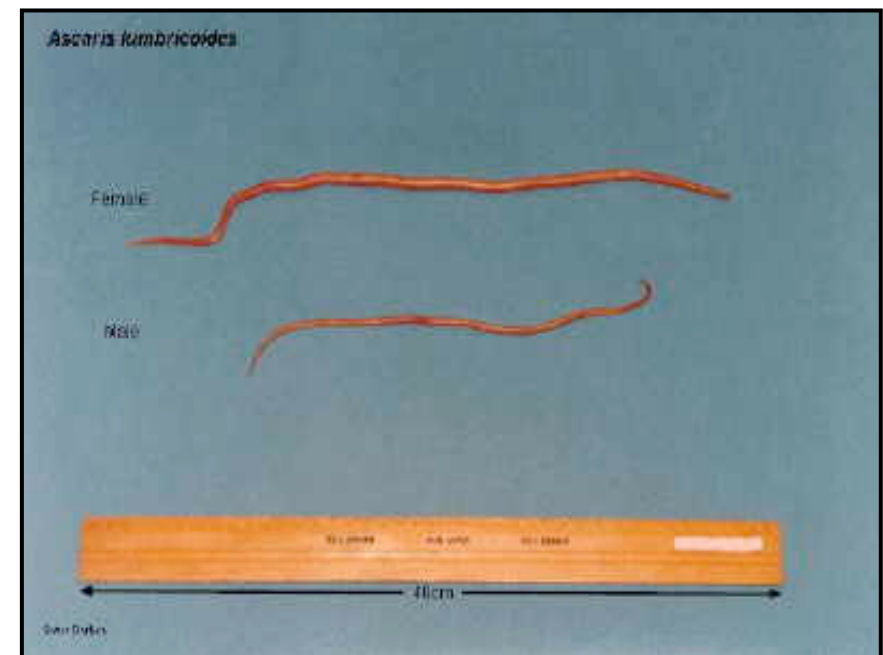
Infective stage >> eggs
Diagnostic stage is also eggs

- Ascaris Lumbricoides

a.k.a. roundworm

*PATHOLOGY:

- The commonest human helminthes infection.
- Found in **jejunum** and **upper part of ileum**.
- Female ± 20 cm longer than male ± 10 cm
- Feed on semi digested food.



- Ascaris Lumbricoides

a.k.a. roundworm

*PATHOLOGY:

- **1-Adult worm** cause:

Light infection: asymptomatic.

Heavy infection: intestinal obstruction

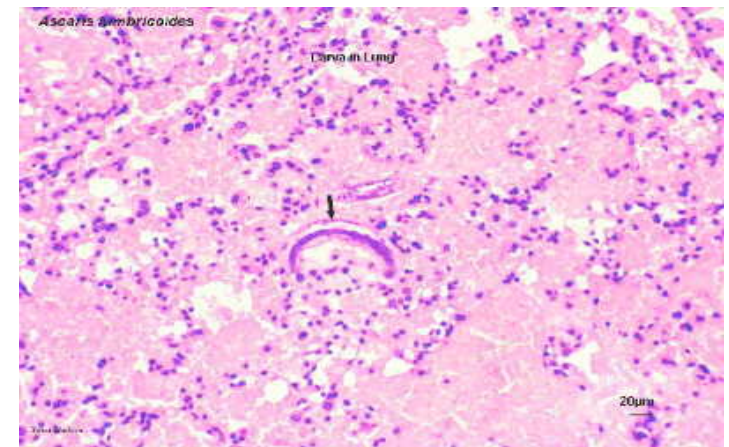
Migrating adult will obstruct the bile duct >> obstructive jaundice

- **2-Larvae** cause **Loeffler`s syndrome (imp)**

larvae migrate with bloodstream and settle in lung alveoli

>> Pneumonia, cough with bloody sputum

Eosinophilia, urticaria



- Ascaris Lumbricoides

*DIAGNOSIS

- eggs in stool.
- larvae in sputum.
- adult worms *themselves* may pass with stool.

"Patient tells you I passed a snake"
Prof. Adeef

X!

