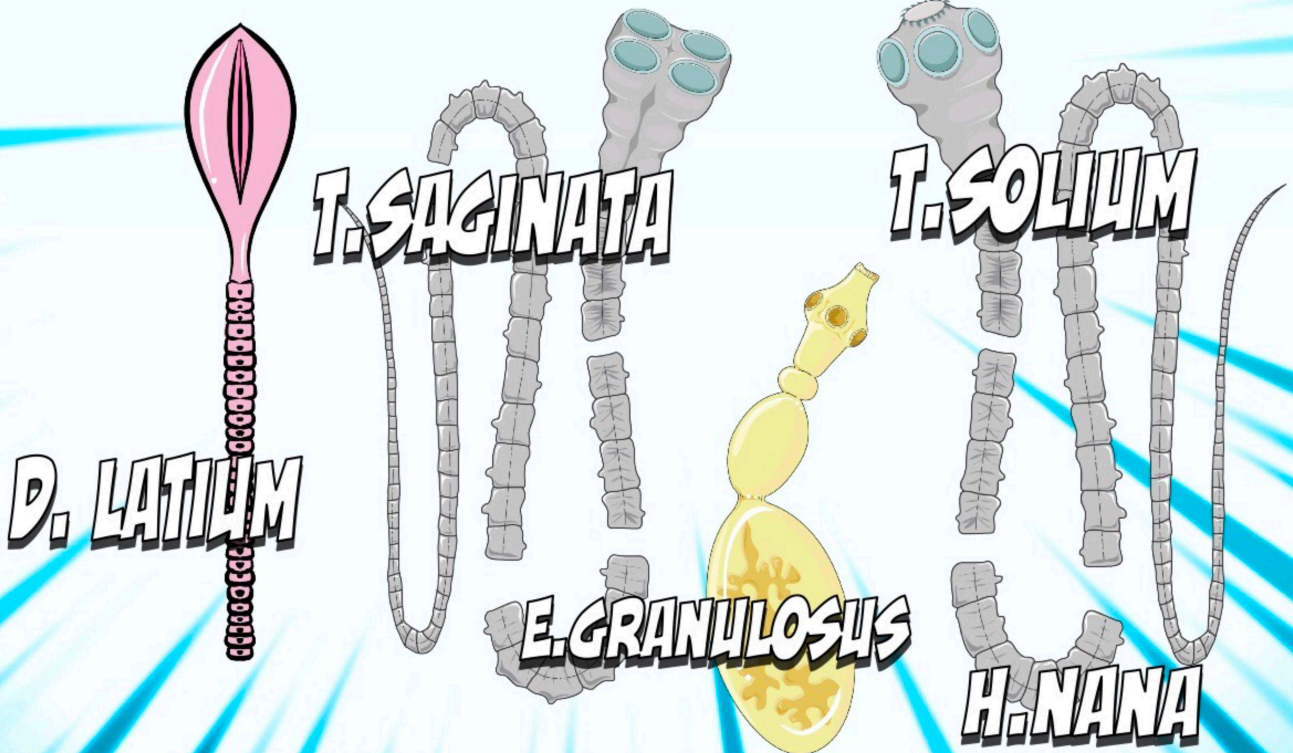




# CESTODES

PARASITOLOGY COMIC BOOK

**FUN WAY TO LEARN PARASITES**



**DR. TANMAY MEHTA**





I just studied this for exam! I know this but cannot recall it". Has this ever happened to you? If yes, we have the solution... As a world's first medical comic studio we bring the creativity of cartoons into the field of medicine to make learning medical concepts fun. We offer affordable, innovative and entertaining alternative to improve competence, capacity and productivity for but not limited to medical and paramedical students worldwide.

Medical studies through conventional books can be tedious and boring. It's often difficult to remember the vast amounts of information required to understand and remember the fundamental medical concepts. Hence, medical students cannot achieve their desired goals. The most frustrating feeling in the world is staring at a question during an exam, and not quite being able to recall the answer. "I just studied this! I know this but cannot recall it," you say to yourself, but the details of the memory just aren't clear enough.

Q world medical comics solves this problem by combining high-quality art and humour to make understanding and memorizing medical concepts easy and fun. You'll be so entertained it'll feel like you're not studying, but you'll actually be gaining and retaining medical knowledge! We will help medical students to become better doctors for a better health care delivery. A layman can also now understand the common diseases in an entertaining way.

Our vision is to build the world's first medical comic studio that will bring the creativity of cartoons into the field of medicine to make learning medical concepts entertaining and fun.

Our mission is to provide affordable and innovative alternative in form of medical comics to conventional medical educational materials.

Q world medical comics offers varieties of medical comics on various subjects for the first time in the world. Our intention of launching medical comics is to help our clients improve their competence, capacity and productivity in an enjoyable format as Digital Medical comics (ebooks) as well as Paperback medical comics.

