

Cestodes

(tapeworms)

Lecture-13-

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- Cestodes(Tapeworms) - Morphology

Tapeworm parts: Flat, segmented body with various length (several mm, 25m as *Hymenolepis nana* ~ several meters. 10m as *Taenia saginata*)
regions of worm body 3
Scolex: suckers, -1 hooklets, grooves
Neck: germinal portion -2
Strobila: immature, -3 mature, gravid proglottides (segments with testes or ovaries)

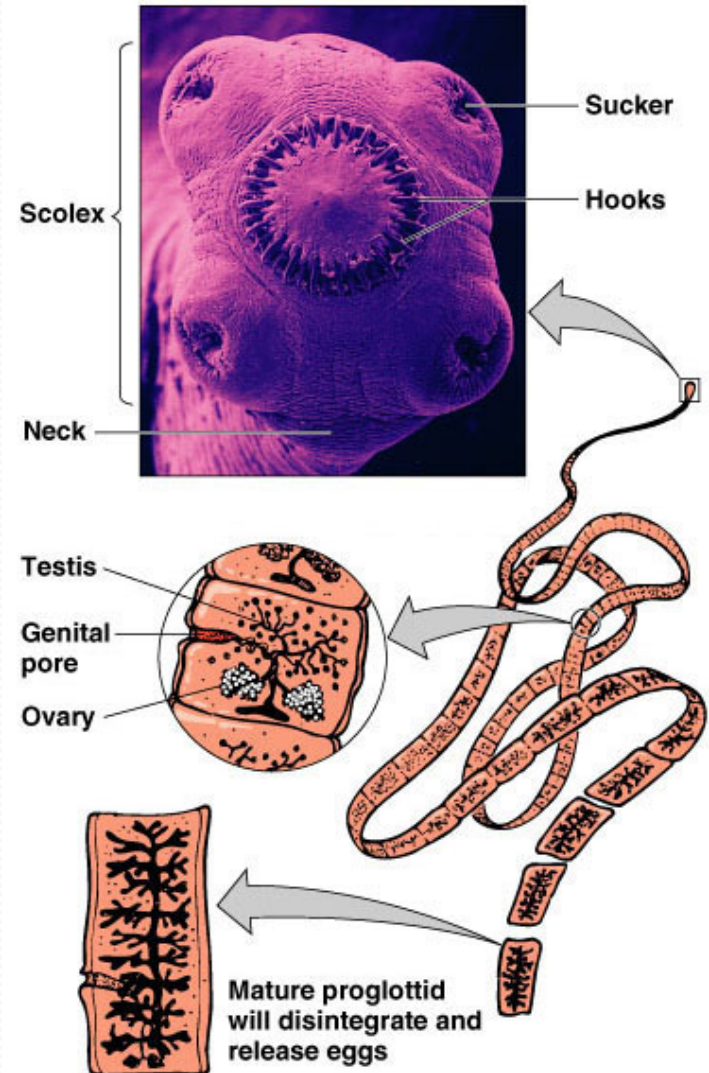


Figure 12.27

Taenia saginata

Beef tapeworm / Hookless tapeworm

Taenia solium

Pork tapeworm / Hook tapeworm

Hymenolepis nana

dwarf tapeworm

Echinococcus granulosus

(*Taenia echinococcus*)

Taenia saginata(beef tapeworm)