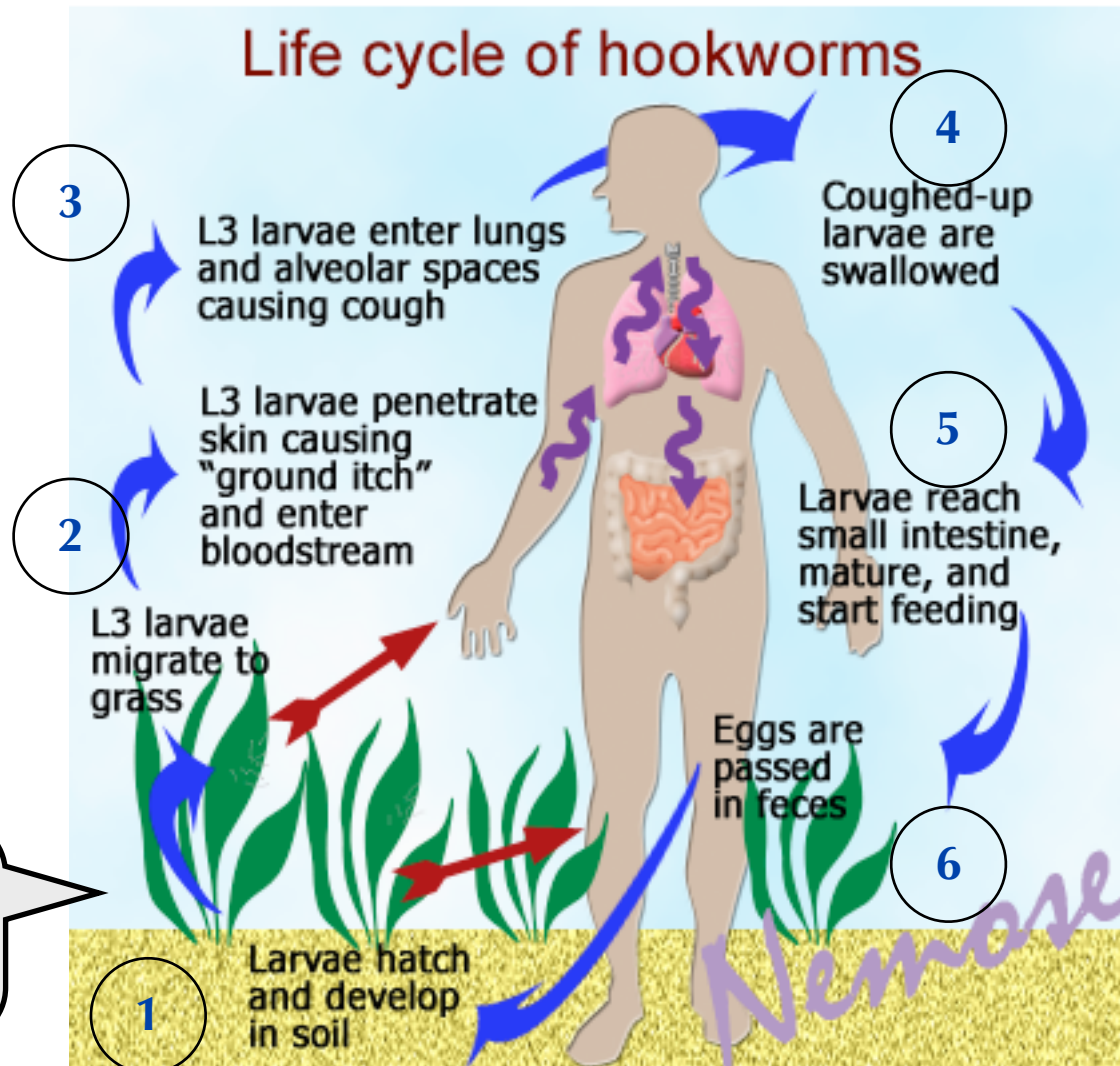


Albendazole or Mebendazole

- Hookworms

Ancylostoma Dudenale
&
Necator Americanus

*LIFE CYCLE:



larvae need
5-7 days to
become infective

NOTE:

Infective stage >> **filariiform larvae**
Diagnostic stage >> **eggs**

- Hookworms

Ancylostoma Dudenale
&
Necator Americanus

*PATHOLOGY:

- A common cause of **anemia**.
- Found in **small intestine** mainly **jejunum**.
- Its (mouth) lined with hard hooks, triangular **cutting plates** and **anticoagulant glands**. so it can enjoy sucking blood >later> anemia



BO!



