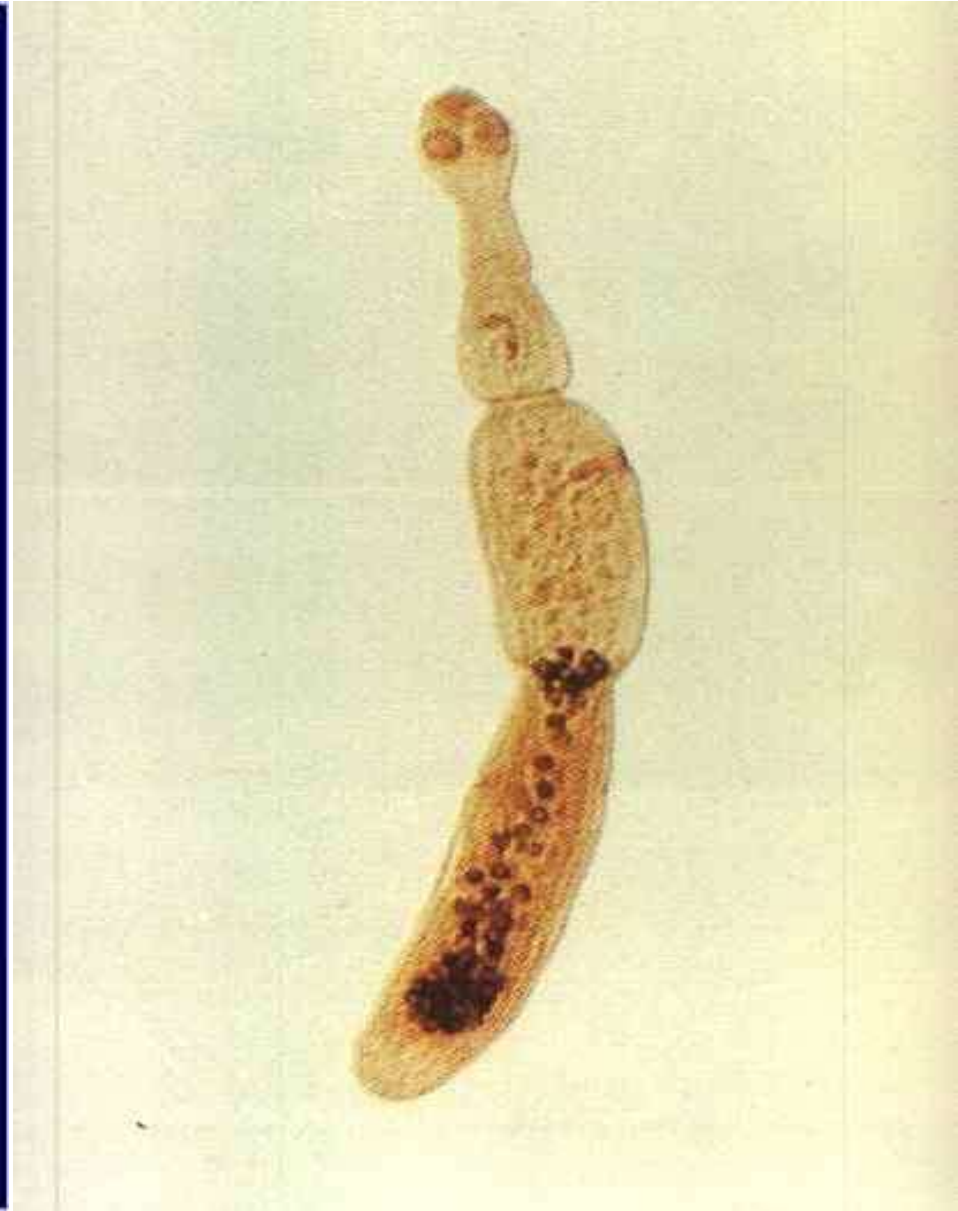
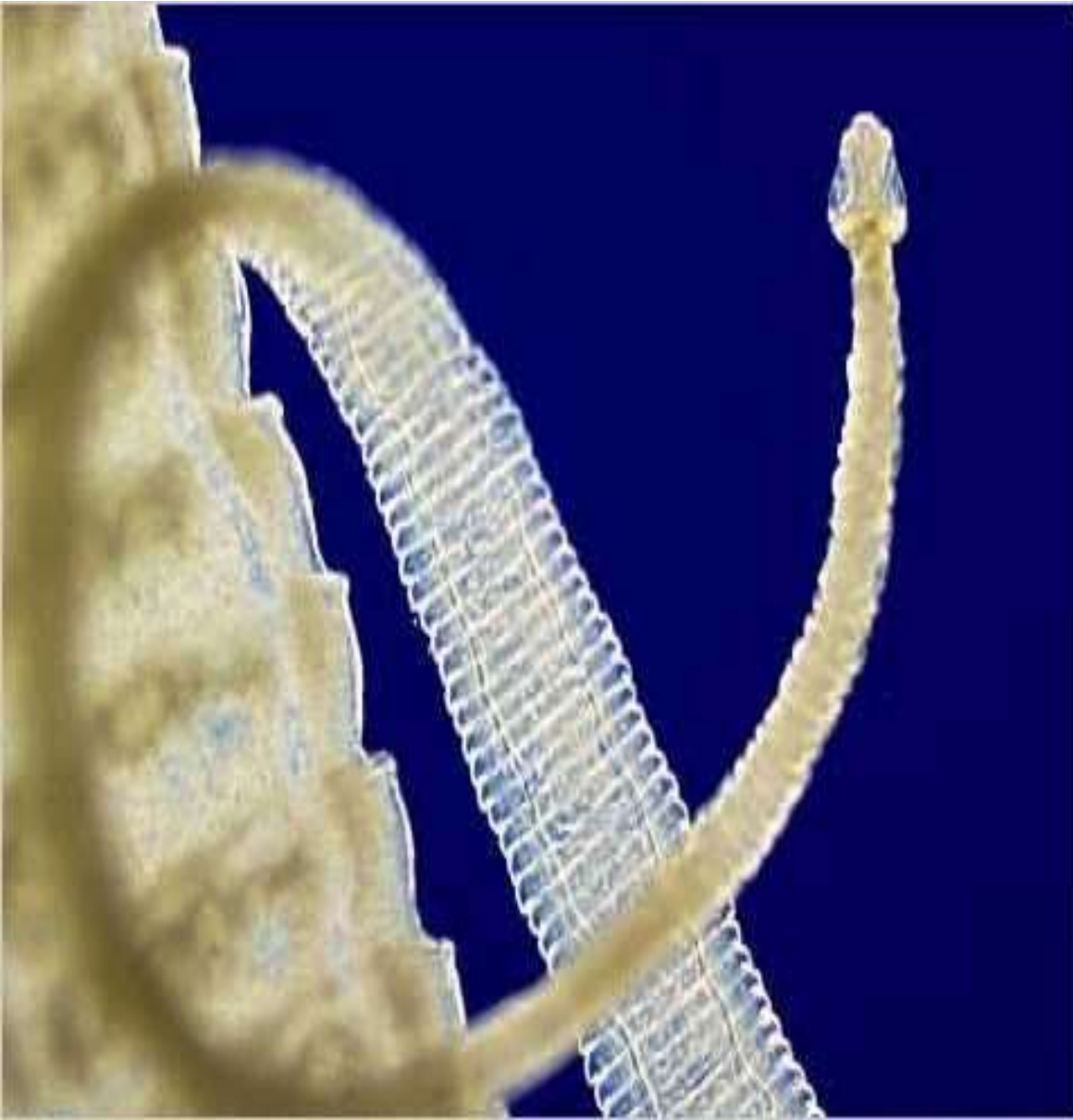