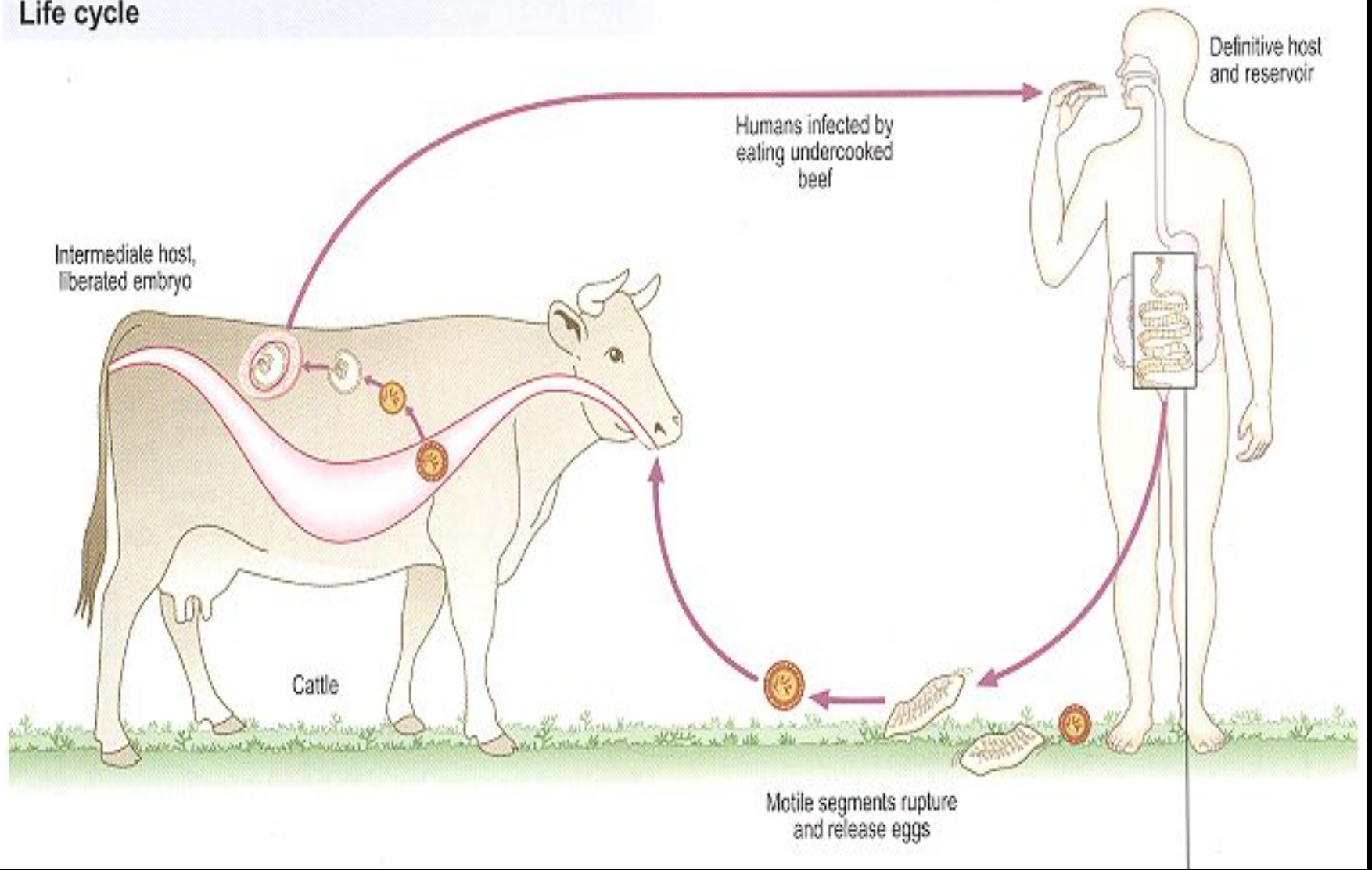
**The beef tapeworm :adult worm: the chain of proglottides is called the strobila, and may be composed of over 1.000 proglottides.
T.saginata may measure 10 m**

Life cycle of *Taenia saginata*

Humans are the only definitive hosts for *Taenia saginata*. The adult tapeworms (length: usually 5 m or less, but up to 25 m) reside in the small intestine, where they attach by their scolex. They produce proglottids (each worm has 1,000 to 2,000 proglottids), which mature, become gravid, detach from the tapeworm, and migrate to the anus or are passed in the stool (approximately 6 per day). The eggs contained in the gravid proglottids (80,000 to 100,000 eggs per proglottid) are released after the proglottid becomes free and are passed with the feces. The eggs can survive for months to years in the environment. Cattle and other herbivores become infected by ingesting vegetation contaminated with eggs (or proglottids). In the animal's intestine, the eggs release the oncosphere, which evaginates, invades the intestinal wall and migrates to the striated muscles, where it develops into a cysticercus. The cysticercus can survive for several years in the animal. Humans become infected by ingesting raw or undercooked infected meat. In the human intestine, the cysticercus develops over 2 months into an adult tapeworm, which can survive for more than 30 years.

Taenia saginata (beef tape worm)

Life cycle



CLINICAL MANIFESTATIONS

Asymptomatic (despite its length, in most cases asymptomatic-1 infection)

Nonspecific complaints of weakness and mild abdominal-2 .discomfort in up to one third of patients

T. saginata proglottides are motile, they may cause acute -3 abdominal symptoms by migrating into and obstructing the .appendix or the pancreatic and biliary ducts

A psychologically distressing feature of infection (and often the -4 first symptom reported by the patient) occurs when motile proglottides migrate out of the anus onto skin or clothing or when .they are observed moving in the feces

DIAGNOSIS

The diagnosis of taeniasis is most readily established by stool examination and perianal inspection for parasite proglottides and eggs. It is not possible, however, to distinguish *T. saginata* eggs from those of *T. solium* morphologically, and the definitive diagnosis of *T. saginata* infection requires pathologic examination of proglottide features or DNA hybridization studies