Buccal cavity attached to intestinal mucosa

- Hookworms

*PATHOLOGY:

- larvae cause:

- At the site of entry of larvae: (**ground** **itch***).
- Migration phase:
 - cough with bloody sputum
 - pneumonia, eosinophilia, urticaria.

***NOTE:**
Ground itch >> **Hookworm larvae**
Swimmer's itch >> **Schistosoma cercariae**

- adult worm cause:

- light infection: no symptoms.
- Moderate to heavy infection:
 - Epigastric pain, vomiting, hemorrhagic enteritis.
 - Protein loss >> hypoproteinaemia edema.
 - **Anemia**: due to withdrawal of blood by parasites and hemorrhage from punctured sites lead to **severe anemia** = microcytic hypochromic.



- Hookworms

Ancylostoma Dudenale
&
Necator Americanus

*DIAGNOSIS

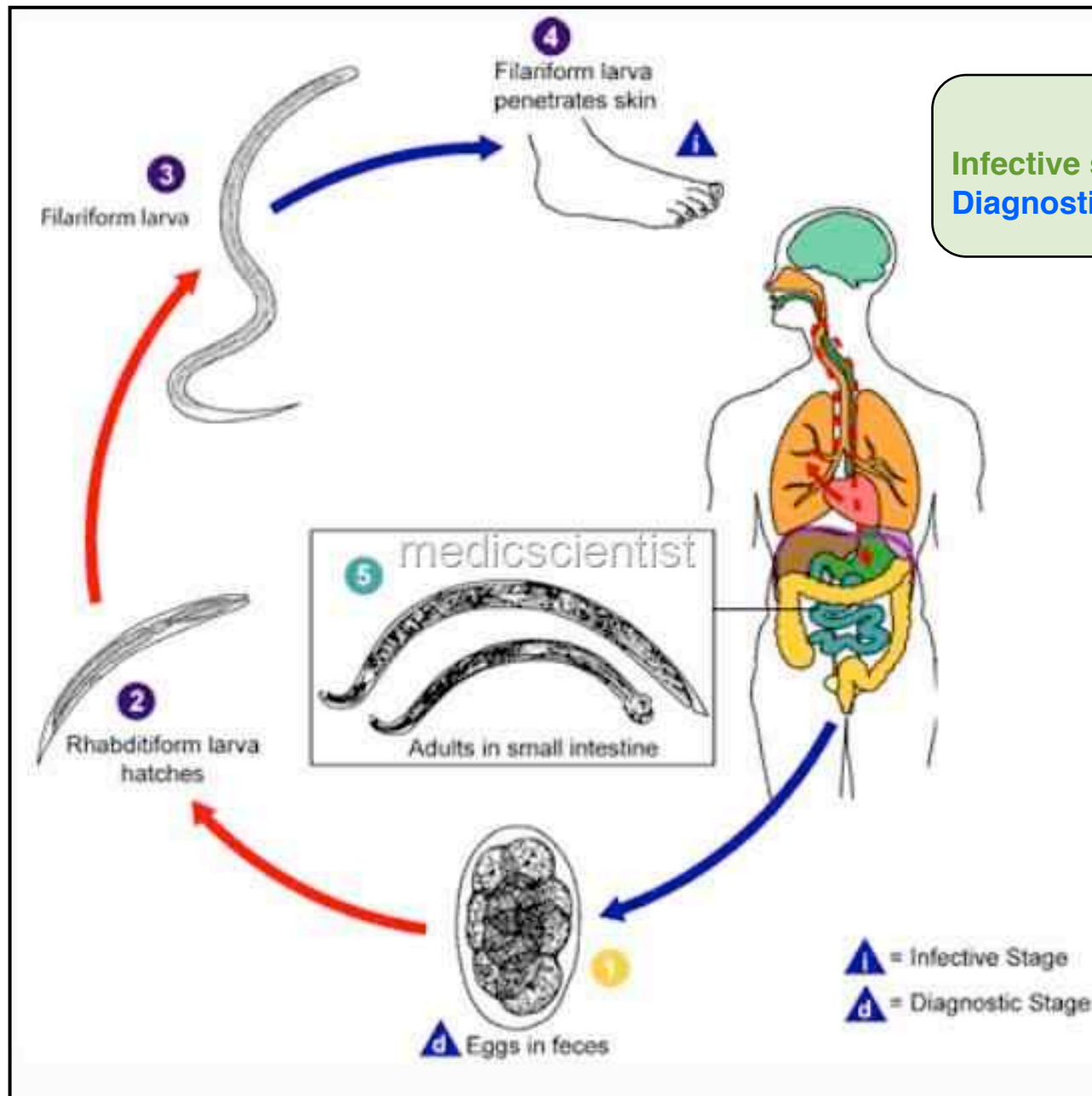
- Eggs in stools
- occult blood (very little amount of blood in stool)



