Think
Story → Shape
→ Spread →
Treatment

# GI Helminths – Visual Mindmaps & Stories

*Quick review | Color-coded for memorization*

## GI Helminths

## NEMATODES (Roundworms)

- Round, unsegmented
- Usually diagnose by eggs in stool
- Infection by ingestion or skin penetration

1. *Enterobius vermicularis* — Pinworm (anal itch)
2. *Ascaris lumbricoides* 

3. *Trichuris trichiura*
4. *Hookworms* 
5. *Strongyloides stercoralis*

## CESTODES (Tapeworms)

- Flat, ribbon-like, segmented
- Scolex + proglottids
- No digestive tract

1. *Echinococcus granulosus* 
2. *Hymenolepis nana* 
3. *Hymenolepis diminuta* 

## TREMATODES (Flukes)

- Flat leaf-shaped flukes
- Snail = first intermediate host
- Most eggs are operculated
- Schistosomes are separate sexes

1. *Schistosoma mansoni* ♂ ♀
2. *Schistosoma japonicum* ♂ ♀
3. *Fasciolopsis buski* 
4. *Fasciola hepatica* 
5. *Clonorchis sinensis* 

### COLOR LEGEND

- Green = nematodes
- Orange = cestodes
- Blue = trematodes
- Purple labels = treatment / drugs
- Pink labels = diagnosis
- Red labels = key complications or danger points
- Yellow arrows = transmission / life cycle hints

### STORY CUES TO REMEMBER

Use story cues + egg shape + transmission + treatment to differentiate worms fast.

**PINWORM** (Pins at Night)

**ASCARIS** (Giant Girl Sara)


**CLONORCHIS** (Chinese Seafood)

### QUICK KEYS (Think 4 Ts)

- **TOILET** (contaminated hand/food)
- **SNAIL** (1st intermediate host)
- **RAW/UNDERCOOKED** (fish, meat, plants)
- **TREATMENT** (anthelmintics)

**Always ask:** *Where does it live? How does it spread? What does the egg look like? What drug works?*

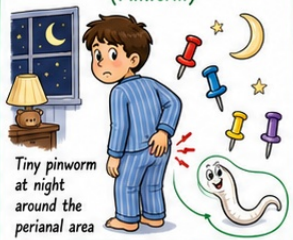
Think
Story → Shape
→ Spread →
Treatment ☆

# Nematodes (Roundworms)



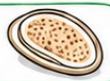
*Green family | eggs + stories + high-yield clues*

## 1 Enterobius vermicularis (Pinworm)



Tiny pinworm at night around the perianal area

**EGG** — Asymmetric (one side flat)



**SPREAD** — Ingestion of embryonated eggs; hand-to-mouth, dust, autoinfection.

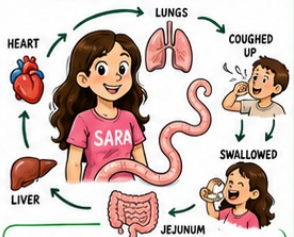
**KEY CLUES** — Child • Nocturnal perianal itching Sleep loss • Eggs laid in perianal folds • Eggs infectious within hours.

**DX** — Scotch tape / anal swab before bathing; eggs rarely in stool.

**RX** — *Albendazole or Mebendazole; treat whole family; repeat after 2 weeks.*

## 2 Ascaris lumbricoides

*Sara's Giant Pink Worm Tour*




**EGG** — Knobby, bile-stained

**SPREAD** — Ingestion of embryonated eggs in contaminated food, water, soil.

**KEY CLUES** — 20–35 cm pink worm • Most common helminth infection • Pneumonitis during lung migration • Intestinal obstruction • Biliary migration.

**DX** — Bile-stained, knobby fertilized or unfertilized eggs in stool.

**RX** — *Albendazole or Mebendazole.*

## 3 Trichuris trichiura (Whipworm)


**EGG** — Barrel-shaped, dark bile-stained with polar plugs

**SPREAD** — Ingestion of embryonated eggs in contaminated soil, food, water.

**KEY CLUES** — Cecum • 3 months to egg laying 3,000–10,000 eggs/day Abdominal pain • Bloody diarrhea Rectal prolapse • Appendicitis Anemia / eosinophilia.

**DX** — Stool egg with polar plugs.

**RX** — *Albendazole or Mebendazole.*

## 4 Hookworms (Ancylostoma duodenale + Necator americanus)


PENETRATES BARE FEET | HOOK-LIKE MOUTH | EGG: SEGMENTED, NON-BILE-STAINED

**SPREAD** — Filariform larva penetrates skin → lungs → swallowed → small intestine.

**KEY CLUES** — Blood-sucking worms • Rash Pneumonitis • GI upset Microcytic hypochromic iron-deficiency anemia.

**DX** — Characteristic segmented, non-bile-stained eggs; The two species are not distinguishable by egg.

**RX** — *Albendazole or Mebendazole Alternative: Pyrantel pamoate + Iron if needed.*

**PREVENTION** — Wear shoes!

## 5 Strongyloides stercoralis

STRONG DOG & WORM


**EGG / STOOL** — Larvae in stool (not eggs)

**SPREAD** — Filariform larva penetrates skin (free-living cycle in soil possible).

**KEY CLUES** — Differs from hookworm: eggs hatch in the intestine • Autoinfection Free-living cycle • Adults in duodenum Larvae (not eggs) in stool Hyperinfection: in immunocompromised patients, , long-term : sternaicitis, abdominal pain, diarrhea, malabsorption.