Treatment

Praziquantel is the drug of choice ●

.5-10 mg/Kg single dose

Alternative drugs are either ●

.niclosamide or nitazoxanide

***Taenia solium* – The Pork Tapeworm**

:General

Man is the only definitive host(the adult worm found only in humans) ●

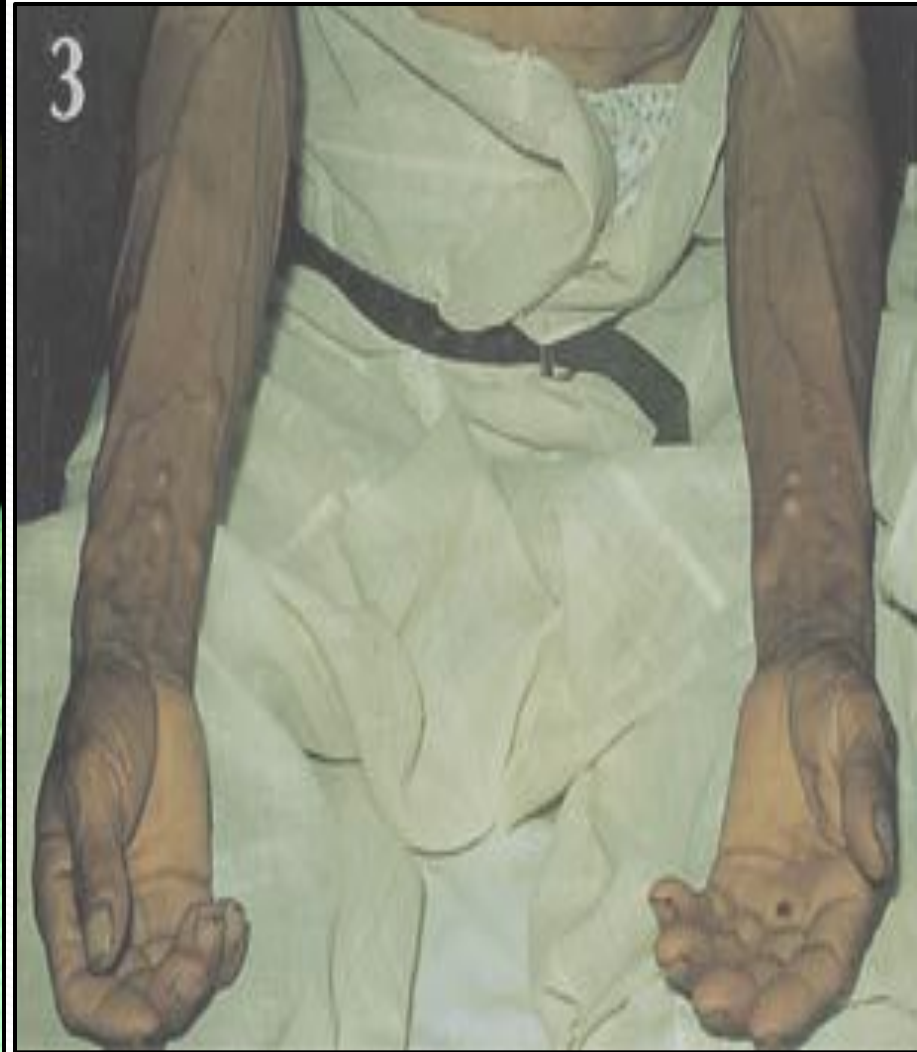
Infection - ingestion of cysticercus in flesh of swine(undercooked pork) ●

Retrograde intestinal autoinfection – due to ingestion of eggs from feces if infected with adult worm which result in cysticercosis(0.5-1cm cyst),commonly in subcutaneous tissue, skeletal muscles & brain ●