R_x

Albendazole or Mebendazole

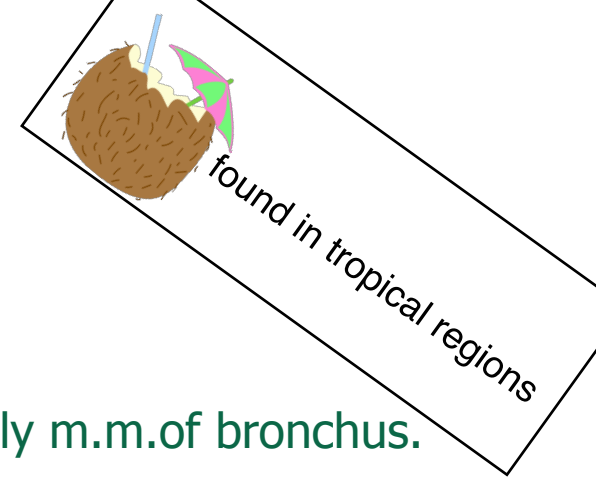
- Strongyloides Stercoralis



NOTE:

Infective stage >> filariform larvae
Diagnostic stage >> rhabditiform larvae

- Strongyloides Stercoralis



*PATHOLOGY:

- It is smallest pathogenic nematodes ± 2.5 mm.
- Adult live in mucous membrane of **duodenum & jejunum** rarely m.m.of bronchus.
- Fatal **opportunistic** in **immuno-compromised** host.

Clinicaly:

- **Cutaneous** little reaction on penetration.
sever dermatitis at perianal region in case of external autoinfection.
- **Migration** : same as hook worms .
- **Intestinal**: inflammation of upper intestinal mucosa, diarrhea, upper abdominal pain colicky in nature.
- **Disseminated strongyloidiasis** : in patient with **immunodeficiency** ,uncontrolled diarrhea – granulomatus changes > necrosis > perforation > peritonitis > death.

- Strongyloides Stercoralis

*DIAGNOSIS

Rhabditiform larvae diagnostic stage in:

- Stool examination
- Duodenal aspirate



Albendazole or Mebendazole

- Cestodes

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Prof. said that this table's all we need to know on cestodes. Yet, he emphasized on the extra notes found in next page:

	Disease	Transmission	Location of adult worms	Location of larvae	Clinical picture	Lab. diagnosis
Taenia saginata (1)	taeniasis	ingestion of larva in undercooked beef	Small Intestine	not present	vague digestive disturbances	eggs or proglottids in stools
Taenia solium-ADULT (2)	taeniasis	ingestion of larva in undercooked pork	Small Intestine	not present	vague digestive disturbances	eggs or proglottids in stools
Taenia solium- LARVA (cysticercus cellulosae)(3)	Cysticercosis	ingestion of egg	not present (except in autoinfection >small intestine)	sub-cutaneous muscles brain,eyes	depending on locality: from none to epilepsy	X -ray,CT,MRI Serology
Hymenolepis nana	hymenolepiasis	ingestion of egg	Small Intestine	Intestinal villi	Enteritis diarrhoea	eggs in stools
Echinochoccus granulosus(4)	hydatid disease	ingestion of egg	not present		depending on locality	X-ray,CT,US Serology Hydatid sand

- Cestodes

Extra notes on the table:

● **Differentiate between 1, 2 & 3 by:**

(1) : beef – not serious – caused by adult worms.

(2): pork – not serious – caused by adults

(3): pork – MOST SERIOUS of three caused by larvae that reach brain!!