**DX** — Larvae in stool; Several stool samples may be needed.

**RX** — *Ivermectin.*

⚠ DANGER: Hyperinfection can be FATAL.

## EGG CLUES

| Enterobius (vermicularis) | Ascaris (lumbricoides) | Trichuris (trichiura) | Hookworm (Ancylostoma / Necator) | Strongyloides (stercoralis) |
|---|---|---|---|---|
|  Asymmetric (one side flat) |  Knobby, bile-stained |  Barrel-shaped with polar plugs |  Segmented, non-bile-stained |  = Larvae in stool (not eggs) |

☆ Story + Shape + Spread + Rx = High-Yield Remember!

Think
Scolex → Sticks
Proglottids →
Packets of eggs

# Cestodes (Tapeworms)



*Orange family | scolex + proglottids + memorable stories*

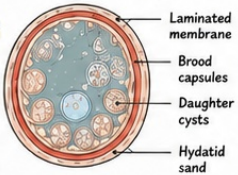

Flat, ribbon-like, segmented worms


Scolex (head) attaches firmly to intestinal wall


Proglottids mature from immature → mature → gravid

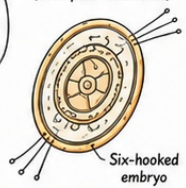

No digestive tract – absorb nutrients through body wall

## 1 Echinococcus granulosus

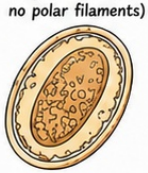

| | |
|---|---|
| SPREAD | Contaminated water/vegetation or hand-to-mouth from canine feces. |
| KEY CLUES | • Slow-growing, tumor-like cyst<br>• Common in liver and lung<br>• Symptoms may take 5–20 years<br>• Cyst rupture → anaphylactic shock and spread of daughter cysts |
| DX | Clinical + radiology + serology. |
| RX | Surgical removal; if inoperable → high-dose albendazole, mebendazole, or praziquantel. |
| DANGER | Rupture of cyst → anaphylaxis + dissemination. |

## 2 Hymenolepis nana


| | |
|---|---|
| SPREAD | Ingestion of embryonated eggs from contaminated food/water. Eggs are directly infective; autoinfection possible. |
| KEY CLUES | • Dwarf tapeworm – only 2–4 cm<br>• Develops in intestinal villi into cysticercoid stage<br>• Heavy infection → diarrhea, abdominal pain, headache, anorexia |
| DX | Stool exam – egg with polar filaments. |
| RX | Praziquantel. |
| DANGER | Heavy infection → malabsorption, growth retardation in children. |

## 3 Hymenolepis diminuta


| | |
|---|---|
| SPREAD | Ingestion of embryonated eggs from contaminated food/water |
| KEY CLUES | • Rat and mouse tapeworm<br>• 20–60 cm long<br>• Found in humans too |
| DX | Stool exam – bile-stained egg without polar filaments. |
| RX | Niclosamide as alternative, praziquantel. |
| DANGER | Heavy infection → diarrhea, abdominal discomfort, malnutrition. |

COMPARE & REMEMBER!

### *H. nana vs H. diminuta*

| Feature | *Hymenolepis nana* | *Hymenolepis diminuta* |
|---|---|---|
| Size of worm | Tiny – 2 to 4 cm | Big – 20 to 60 cm |
| Autoinfection | Yes – common | No |
| Egg filaments | Present (polar filaments) | Absent (no polar filaments) |

**Memory Flash**

- **Nana** = little, with filaments, likes to recycle (autoinfect).
- **Diminuta** = big rat's tapeworm, no filaments.

Think
Story → Shape
→ Spread →
Treatment

# Schistosomes



*Blue family | intravascular flukes | mansoni vs japonicum*

♂ ♀ Separate male + female worms (not hermaphrodites)

Infective form = skin-penetrating cercariae from freshwater snails

Obligate intravascular parasites

Disease mainly due to immune response to eggs

Early: cercarial rash
→ Later: Katayama syndrome

## SCHISTOSOMA MANSONI

"Man on the side"
→ sharp lateral spine

| | |
|---|---|
| SPREAD / SITE | Small branches of inferior mesenteric vein near lower colon (large intestine) |
| EGG CLUE | Large oval egg with a SHARP LATERAL SPINE |
| GEOGRAPHY CUE | Africa, Saudi Arabia, Madagascar |
| DISEASE | • Abdominal pain, diarrhea, blood in stool, bowel wall inflammation<br>• Eggs trapped in liver → periportal fibrosis → portal hypertension, hepatosplenomegaly, ascites |
| DX | Stool exam (eggs with lateral spine) • Concentration techniques<br>Rectal biopsy may show egg tracks (salt & pepper) |
| RX | PRAZIQUANTEL (drug of choice)<br>Alternative: OXAMNIQUINE |
| CONTROL | Health education • Sanitation • Snail control • Safe water |