We thank medical and paramedical students as well as faculties worldwide for their tremendous support and suggestions. If you have any suggestions, idea, comment, review, or you want to contribute or volunteer for our project feel free to contact us at [qworldmedicalcomics@gmail.com](mailto:qworldmedicalcomics@gmail.com)

<https://qworld.co.in/medical-comics.html>





#### About the Author:

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(MBBS, MD, DNB, MNAMS, PGDCTM, ACME, DipFRCP)

Assistant Professor, Department of Microbiology,  
Smt. NHL Municipal Medical College, Ahmedabad

#### **Read about his journey as an author, medical illustrator and medical comics creator:**

*"My book writing journey started in 2017 with the "500 Most Common List For NEET-PG" published on kindle and amazon. This book got a huge response from medical students all over India and became the best seller in medical entrance exam books on kindle-amazon since 2017.*

*Inspired by the success of this book, I wrote and publish "Parasitology Simplified: easiest way to learn parasites" first edition (2017) and second edition (2019). Then the journey continued with many books like Immunology Flash Cards, Bacteriology flashcards, Mycology and Virology flashcards, Bacteria High Yield concepts, Biomedical waste management rules simplified and recently Basic course in biomedical research handbook.*

*In 2019, I have pursued my old passion for sketching doodles, portraits, comic characters on paper and on the digital platform. One day I made a carton that is entertaining, visually stunning as well as provide high yield information on a medical topic. It got a tremendous response on social media. So, I decided to bring the creativity of cartoons into the field of medicine to make learning medical concepts entertaining. That's how "Q world Medical Comics" started. With help of friends and the support of Q world, I created the world's first medical comic studio. The mission is to provide an affordable and innovative alternative in form of medical comics to conventional medical educational materials without affecting technical correctness.*

*From my vast experience in medical teaching, I have observed that medical studies through conventional books can be tedious. It's often difficult to remember the vast amounts of information required to understand and remember the fundamental medical concepts. Hence, medical students cannot achieve their desired goals. The most frustrating feeling in the world is staring at a question during an exam, and not quite being able to recall the answer. Q world medical comics solve this problem by combining high-quality art and humour to make understanding and memorizing medical concepts easy and fun.*

*I published my first medical comic book "Cholera: Medical Comic" in April 2019. Overwhelmed by its response, I published medical comics about "Clostridium, Parasitology basics, Amoebae, Cestodes and Malaria. I invite all faculties and students who want to volunteer for the project to make medical education more interesting."*