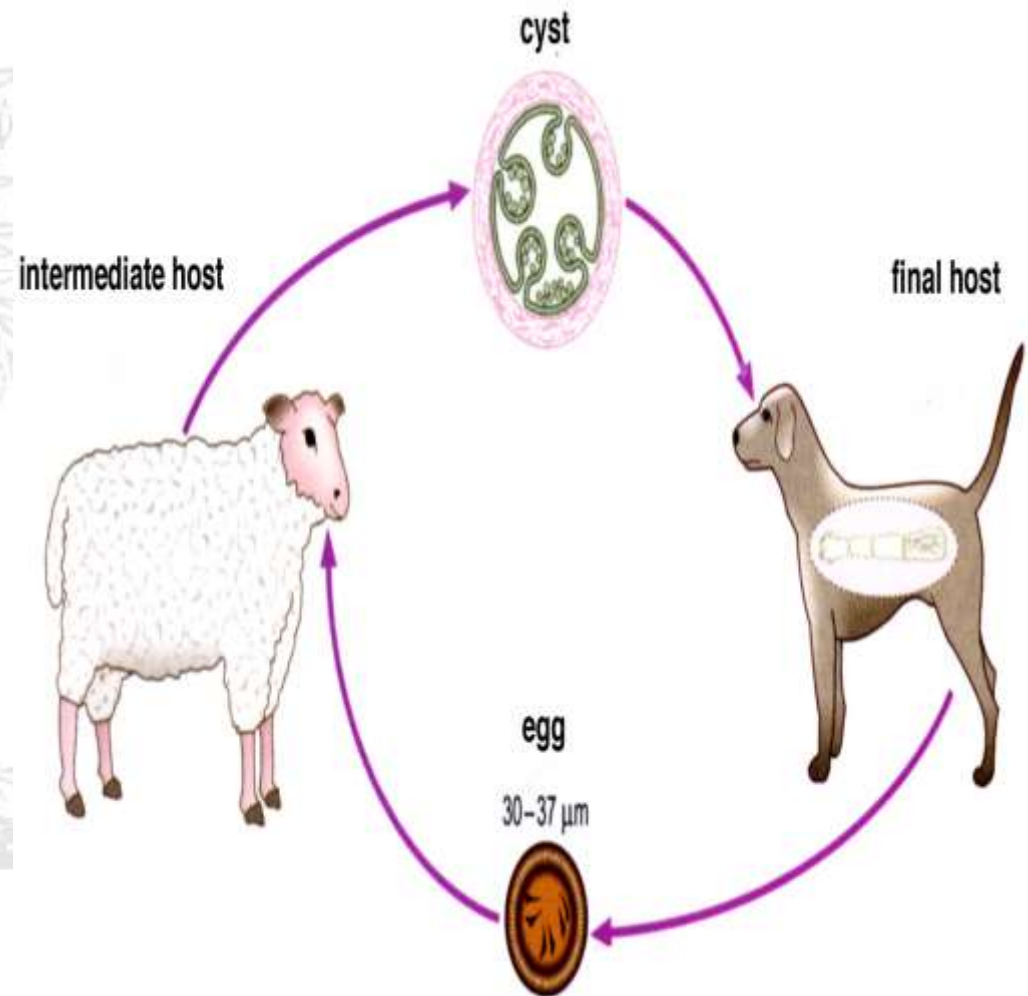
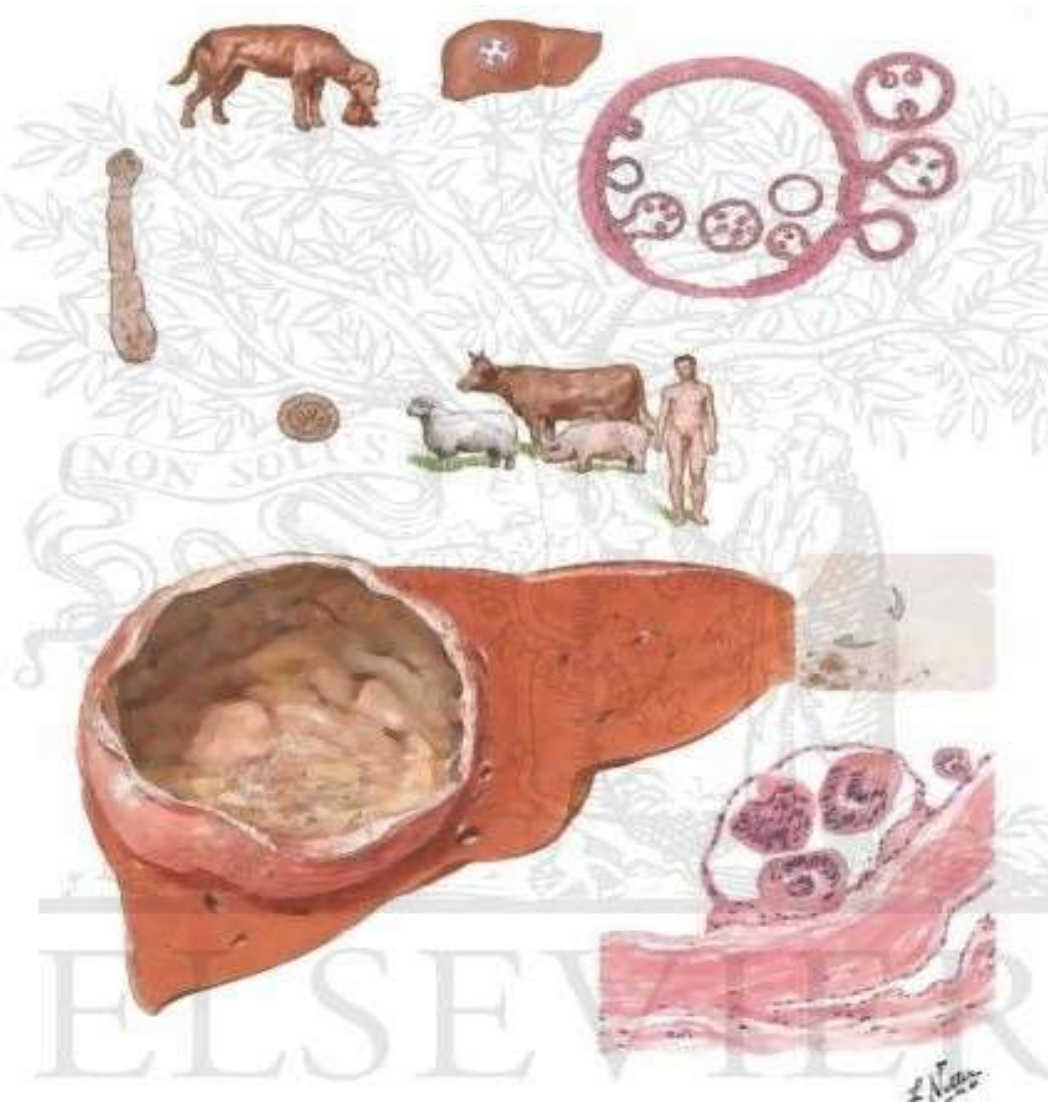