.Size - up to 7 meters in length ●

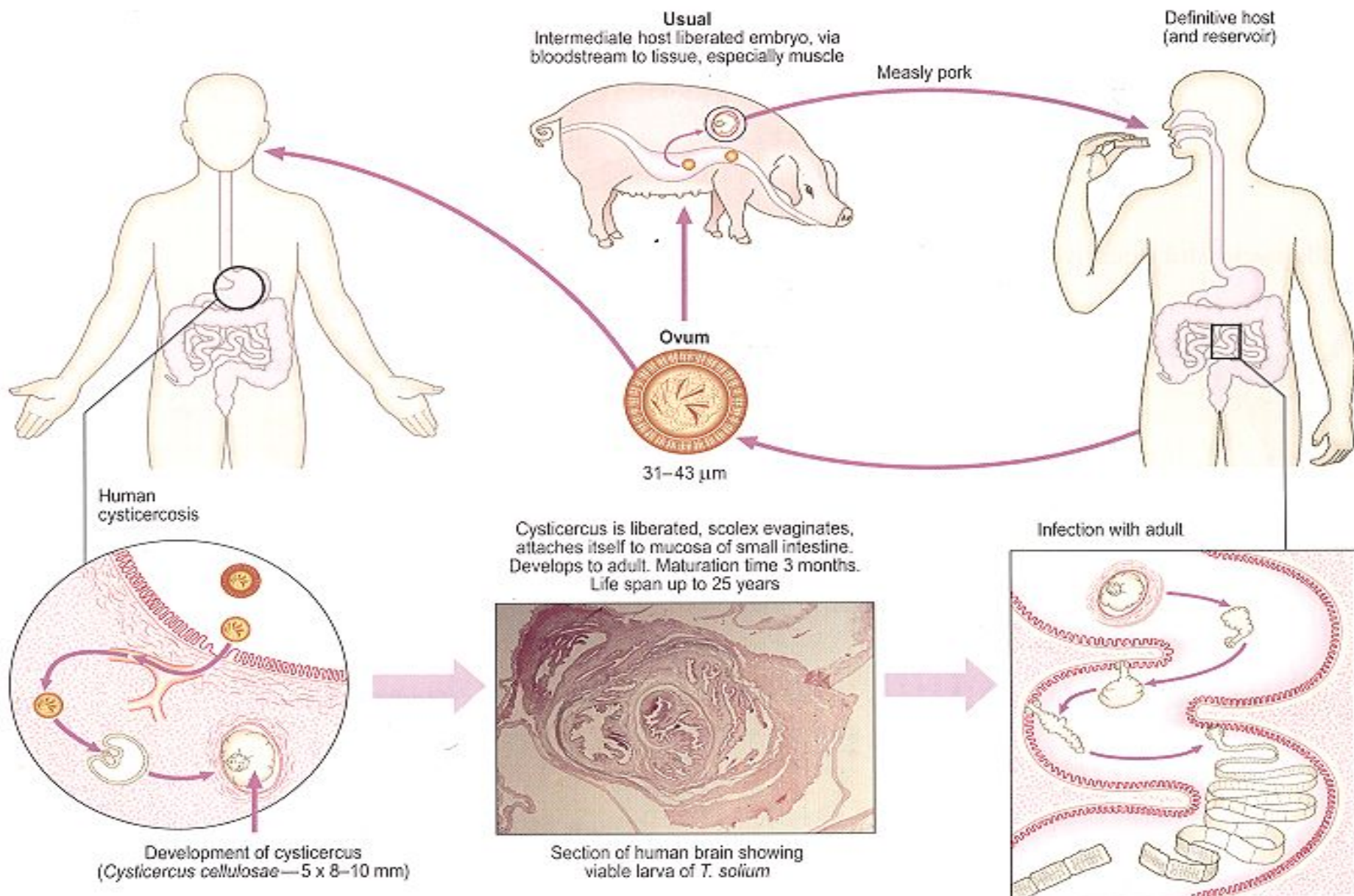
.Life expectancy - 25 years or more ●

. ●



Taenia solium (pork tape worm)

Life cycle



	<i>T.saginata</i>	<i>T.solium</i>	
Definitive Host	Human	Human	Human
Intermediate Host	Cattle	Swine	Human
Habitation	Small intestine	Small intestine	Tissue(brain, eye, skin etc.)
Infective stage	Cysticercus bovis	Cysticercus Cellulosae	Egg
Disease	Taeniasis	Taeniasis	Cysticercosis

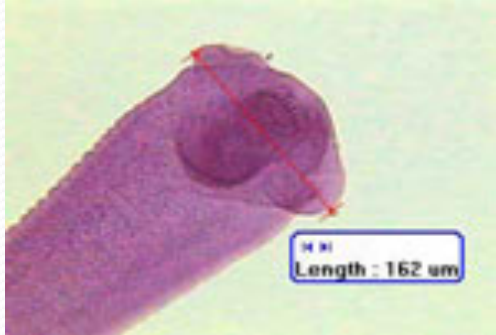
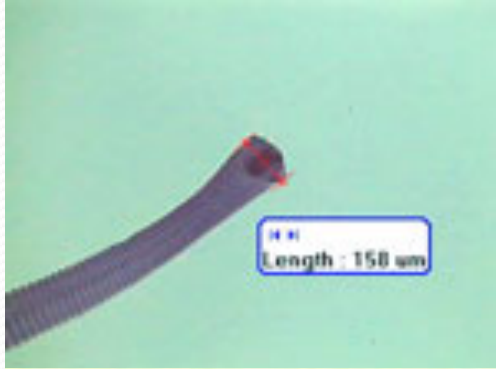


Hymenolepis nana **(Dwarf Tapeworm)**

***H. nana* (dwarf tapeworm)**

is found frequently in warm, dry climates and is prevalent in Southern and Eastern Europe, Asia, Africa, Central and South America, and Australia. It is endemic in Iraq but usually under estimated.. With time, however, a regulatory immunity to infection may develop, so that *H. nana* infection can be spontaneously cleared. Intensive infection is more common in malnourished, or immunodeficient individuals