**Instagram handle:** medicalcomics

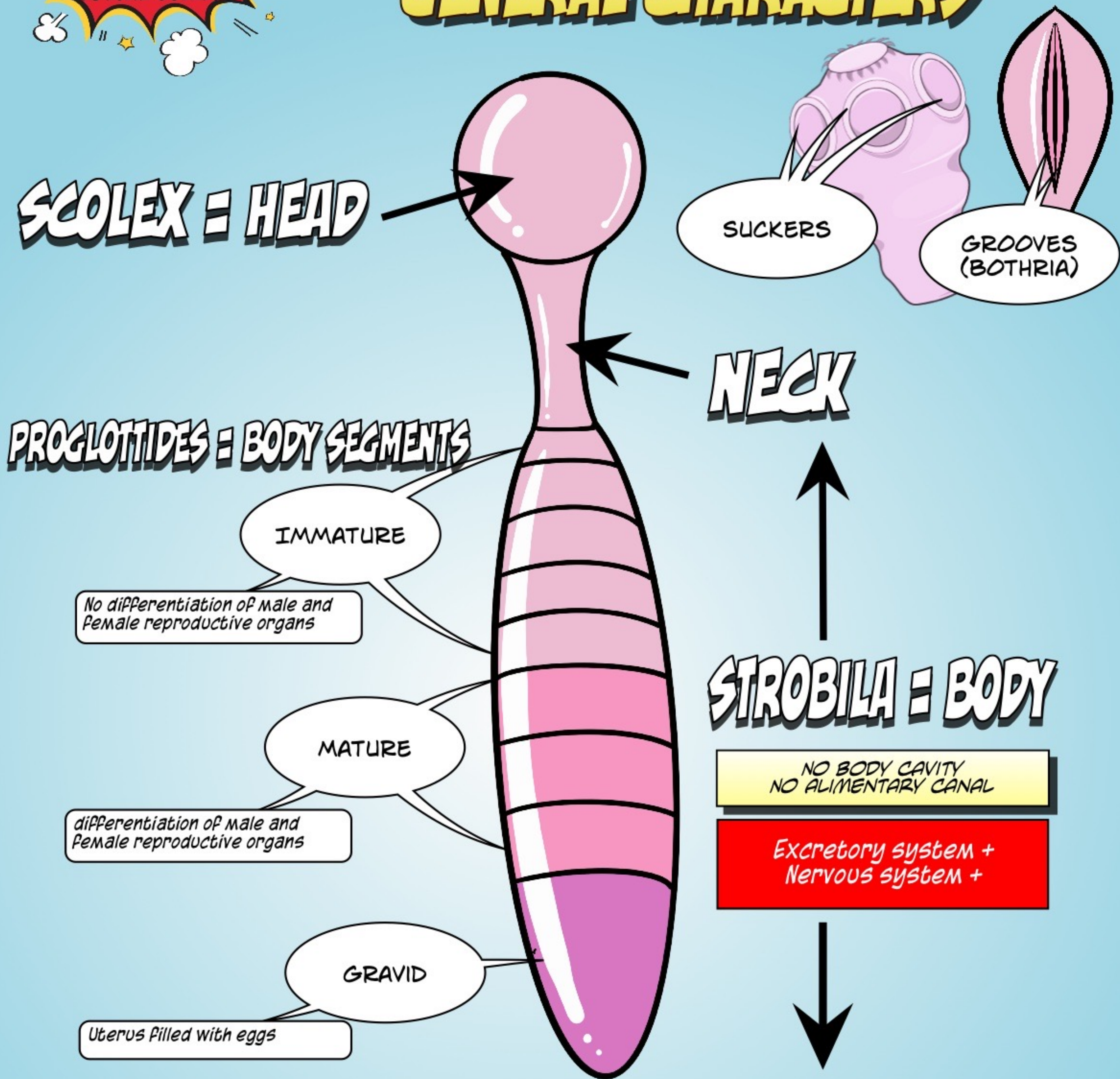






# CESTODES

## GENERAL CHARACTERS



**DORSOVENTRALLY FLAT TAPE LIKE WORMS**

**NO SEPARATE SEXES**





# CESTODES

## GENERAL CHARACTERISTICS

Phylum PLATYHELMINTHES	
Flattened, leaf-like or tape-like and segmented. Hermaphrodite (monoecious). Alimentary canal incomplete or entirely lacking & Body cavity absent.	
Class CESTOIDEA	
Subclass CESTODA	
<p>General Characters:</p> <ul style="list-style-type: none"> <li>• long, segmented and tape-like, hence called tapeworms (flattened dorsoventrally.)</li> <li>• Size : few millimetres to several metres.</li> <li>• Habitat of adult worm : intestinal canal of man and animal.</li> <li>• There are three regions in an adult worm: <ul style="list-style-type: none"> <li>⇒ a "head" (<i>scolex</i>): has organs of attachment called suckers (slit-like or cup-like) which are sometimes with hooks</li> <li>⇒ a "neck"</li> <li>⇒ a <i>strobila</i> (a body or trunk) consisting of a series of segments (proglottides) ∴ Reproductive system is highly developed and complete in each segment. According to the maturity of reproductive organs three types of segments of the strobila can be recognised from the front backwards: <ul style="list-style-type: none"> <li>◆ <i>Immature</i>: Male and female organs not differentiated .</li> <li>◆ <i>Mature</i>: Male and female organs have become differentiated (male organs appear first).</li> <li>◆ <i>Gravid</i>: Uteri are filled with eggs (other organs atrophied or disappeared).</li> </ul> </li> </ul> </li> <li>• Sexes are not separate, i.e., each individual worm is a hermaphrodite.</li> <li>• Body cavity is absent</li> <li>• Alimentary canal is entirely absent.</li> <li>• Excretory and nervous systems are present</li> </ul>	
Order I Pseudophyllidea	Order II Cyclophyllidea
• "Head" : has 2 slit-like grooves.	• "Head" : has 4 cup-like suckers.
• Uterus: No branching; the convoluted uterine tube assumes the form of a rosette.	• Uterus: Branching may or may not be present
• Uterine Pore : Present.	• Uterine Pore : Absent.
• Common Genital Pore: Ventral, in the middle line .	• Common Genital Pore: Lateral.
• Eggs : Operculated; give rise to ciliated larvae	• Eggs : Not operculated; do not give rise to ciliated larvae .





# CESTODES



FIRST  
INTERMEDIATE HOST

**DIPHYLOBOTHRUM LATIUM**  
**FISH TAPEWORM**



SECOND  
INTERMEDIATE HOST

**ECHINOCOCCUS GRANULOSUS**  
**DOG TAPEWORM**



I AM DEFINITIVE  
HOST!

**HABITAT**

**SMALL INTENSTINE**

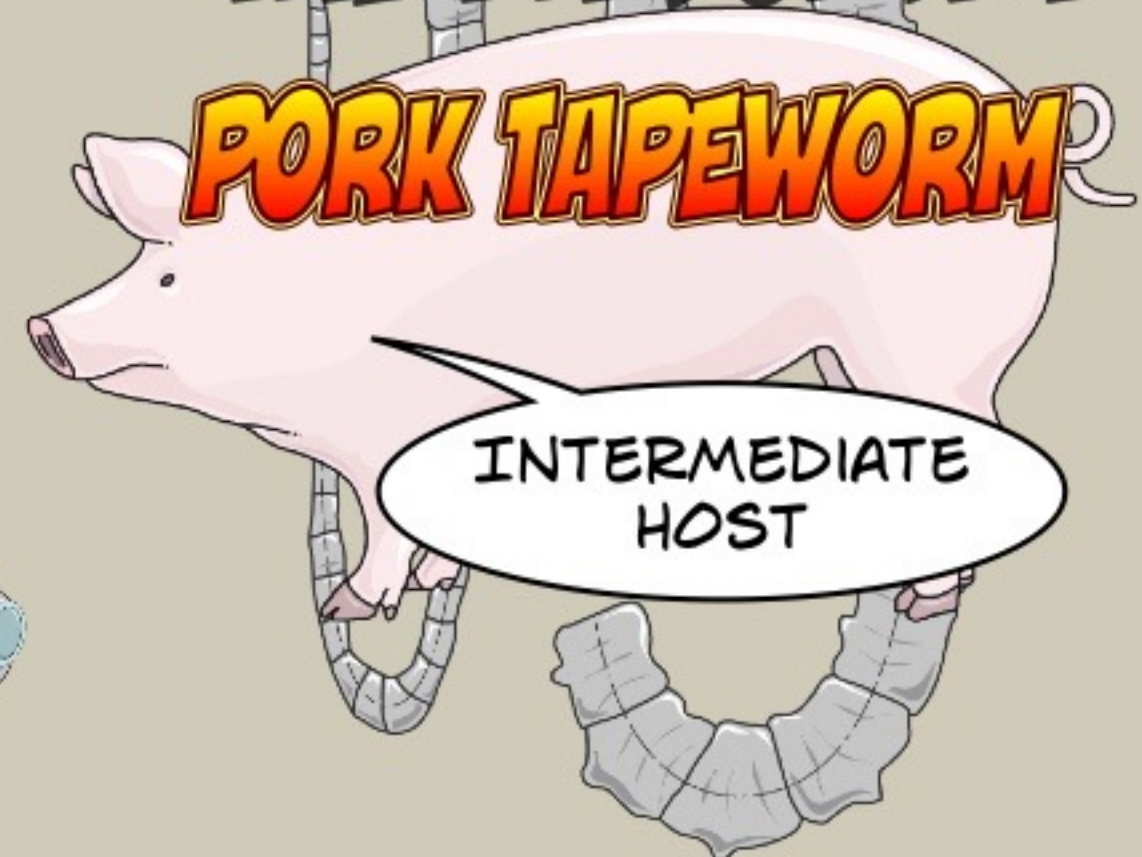
Definitive host for  
all. Intermediate for  
E.granulosus