CESTODES OR TAPEWORMS



ECHINOCOCCUS GRANULOSUS **OR**

(DOG TAPEWORM/HYDATID WORM)



ECHINOCOCCUS GRANULOSUS

INTRODUCTION :

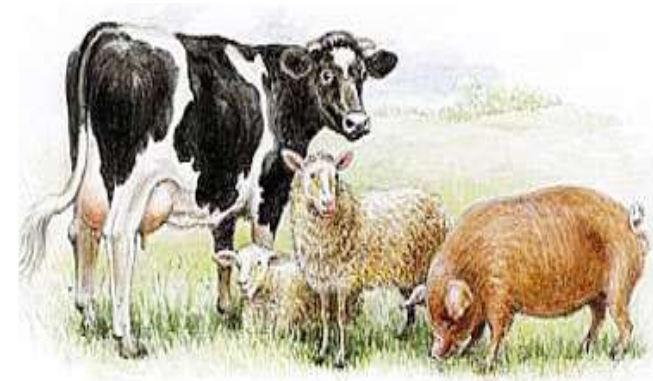
- Hartmann (1695) – Adult *E.granulosus* in the S.I of dog
- Goeze (1782) – Larval form (hydatid cyst)
- Common in sheep and cattle-raising country

HABITAT :

- **ADULT WORM** : In S.I of **DOG** & other canine animals like wolf, fox, jackal (**Definitive Host**)