Hymenolepis nana - The Dwarf Tapeworm



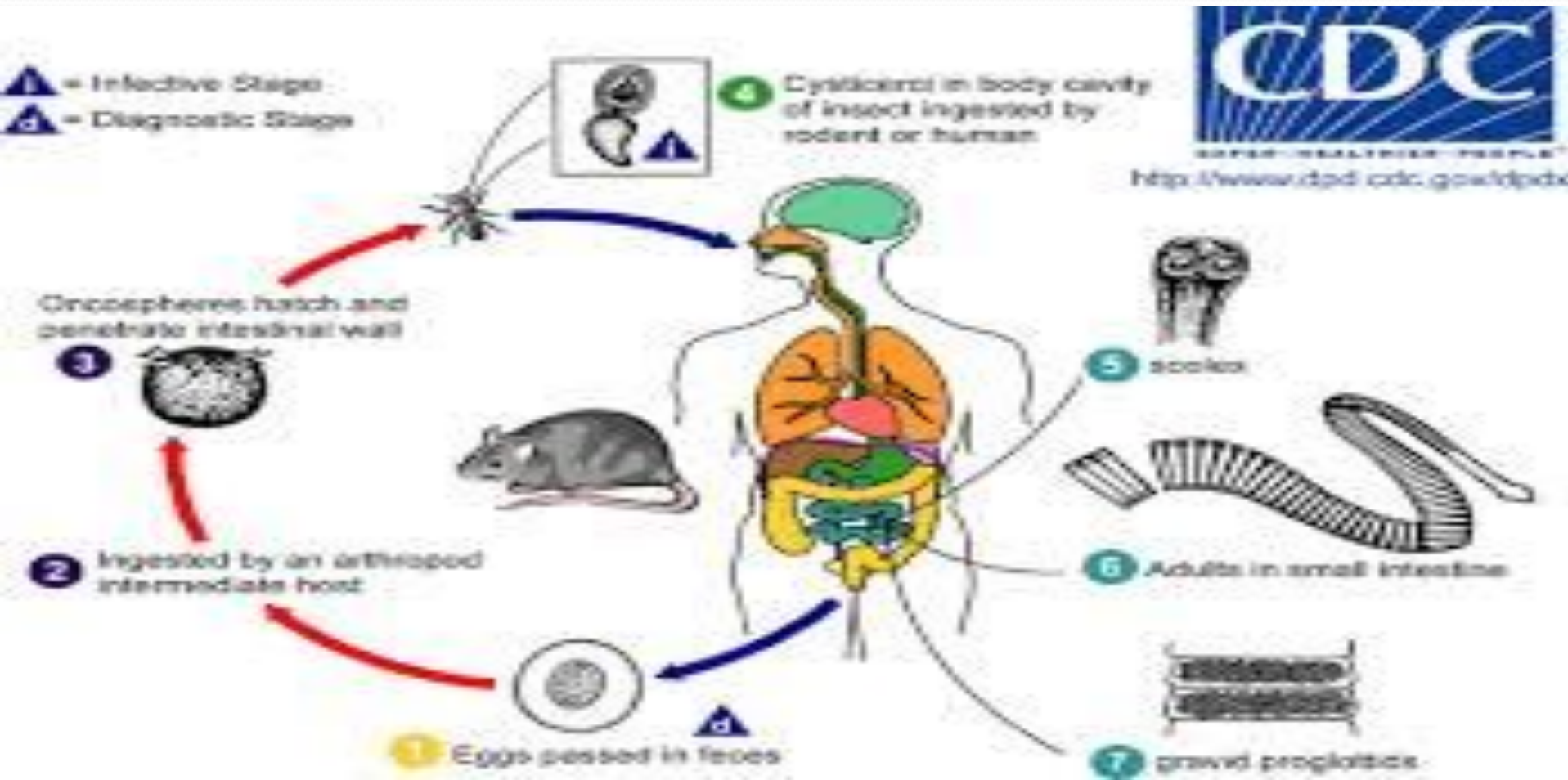
- .Morphology - small, 2 to 4 cm in length ●
- Scolex - 4 sucking disks & short rostellum ●
- .with hooks
- Proglottid - are broader than long; rarely seen ●
- in feces specimens (usually disintegrate in
- .intestine)
- Eggs - most often seen stage in specimens, ●
- measuring 45 to 50 microns in diameter and
- exhibiting polar filaments lying between the
- .egg shell and the hexacanth embryo

Life cycle

human infected by ingesting eggs, in the small intestine, hatching eggs release oncospheres that penetrate the villi of the mucosa. Four to 5 days later, the developed cysticercoid ruptures out of the villus, and a parasite scolex attaches to the lining of the ileum, maturing in 10 to 12 days.

Autoinfection can occur internally (i.e., within the small bowel) or externally through the fecal-oral route, resulting in heavy infection. It is the only human tapeworm that does not require an intermediate host. Human & rodents are definite hosts

Eggs of *Hymenolepis nana* are immediately infective when passed with the stool and cannot survive more than 10 days in the external environment . When eggs are ingested by an arthropod intermediate host (various species of beetles and fleas may serve as intermediate hosts), they develop into cysticeroids, which can infect humans or rodents upon ingestion and develop into adults in the small intestine



CLINICAL MANIFESTATIONS

The clinical manifestations of *H. nana* vary with intensity and may include diarrhea, anorexia, abdominal pain, and pallor.

