

# HIGH-YIELD Q&A: GASTROINTESTINAL PARASITOLOGY 2 (NEMATODES)

## GENERAL CONCEPTS – INTESTINAL NEMATODES

- Nematodes (roundworms) are the most common intestinal helminths.
- Adults live primarily in the intestinal lumen.
- Infection is usually via ingestion of **embryonated eggs** (or larvae) from fecally contaminated soil, water or food.
- Diagnosis** in most cases is by detection of characteristic eggs in stool (size, shape, shell, and special structures).
- Treatment:** **Albendazole** or **Mebendazole** are drugs of choice for most intestinal nematodes.
- Prevention:** Improve sanitation, safe water, hand hygiene, and avoid use of human feces as fertilizer.

## KEY NEMATODE EGG COMPARISON (Stool Findings)

Nematode	Egg Size	Egg Shape & Features	Other Clues Cites
<i>Enterobius vermicularis</i>	50–60 $\mu\text{m}$ (length)	Asymmetric (D-shaped), one side flat	Planoconvex (one side flattened)
<i>Ascaris lumbricoides</i>	45–75 $\mu\text{m}$ (diameter)	Round/oval, thick shell with <b>mammillated</b> (knobby) outer coat	Bile-stained in stool
<i>Trichuris trichiura</i>	50–55 $\mu\text{m}$ (length)	Barrel (lemon) shaped with bipolar plugs	Brown, polar plugs at both ends

## NEMATODE MORPHOLOGY – GENERAL

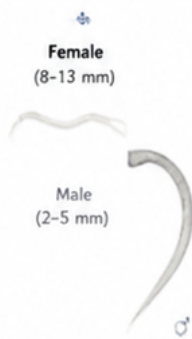
- Cylindrical, elongated, unsegmented bodies.
- Tapered at both ends.
- Complete digestive tract** (mouth and anus).
- Males usually smaller with curved posterior.
- Females larger and produce many eggs.
- Important human intestinal nematodes: *Enterobius*, *Ascaris*, *Trichuris*, Hookworm.

## 1. ENTEROBIUS VERMICULARIS (PINWORM)

### LIFE CYCLE (Simplified)

- Ingestion of embryonated eggs (from hands, dust, food).
- Larvae hatch in small intestine.
- Adults in cecum/colon.
- Gravid female migrates at night to perianal folds → lays eggs.
- Eggs mature in hours and become infective → cycle continues.

### Adult worms



### EPIDEMIOLOGY & CLINICAL DISEASE

- Highest in children (**day-care centers**, schools), mental institutions, crowded living.
- Transmission:** hand-to-mouth, inhalation of egg-laden dust, autoinfection (retrofection).
- Many infections are asymptomatic.
- Main symptom: **intense perianal pruritus** (worse at night).
- May cause **irritability**, loss of sleep, poor concentration.
- Rare: **vulvovaginitis** in females.

### DIAGNOSIS

- Best test:** "Scotch tape" (cellulose tape) test → collect from perianal folds in the morning before bathing or defecation.
- Eggs are rarely seen in stool.

### Egg (D-shaped)



50–60  $\mu\text{m}$

### TREATMENT & PREVENTION

- Drugs:** Albendazole 400 mg single dose OR Mebendazole 100 mg single dose. Repeat in 2 weeks.
- Alternatives:** Pyrantel pamoate or Piperazine.
- Treat all household members.
- Prevention:** hand hygiene, short nails, daily bath, wash bedding/clothes in hot water, vacuum room.

## 2. ASCARIS LUMBRICOIDES (ROUNDWORM)

### LIFE CYCLE (Simplified)

- Larva hatches in small intestine, penetrates wall → blood.
- Migrates: **liver** → heart → lungs.
- Breaks into alveoli → up bronchi → swallowed.
- Returns to small intestine → adults mature and lay eggs.

### Adult worms



### EPIDEMIOLOGY & DISEASE

- Worldwide:** associated with poor sanitation and use of human feces as fertilizer.
- Most infections are mild or asymptomatic.
- Migration to lungs → **cough**, wheeze, low-grade fever (Löffler's syndrome).
- Heavy infection → intestinal obstruction, volvulus, perforation, appendicitis.
- Migration to biliary tract → **jaundice**, cholangitis, pancreatitis.
- Malnutrition, growth retardation in children.

### DIAGNOSIS

- Finding thick-shelled, round/oval eggs with mammillated coat in concentrated stool.