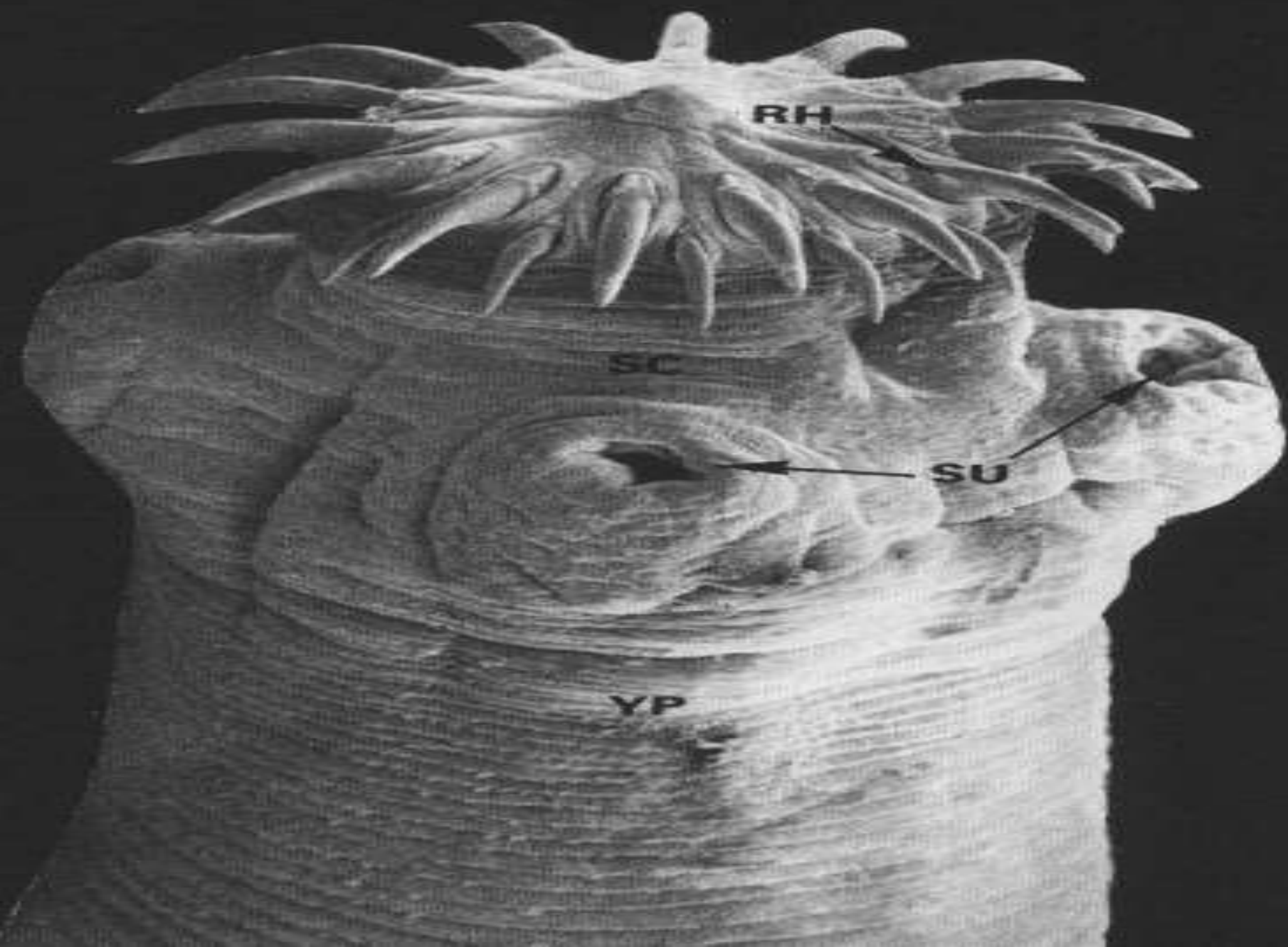
- **LARVAL FORM** : In **MAN** & sheep, goat, cattle, pig, horse (**Intermediate Host**)



MORPHOLOGY :

ADULT WORM : 3-6 mm in size

- **Scolex** – pyriform in shape, 300 μm in diameter, four suckers, rostellum with two circular rows of hooklets
- **Neck** – short and thick



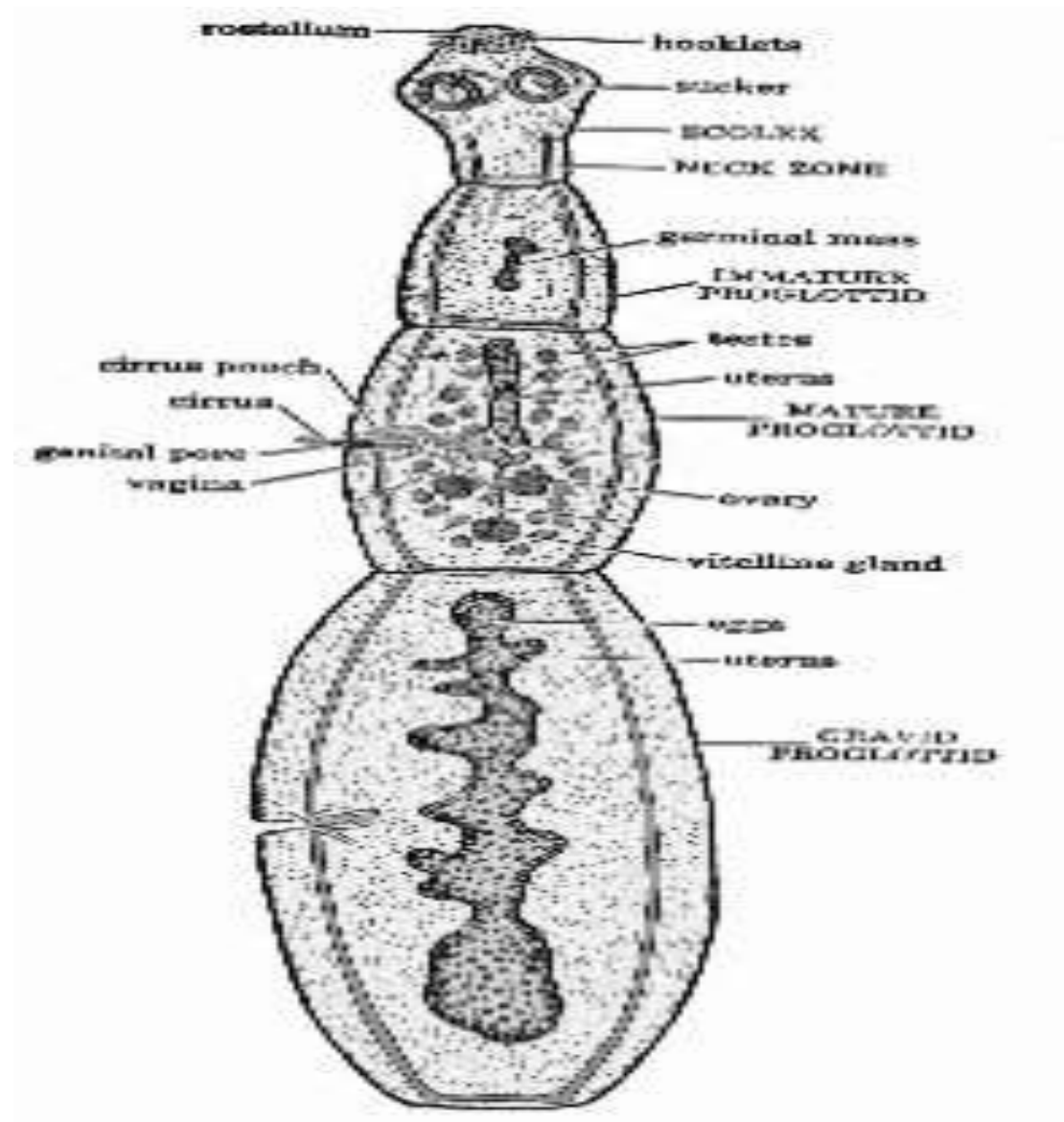
- **Strobila** – 3 segments – immature, mature & gravid



scolex

neck

strobila



EGGS : Same like Taenia species

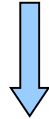
- Size – 32-36 (L) X 25-32 (B)
- Hexacanth embryos with three pairs of hooklets