Association with keratoconjunctivitis has been observed and has been related to the immune response to infection

The following are clinical features

....of

The clinical manifestations of this worm vary with intensity of infection and may include diarrhea, .anorexia, abdominal pain, and pallor

Association with keratoconjunctivitis has been observed and has been related to the immune .response to infection

DIAGNOSIS

The diagnosis of *H. nana* infection is made by examining stool for eggs 30 to 47 μm in diameter that have a characteristic double membrane. Proglottides are usually not seen in the stool

TREATMENT

***H. nana* infection is treated with niclosamide or praziquantel.**

PREVENTION

Because *H. nana* is easily transmitted from person to person, sanitation and handwashing are essential to control this parasite. Mass chemotherapy may also be used to suppress endemic transmission, particularly within closed institutions

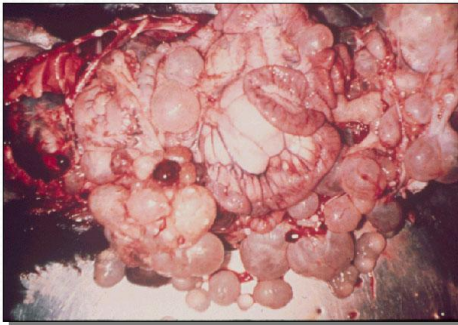
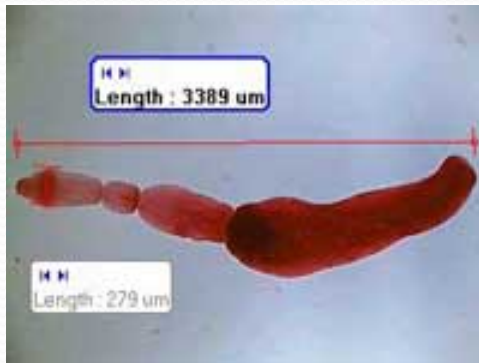
Echinococcus granulosus

The Hydatid Tapeworm

:Morphology

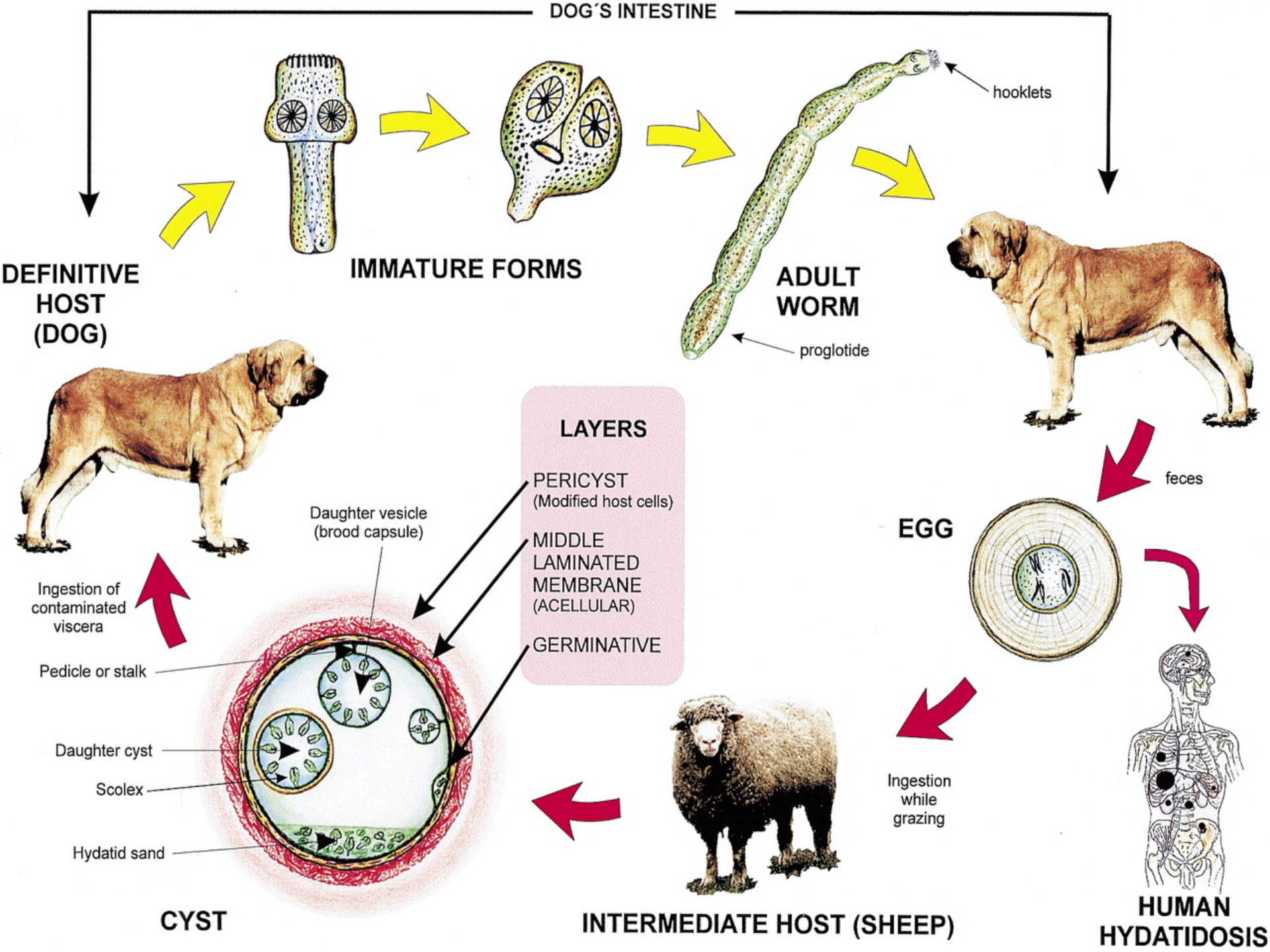
**Adult worm - Small, consists of ●
.only 3 segments**