**TAENIA SAGINATA**  
**BEEF TAPEWORM**



INTERMEDIATE  
HOST

**TAENIA SOLIUM**  
**PORK TAPEWORM**



INTERMEDIATE  
HOST

**HYMENOLEPIS NANA**  
**DWARF TAPEWORM**



I AM OPTIMUM  
DEFINITIVE HOST

NO INTERMEDIATE  
HOST





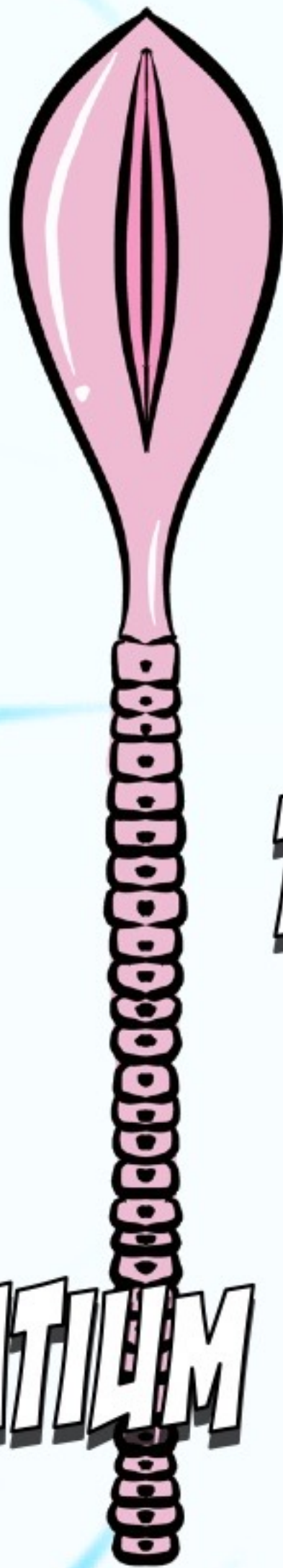
# CESTODES

8.3.1	<b>Diphyllobothrium latum</b>	<b>Taenia Saginata</b>	<b>Taenia Solium</b>	<b>Echinococcus Granulosus</b>	<b>Hymenolepis nana</b>
<b>Common name</b>	-Fish tapeworm -Broad tape worm	-Beef tapeworm -Unarmed tape-worm of man	-Pork tapeworm -Armed tapeworm of man	-Taenia echinococcus -Dog tapeworm -Hydatid worm	Dwarf tape-worm
<b>GD</b>	Central & North europe North america Siberia Japan Central africa India (less common -cooked fish eating)	Worldwide India –Muslims	Worldwide Unocommon in Muslims & Jaws	Worldwide Temperate	Worldwide Cosmopolitan
<b>Habitat</b>	SI (ileum)	SI (upper jejunum)	SI (upper jejunum)	SI of dog	SI
<b>Hosts</b>	DH : Man > dog,cat IH-1 : Cyclops IH-2: fresh water fish (pike,trout,salmon, perch)	DH: Man IH: Cow (T.saginata asiatica – IH is pig)	DH: Man IH: Pig>Man	DH: dog>wolf,fox,jacal IH: sheep > cow,pig Accidental IH : Man	DH: Rat > Man No IH Helminths don't multiply in DH except H.nana
<b>Mode of inf. For Man</b>	Ingestion of undercooked/raw fish	Ingestion of undercooked beef (larva) (T.saginata asiatica – cysticerci in liver of pig)	-Ingestion of undercooked pork(Larva) -Ingestion of water/vegetable/ autoinfection/reverse peristalsis (egg)	Ingestion of egg's in dog feces (sheep) Contaminated fingers/ food (not water-egg sink to bottom)	Direct : Ingestion of food/ autoinfection Indirect : beetles/ rat flea
<b>Infective form</b>	L-3: plerocercoid larva (not destroyed by salt/ smoke)	-Cysticercus bovis in beef	-Cysticercus cellulose in pork Egg	Embryonated Egg	Embryonated egg