LARVAL FORM : within hydatid cyst

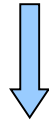


LIFE CYCLE :

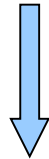
Two hosts



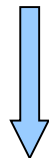
Adult worm in S.I of dog

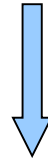


Eggs are discharged and swallowed by I. Host

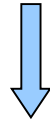


Infection by direct contact or by contaminated water or food

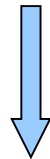




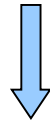
In **duodenum** – hexacanth embryos hatch out

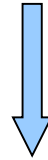


It penetrates the intestinal wall and enters into the radicles of portal vein ----> **Liver**

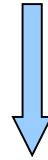


Liver act as the 1st filter (60-70%)

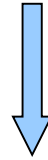




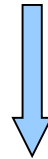
Enter in pulmonary circulation

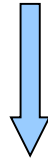


Lungs act as the 2nd filter

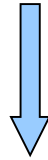


Enter in general circulation and may lodge in brain, heart, kidney, muscles, bones etc.

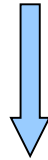




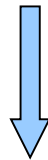
Destroyed by host defence mechanism

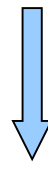


Some of them escape and develop into hydatid cyst

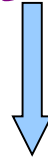


When active cellular reaction disappears then a layer of fibroblasts and new blood vessels envelops the growing embryo & known as **Pericyst**

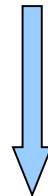




Inside the Pericyst – the embryo develops into a fluid-filled bladder --- **Hydatid Cyst**