## SCHISTOSOMA JAPONICUM

"A small round Japanese egg that travels to the brain"

| | |
|---|---|
| SPREAD / SITE | Branches of superior mesenteric vein around small intestine AND inferior mesenteric vessels |
| EGG CLUE | Small, almost spherical egg with a TINY LATERAL SPINE |
| GEOGRAPHY CUE | China, Philippines, Sulawesi (Indonesia) |
| DISEASE | • Early illness similar; Katayama syndrome more common<br>• Chronic: hepatosplenic disease, portal hypertension, bleeding esophageal varices, ascites<br>• More dissemination → liver, lungs, and BRAIN involvement → seizures, speech impairment, visual defects |
| DX | Stool exam (eggs with tiny spine) • Rectal biopsy • Serology (ELISA/IGA) |
| RX | PRAZIQUANTEL (drug of choice) |
| CONTROL | Health education • Sanitation • Snail control • Safe water |

## THINK FAST — SCHISTOSOMES AT A GLANCE

**MANSONI**
Lateral spine
Lower colon (inferior mesenteric vein)

**JAPONICUM**
Tiny spine + small spherical egg
Brain involvement (hepato-pulmonary dissemination)

**BOTH**
Freshwater → Snail → Cercaria → Skin penetration → Intravascular adulthood → Eggs in tissues

Rx: PRAZIQUANTEL (drug of choice)

## CONTROL — STOP THE CYCLE

Education | Sanitation | Snail control | Safe water

Think
Story → Shape
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Treatment

# Other Trematodes (Flukes)

*Blue family | snail host + operculated eggs*

- Flat, leaf-shaped flukes
- Oral + ventral suckers
- Most are hermaphroditic
- 1st intermediate host is always a snail or mollusk
- Most eggs have an operculum

## 1 Fasciolopsis buski

(Giant intestinal fluke)


Egg → Snail → Cercaria → Metacercaria (on aquatic plants)

| | |
|---|---|
| **Spread** | Ingest metacercariae on aquatic vegetation (e.g., water chestnuts). |
| **Site/Path** | Develops in duodenum; adults in small intestine. |
| **Key clues** | • Largest intestinal fluke.<br>• Endemic in China, Vietnam, Thailand, Indonesia, Malaysia, India.<br>• Pigs, dogs, rabbits = reservoirs.<br>⚠ Heavy infection → abdominal discomfort, diarrhea, malabsorption, intestinal obstruction, eosinophilia. |
| **Dx** | Large, golden, bile-stained, operculated eggs in stool. |
| **Rx** | Praziquantel (drug of choice); Mebendazole (alternative). |

## 2 Fasciola hepatica

(Sheep liver fluke)


Egg → Snail → Cercaria → Metacercaria (on watercress)

| | |
|---|---|
| **Spread** | Ingest metacercariae on watercress. |
| **Site/Path** | Larvae penetrate intestinal wall (duodenum) → migrate through liver parenchyma → enter bile ducts. |
| **Key clues** | • RUQ pain, fever, hepatomegaly.<br>• Marked eosinophilia.<br>• Hepatitis, biliary obstruction. |
| **Dx** | Stool: operculated eggs.<br>Bile examination helps confirm.<br>Serology is valuable. |
| **Rx** | Triclabendazole (drug of choice).<br>Poor response to praziquantel. |

## 3 Clonorchis sinensis

(Chinese liver fluke)

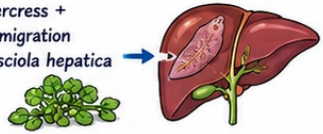

Egg → Snail → Cercaria → Metacercaria (in freshwater fish)

| | |
|---|---|
| **Spread** | Ingest raw or undercooked freshwater fish with metacercariae. |
| **Site/Path** | Develops in duodenum → migrates to bile ducts. |
| **Key clues** | • Often mild; may cause diarrhea, hepatomegaly, biliary obstruction.<br>⚠ Chronic infection → risk of cholangiocarcinoma. |
| **Dx** | Operculated egg with tiny posterior knob in stool. |
| **Rx** | Praziquantel (drug of choice). |

## QUICK COMPARE – 3 EASY MEMORY HOOKS

1. *Aquatic plants = Fasciolopsis buski*


2. *Watercress + liver migration = Fasciola hepatica*



3. *Raw freshwater fish + cholangiocarcinoma = Clonorchis sinensis*

Chronic infection → Cholangiocarcinoma