● **(4) E. granulosus:** causes hydatid cyst (like an abscess) that is serious because:

a) compress vital organs b) may rupture >> anaphylactic shock

– hydatid cysts are found in:

A) Rt. lobe of liver (most common)

B) Lung >> sputum containing blood and cyst fluid

C) Bone >> fractures

D) rarely >> kidney, spleen & brain

– E. granulosus life cycle involves sheep and dogs.



All cestodes are treated with **Praziquantel**
except hydatid & cysticercosis by **Albendazole**

MCQ's

1. About strongyloides, all true except:

- a) acquired by ingestion of its eggs.
- b) have a free living life cycle in soil
- c) associated with marked eosinophilia
- d) produce filariform

2. Dogs or pigs are reservoir of all except:

- a) *Tenia solium* b) *E. granulosus* c) *ascaris* d) Cysticercosis

3. which nematode is present in small intestine:

- a) *tenia saginata*
- b) *tenia solium*
- c) *trichuris trichiura*
- d) *ascaris lumbricoides*

4. High eosinophil count is present in all of the following cases except:

- a) fascioliasis b) enterobiasis c) hydatidosis d) trichinosis

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5. which of the following worms infect human but not by digestion:

- a) fasciola hepatica
- b) ancylostoma duodenale
- c) Enterobius vermicularis
- d) hymenolepis nana

6. parasite causing blood loss:

- a. hymenolepis nana b) fasciola hepatica c) ancylostoma duodenale d) ascaris lumbricoides

7. infection by penetration is caused by:

- a) fasciola
- b) ascaris
- c) strongyloides
- d) H. nana

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8. Strongyloides Stercoralis infect man by:

- a) Ingestion of embryonated eggs
- b) Penetration of skin by filariform larvae
- c) Penetration of skin by rhabditiform larvae
- d) Ingestion of encysted larvae in meat.

9. Infective stage of ascaris:

- a) Fertilized of eggs
- b) Unfertilized egg
- c) Encysted larvae
- d) Fertilized egg with 2nd stage rhabditiform larva

10. Löffler syndrome is caused by:

- a) adult ascaris in liver
- b) fasciola in liver
- c) adult ascaris in intestine
- d) ascaris larva in lung

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11.intestinal obstruction is a complication of:

a. ascaris lumbricoides b.Enterobius vermicularis c. ancylostoma duodenale d. Strongyloides Stercoralis

12 Child with Enterobius vermicularis usually complains of:

a. anemia b. hunger pain c. itching d. loss of weight

13. Enterobius vermicularis is:

a. rare in children
b. called pinworm
c. eggs require time for maturation outside the body
d. infection is by ingestion of larva

14. Strongyloides Stercoralis is classified as:

a. trematode b. cestode c.flat worm d.nematode

15. Parasite infection complicated by rectal prolapse:

a. Oxyruasis b. Strongyloidiasis c. Trichuriasis d.Ancylostomiasis

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16. The following helminth has migratory cycle in lung, except:

- a) ascaris b) Strongyloides Stercoralis c) Ancylostoma duodenale d) Trichuris

17. Dogs are source of:

- a) Ascaris Lumbricoides b) E.granulosa c) trichnella spiralis d) H. nana

18. The life cycle of the following may not require intermediate host (could be transmitted directly from human to human):

- a) Fasciola hepatica
b) Hymenolepis nana
c) Echinococcus granulosus
d) Schistosoma mansoni

19. Not zoonotic disease:

- a) Enterobius vermicularis
b) Fasciola hepatica
c) Echinococcus granulosus
d) Trichnella spiralis.

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20. Regarding *H. nana*, all true except:

- a) diagnosis is made by finding eggs in stool
- b) causes acute infection
- c) use cattle as intermediate host.
- d) dwarf tapeworm.

21. Ingestion of *tenia saginata* larvae causes:

- a) Hydatid disease.
- b) trichinellosis
- c) cysticercosis
- d) none of the above

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Answers:

- | | | |
|------|------|------|
| 1) a | 8)b | 15)c |
| 2) c | 9)d | 16)d |
| 3) d | 10)d | 17)b |
| 4) b | 11)a | 18)b |
| 5) b | 12)c | 19)a |
| 6) c | 13)b | 20)c |
| 7) c | 14)d | 21)d |