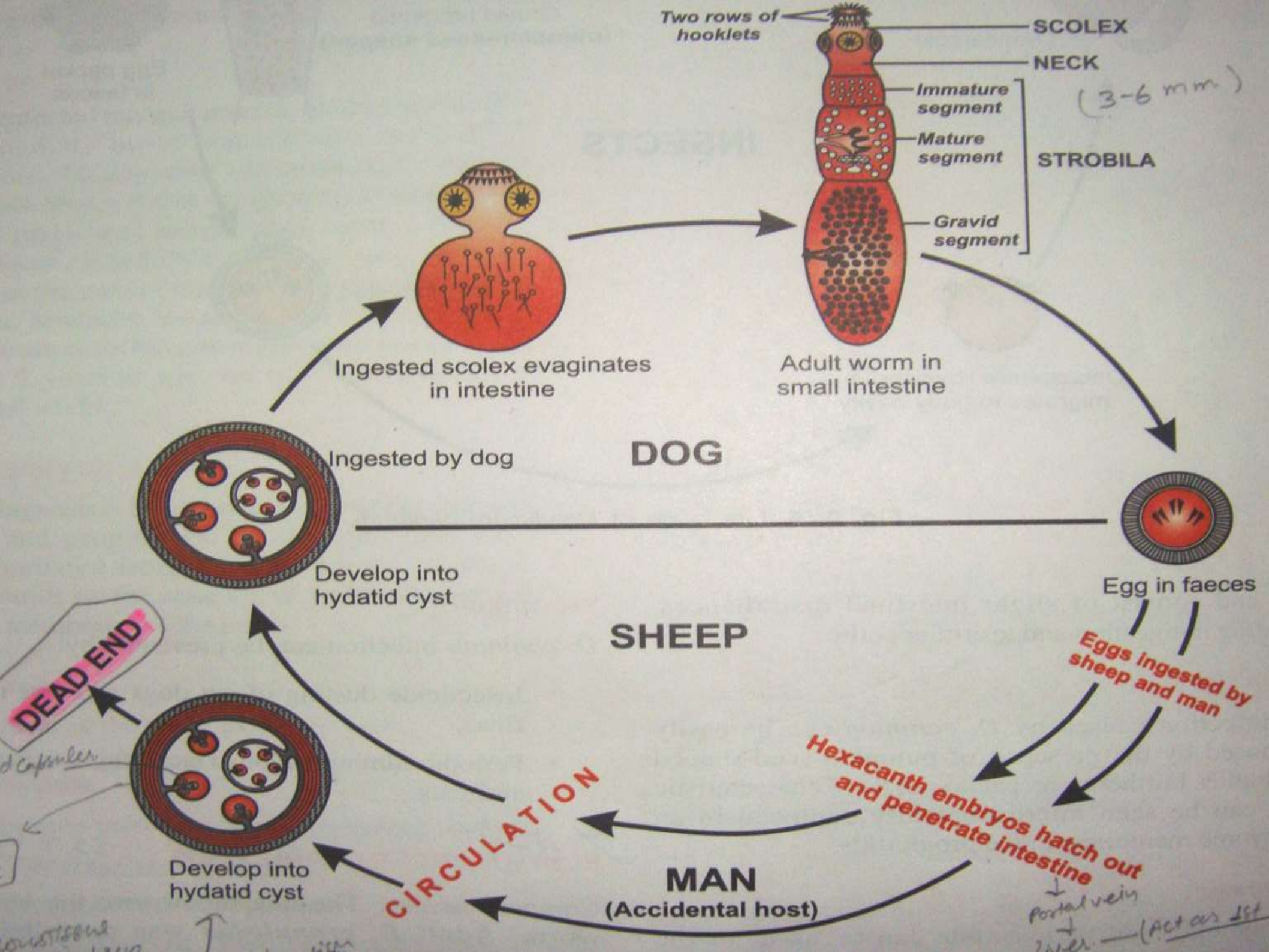


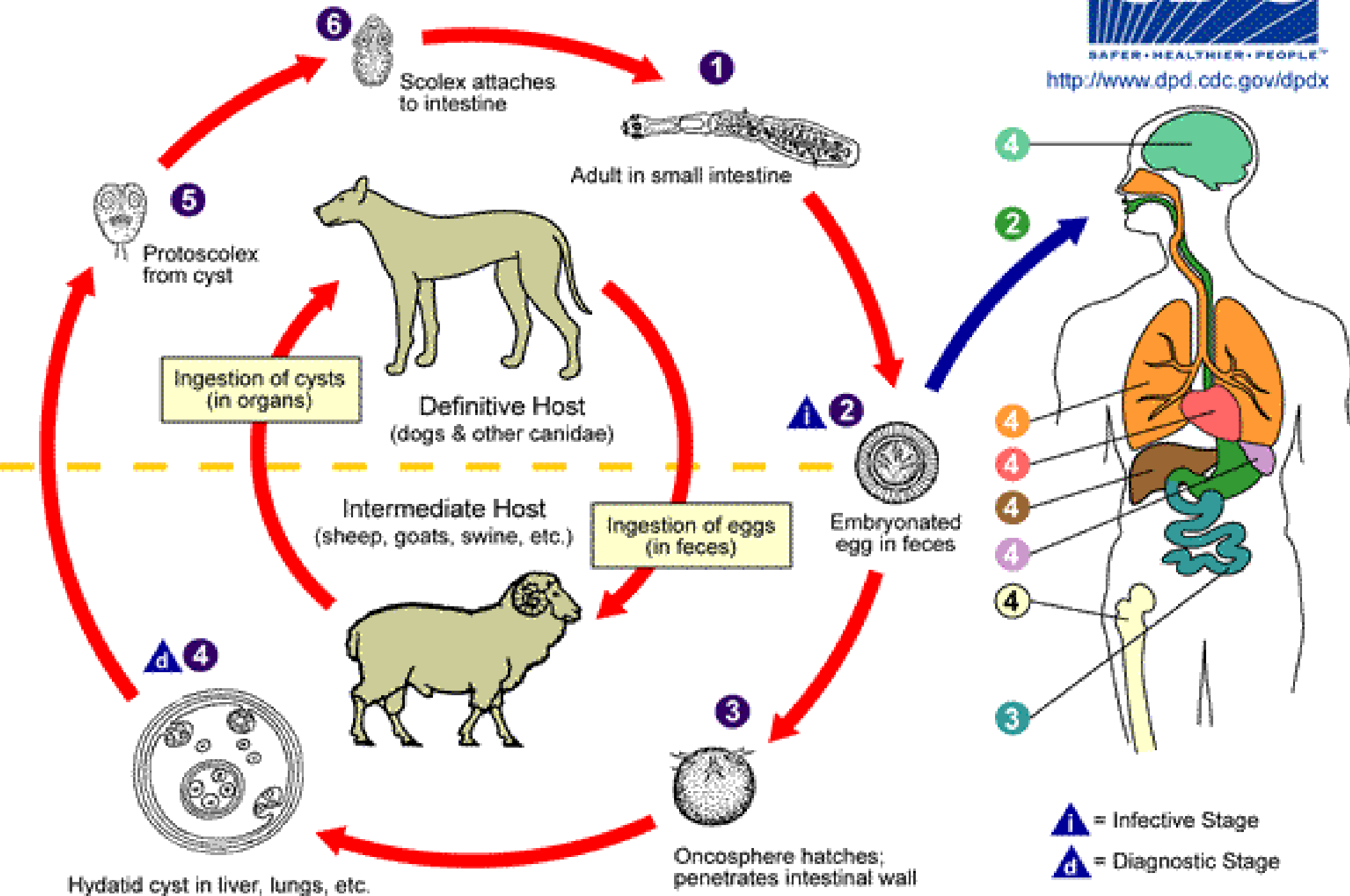
I. Host (sheep) are slaughtered and ingested by definitive host (dog) ---- adult worm develop in intestine



Eggs are passed in faeces

IN MAN – life cycle of the parasite comes to
DEAD END

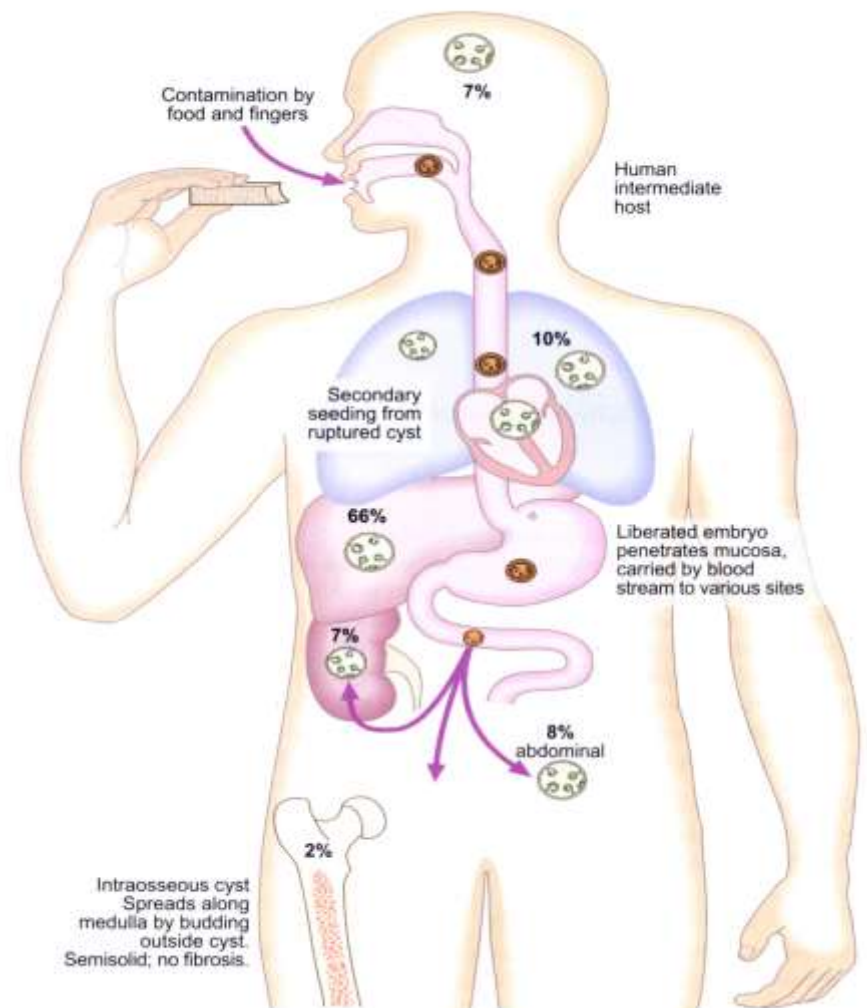




PATHOGENICITY

Echinococcus granulosus causes :