### Fertilized egg



50–60  $\mu\text{m}$

### TREATMENT & PREVENTION

- Drugs:** Albendazole 400 mg single dose OR Mebendazole 100 mg BID x 3 days.
- Alternatives:** Pyrantel pamoate or Piperazine.
- Prevention:** sanitation, latrine use, don't use human feces as fertilizer, health education.

## 3. TRICHURIS TRICHIURA (WHIPWORM)

### LIFE CYCLE (Simplified)

- Ingestion of embryonated egg.
- Larva hatches in small intestine.
- Migrates to cecum/colon.
- Penetrates mucosa → matures and lays eggs in cecum/colon.

### Adult worm



### EPIDEMIOLOGY & DISEASE

- Worldwide: related to poor sanitation.
- Heavy infections → **colitis**, **dysentery**, bloody stools, abdominal pain.
- Chronic infection → **iron-deficiency anemia**, growth retardation.
- Rectal prolapse in children.

### DIAGNOSIS

- Finding characteristic **barrel-shaped eggs with bipolar plugs** in concentrated stool.

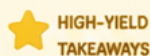
### Egg with bipolar plugs



50–55  $\mu\text{m}$

### TREATMENT & PREVENTION

- Drugs:** Albendazole 400 mg single dose OR Mebendazole 100 mg BID x 3 days.
- Prevention:** sanitation, safe water, avoid use of human feces as fertilizer, wear footwear.



### HIGH-YIELD TAKEAWAYS

- Nematodes = roundworms; adults in intestine; eggs in stool for diagnosis.
- Pinworm = perianal itching; diagnose with tape test; treat entire family.

- Ascaris* = migration through lungs; complications: obstruction, biliary disease.
- Egg: round, thick, mammillated.

- Trichuris* = whipworm; causes colitis and anemia when heavy.
- Egg: barrel-shaped with polar plugs.

- Key drugs: Albendazole or Mebendazole.
- Prevention is better than treatment: sanitation, hygiene, safe water.

1. What are the major classes of gastrointestinal helminths?

Answer:

- \* Nematodes (roundworms) – e.g., *Ascaris lumbricoides*, *Enterobius vermicularis*, *Trichuris trichiura*.
  - \* Cestodes (tapeworms) – e.g., *Taenia solium*, *Taenia saginata*, *Hymenolepis nana*.
  - \* Trematodes (flukes) – less common in the GI tract, e.g., *Fasciolopsis buski*.
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2. What is the life cycle of *Ascaris lumbricoides*?

Answer:

1. Ingestion of embryonated eggs from contaminated soil.
  2. Larvae hatch in the intestine → penetrate intestinal wall → bloodstream → lungs.
  3. Larvae migrate to alveoli → ascend trachea → swallowed back to intestine.
  4. Mature in small intestine → adult worms lay eggs.
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3. How does *Enterobius vermicularis* infection present clinically?

Answer:

- \* Perianal itching, especially at night.
  - \* Restless sleep and irritability.
  - \* Often asymptomatic in light infections.
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4. Which test is used to diagnose *Enterobius vermicularis*?

Answer:

- \* Scotch tape (cellophane) test: eggs collected from perianal region.
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5. What are the main complications of *Trichuris trichiura* infection?

Answer:

- \* Heavy infection → chronic diarrhea, anemia, growth retardation in children.
  - \* Rectal prolapse in severe cases.
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6. How is *Taenia solium* transmitted?

Answer:

\* Ingestion of undercooked pork containing cysticerci → adult tapeworm in intestine.

\* Fecal-oral route of eggs → cysticercosis in tissues.

7. What is the difference between *Taenia solium* and *Taenia saginata*?

Answer:

Feature	<i>T. solium</i>	<i>T. saginata</i>
Intermediate host	Pig	Cow
Egg ingestion → cysticercosis	Yes	No
Scolex with hooks	Yes	No

8. How is *Hymenolepis nana* infection acquired?

Answer:

\* Direct ingestion of eggs from contaminated food/water.

\* Autoinfection possible → repeated cycles without external exposure.

9. What are the high-yield diagnostic features of GI helminths?

Answer:

\* Stool examination for eggs, larvae, or adult worms.

\* Serology or PCR for tissue-invading helminths.

\* Imaging for cystic forms (*T. solium* cysticercosis).

10. Which drugs are commonly used for GI helminth infections?

Answer:

\* Albendazole / Mebendazole – broad-spectrum, first-line for nematodes.

\* Praziquantel – for cestodes and flukes.

\* Ivermectin – sometimes used for resistant nematodes.