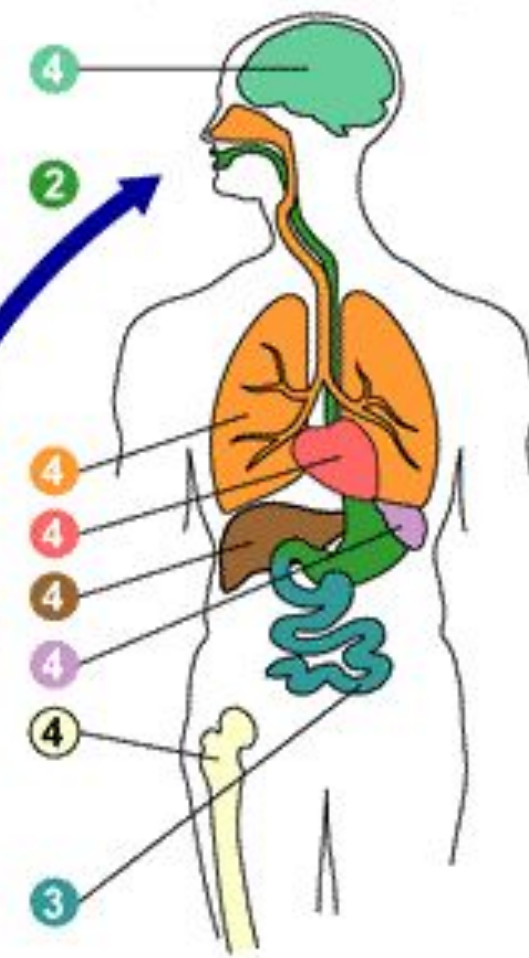
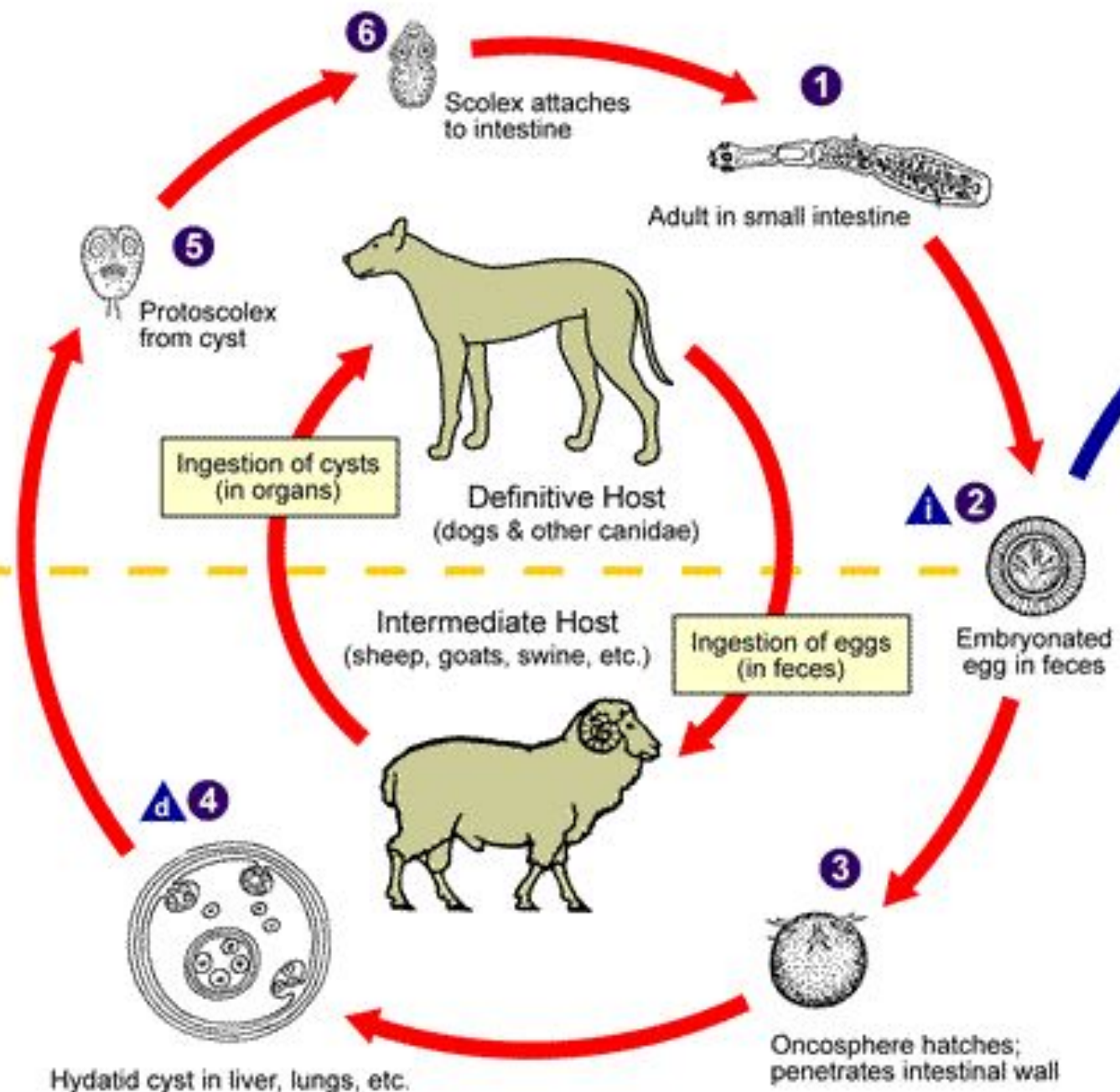
**Hydatid cyst - a thin walled larva ●
containing many thousands of
.invaginated scoleces**