- Cystic Echinococcosis
- Hydatidosis
- Hydatid Disease
- Hydatid Cyst



HYDATID CYST :

- Acquired during childhood but manifests in adult life

TWO LAYERS :

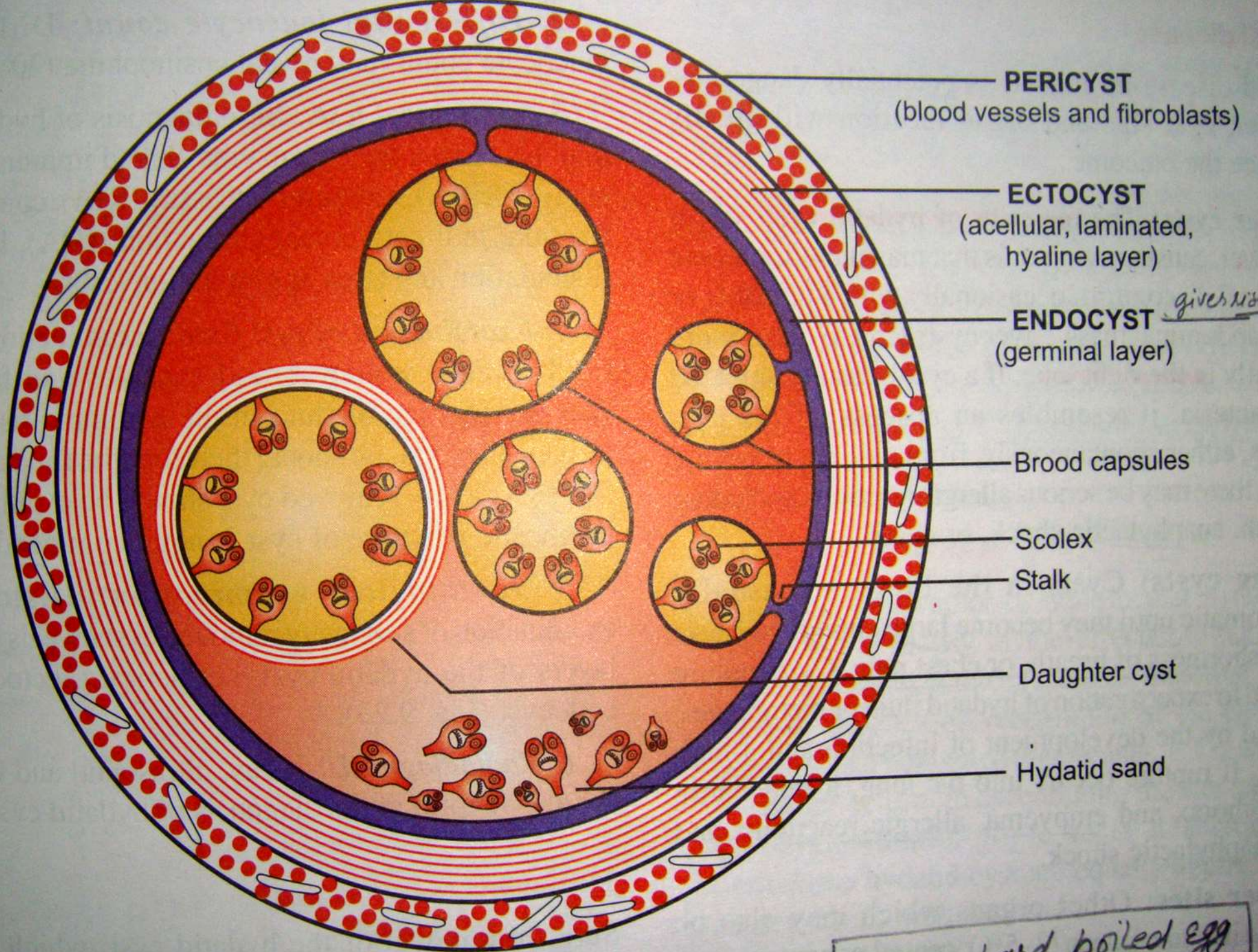
ECTOCYST :

- Acellular, 1mm thick (white of hard-boiled egg)
- Elastic so curls on itself when excised or ruptured

ENDOCYST :

- Inner or Germinal layer
- 22-25 μm thick
- Gives rise to Ectocyst on outside and Brood capsules and Scolices on inside
- It secretes Hydatid Fluid

Hydated Sand - When embryos break and float in fluid within cyst



HYDATID FLUID -

- Clear, colourless or pale yellow
- Sp. gravity – 1.005-1.010
- pH – 6.7
- Contains – Sod. chloride, Sod. sulphate, Sod. phosphate, Sod. & Calcium salts of Succinic acid
- It shows hydatid sand consist of brood capsule, free scolices and hooklets
- Antigenic and used for ***CASONI TEST***

ACEPHALOCYST :

- Some cysts are sterile , some become sterile by bacterial invasion or calcification
- If ingested – do not lead to infection