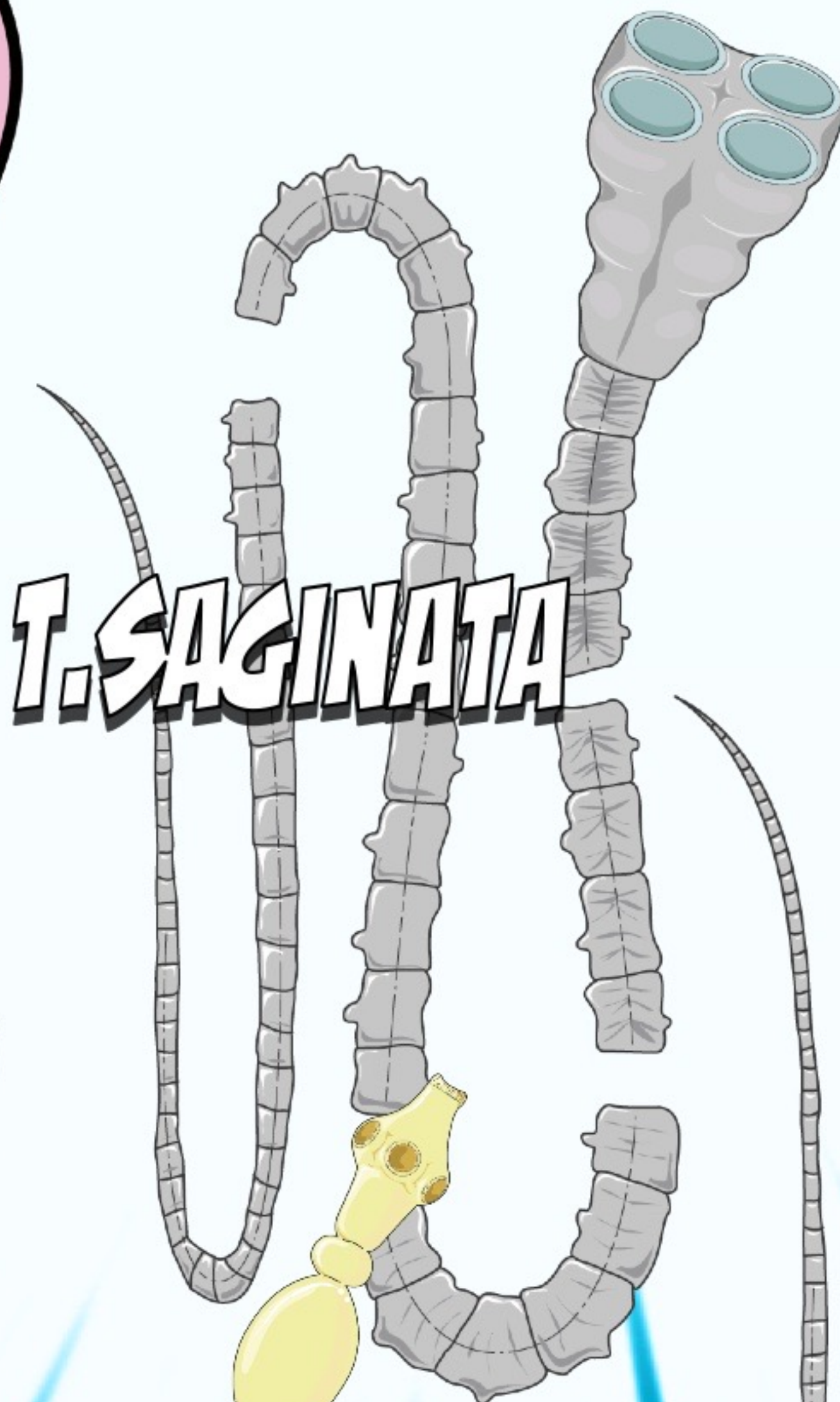


# CESTODES

## ADULT WORMS

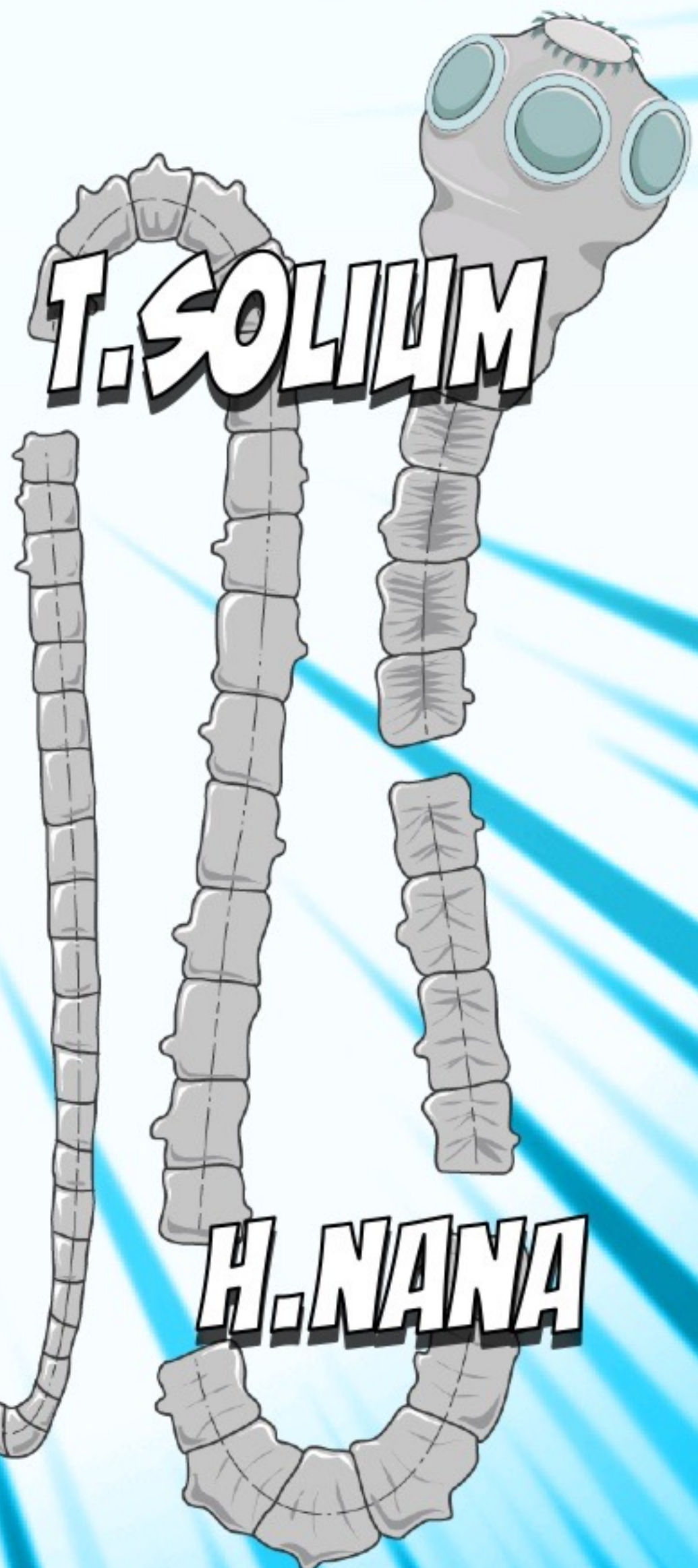


**D. LATIUM**



**T. SAGINATA**

**E. GRANULOSUS**



**T. SOLIUM**

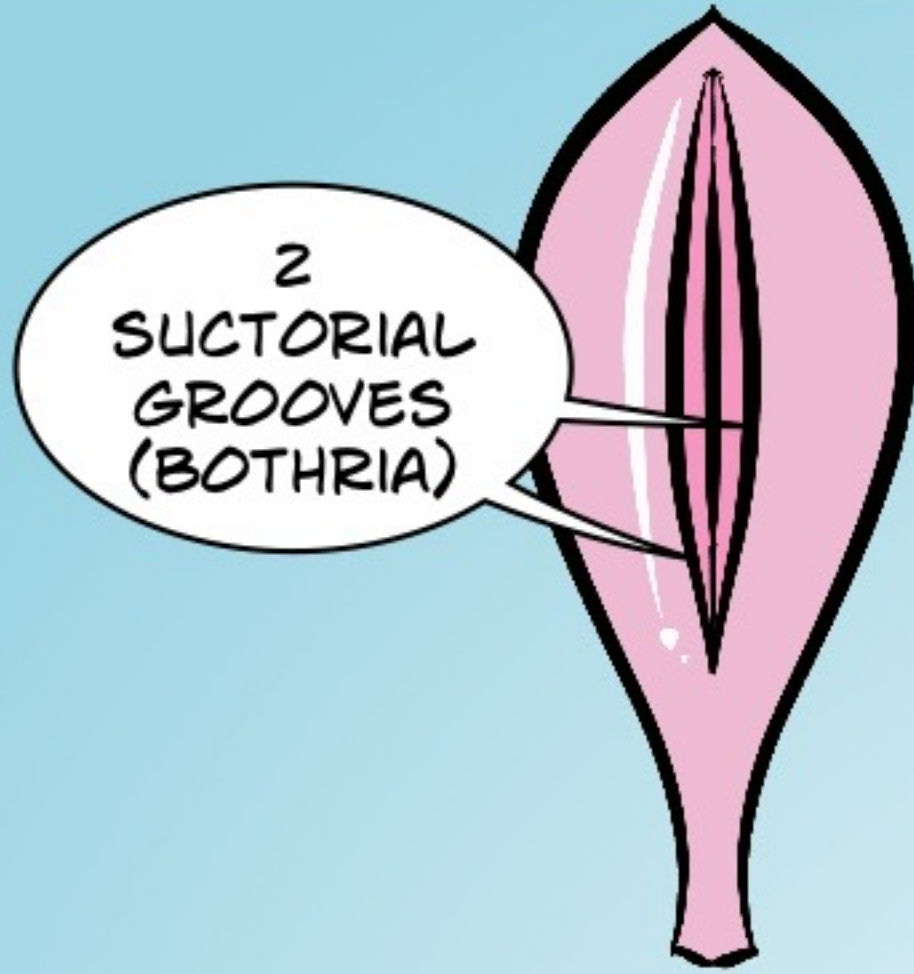
**H. NANA**



# SCOLEX (HEAD)

Spoon shaped head

NO SUCKERS  
NO HOOKS



2  
SUCTORIAL  
GROOVES  
(BOTHRIA)

**DIPHYLOBOTHRIUM LATIUM**



Quadrate/globular head

4 SUCKERS

NO HOOKS



**TAENIA SAGINATA**

**HYMENOLEPIS DIMINUTA**

ROSTELLUM WITH HOOKLETS



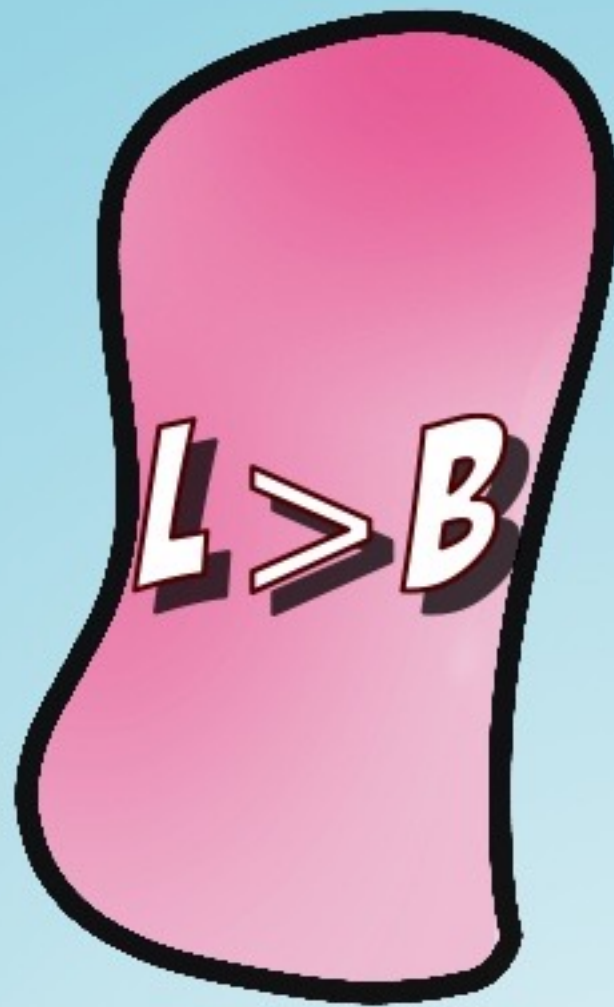
**TAENIA SOLIUM (2 ROWS)**

**ECHINOCOCCUS GRANULOSUS (2 ROWS)**

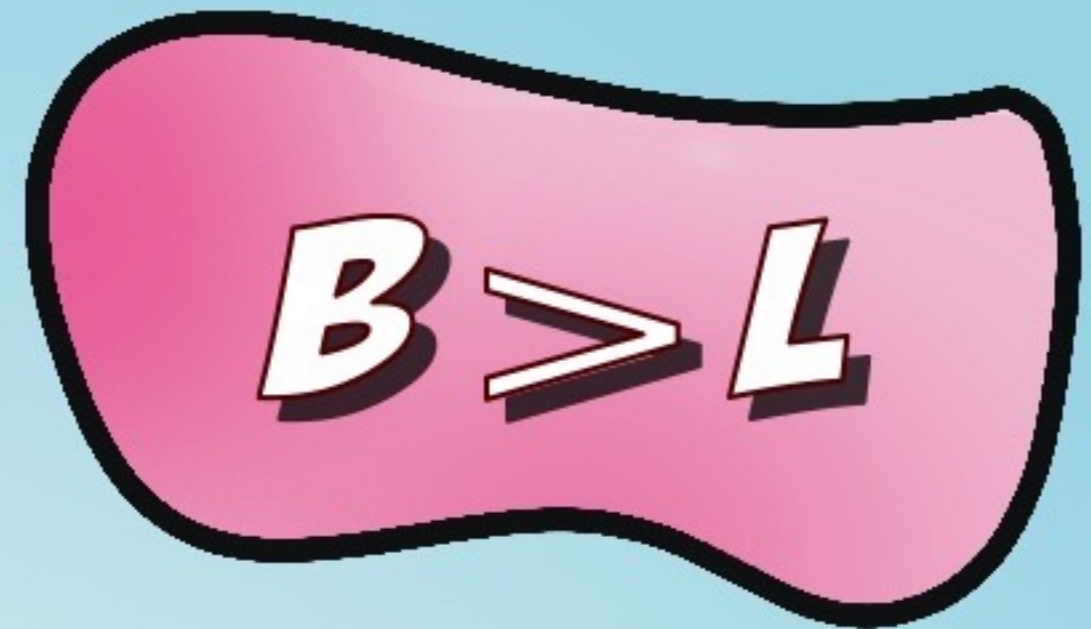
**HYMENOLEPIS NANA (1 ROW)**



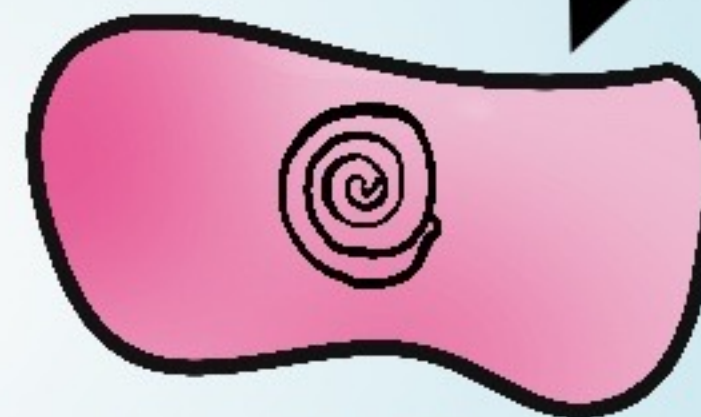
# PROGLOTTIDES (BODY SEGMENTS)