EXOGENOUS CYST – Hydatid disease of bone

CLINICAL FEATURE

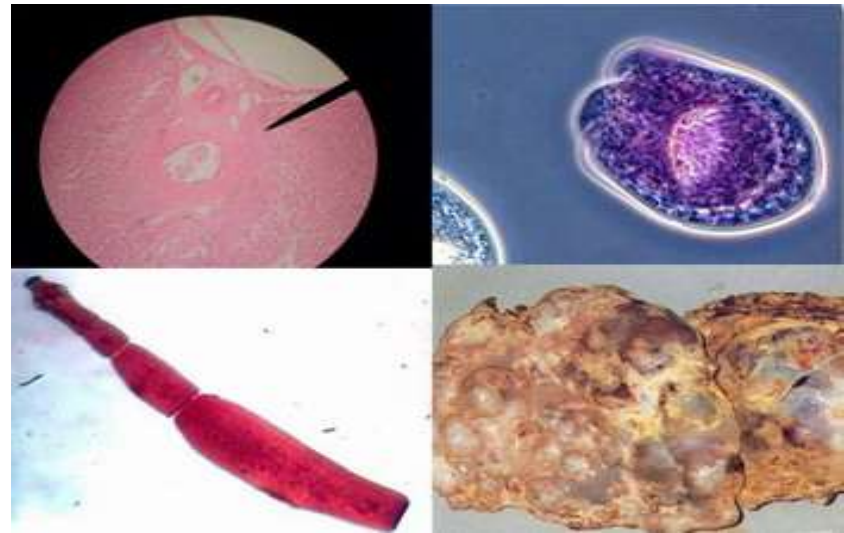
LIVER CYST :

- Usually in the right lobe
- Causing abdominal discomfort
- If cyst ruptures – allergic reactions including Skin rash, Anaphylactic shock or Death



LUNG CYST -

- Causes cough, shortness of breath, chest pain
- If ruptures – Expectoration of Hydatid fluid followed by development of inf. and abscess
- If rupture into the lungs – Pneumothorax and Empheyma, Allergic reactions and Anaphylactic shock



OTHER SITES :

- Spleen (3-5%),
- CNS & Heart (1-1.5%),
- Kidneys, Bones, Muscles, Eyes etc.



LABORATORY DIAGNOSIS

CASONI TEST : By Casoni (1911)

- Immediate Hypersensitivity Reaction
- i/d 0.2 ml of Ag
- Large wheel > 5 cm with multiple pseudopodia within 30 min.

DLC : Eosinophilia (20-25%)

SEROLOGICAL TESTS :

- ELISA, RIA, IHA, LA

EXAMINATION OF CYST FLUID :

- Surgically removed cyst – Scolices, Brood capsules, Hooklets
- Diagnostic puncture of cyst -**Not recommended**

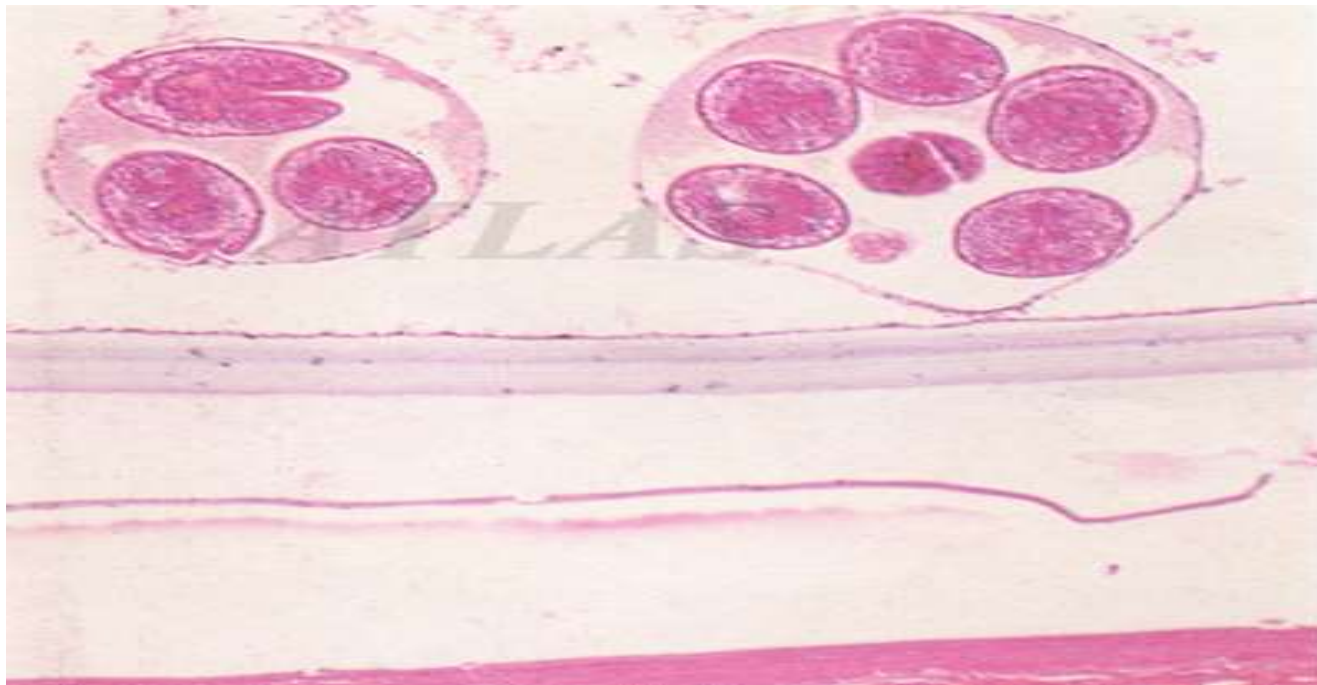


HISTOLOGICAL EXAMINATION :

- Reveals different layers of hydatid cyst

RADIODIAGNOSIS :

- X-ray, Ultrasound, CT scan



TREATMENT

- **Surgical removal in 90% cases**
- Preferred treatment when cysts are large (>10cm) or located in brain or the heart
- Recurrences in 2-25% cases
- Postoperative chemotherapy for at least 2 years
- **PRAZIQUANTEL**
- **ALBENDAZOLE**

PROPHYLAXIS

- Strict personal hygiene
- Dogs should not be allowed to eat the carcasses of slaughtered animals
- Reduction of stray dog population