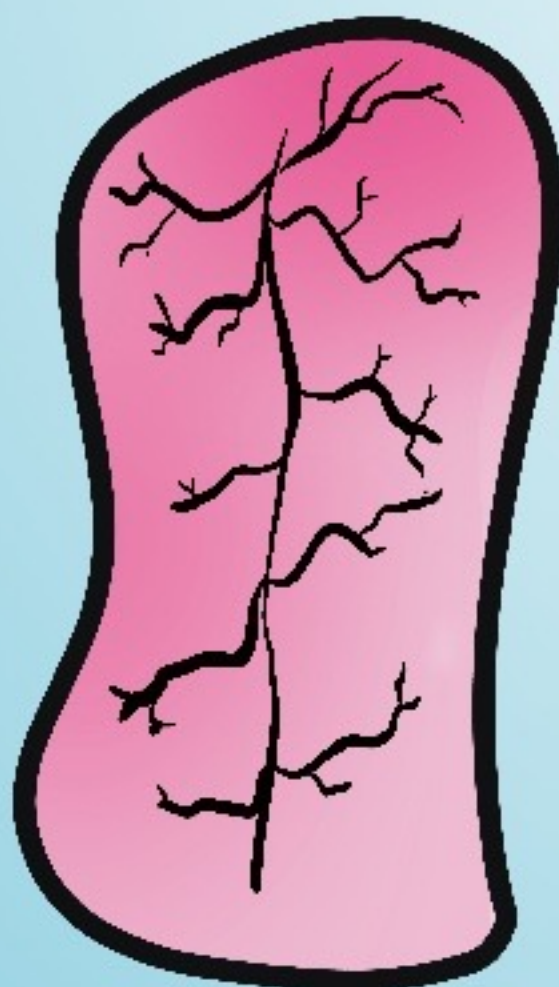
**TAENIA SOLIUM**  
**TAENIA SAGINATA**  
**ECHINOCOCCUS GRANULOSUS**



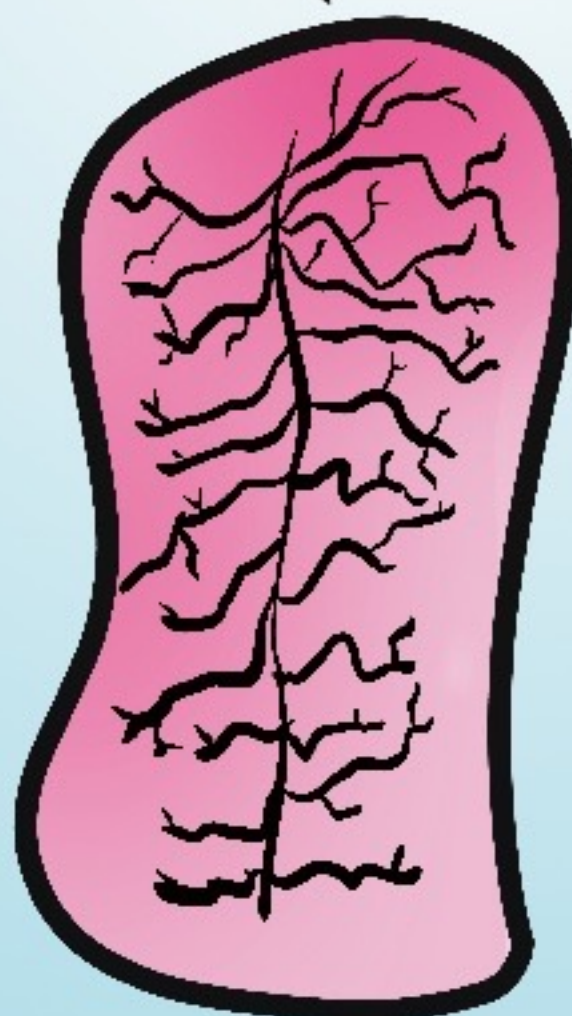
**DIPHYLOBOTHRIUM LATIUM**  
**HYMENOLEPIS NANA**  
**HYMENOLEPIS DIMINUTA**



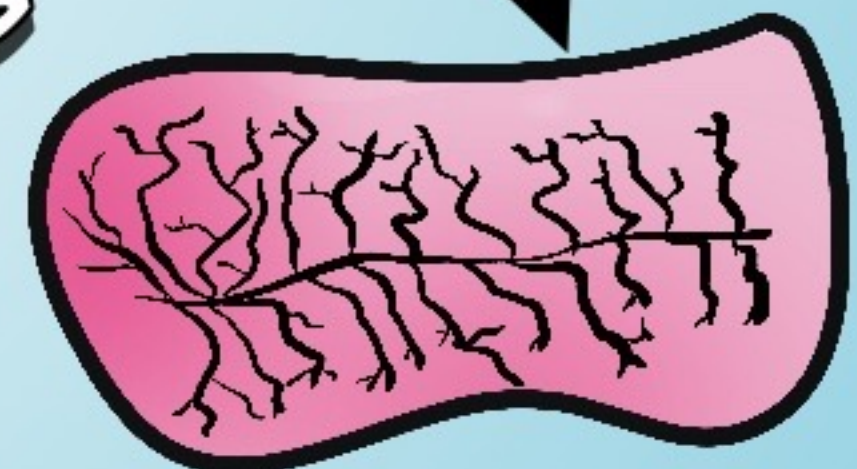
**DIPHYLOBOTHRIUM LATIUM**  
**COILED UTERUS**



**TAENIA SOLIUM**  
**7-10 UTERUS BRANCHES**



**TAENIA SAGINATA**  
**15-30 UTERUS BRANCHES**



**HYMENOLEPIS NANA**  
**HYMENOLEPIS DIMINUTA**



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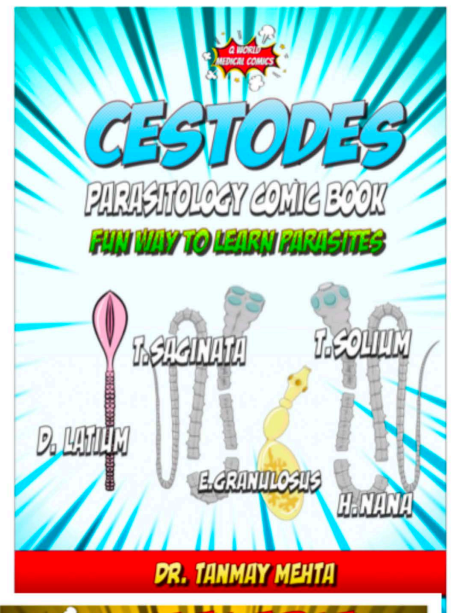
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