.....The worm seen in this slide is







i = Infective Stage
d = Diagnostic Stage

Echinococcus granulosus

The Hydatid Tapeworm



Major pathology - hydatid cysts (the larval stage) develop anywhere in the body (except hair & nail). Most commonly found in liver (70%), lungs, spleen but can include the bone & the brain.

Estimates of the average increase of cyst diameter vary (depends on site & strain) (approximately 1.5-2 cm/year). Can grow to large size and contain as much as two liters of fluid.

Pressure necrosis of tissue can result from larger cysts

Layers of hydatid cyst

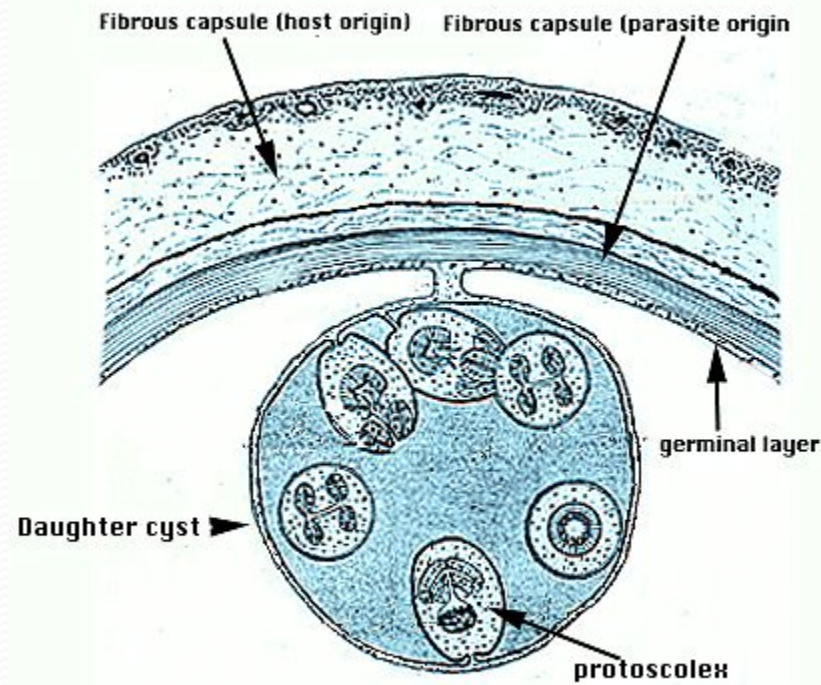
Pericyst or adventitia ●

The endocyst or laminated layer ●

Germinal layer ●

The germinal layer produces clear fluid which attains a pressure of up to 300 mm of water, keeping the endocyst in intimate contact with the pericyst. The endocyst receives its sustenance from the pericyst

Cyst layers and contents



Hydatid cyst

Pathology & clinical features

- **Depend on site and size**
- **Can cause obstructions and pressure on vital organs such as biliary tract.**
- **Or ruptures of cyst or leaks results in immunologic reactions such as asthma, anaphylaxis(shock), or membranous nephropathy secondary to release of antigenic material.**
- **Bacterial infection of cysts & abscess formation.**
- **Some cyst grow for short time ,die and calcify.**
- **66-70% of cyst found in liver in Rt lobe. Some discover accidentally by Ultrasonography or CXRfor another reasons.**
- **H.cyst in lung cause respiratory symptoms such as dyspnoea. Cough with sputum containing blood and sometime hydatid fluid.The cysts can be found in bone , brain ,spleen and kidneys.....**



Diagnosis

:Imaging Studies

Plain radiography●

Ultrasound examination●

CT scanning●

MRI●

Laboratory Studies

Generally, routine laboratory tests do not show specific ●
.results

In patients with rupture of the cyst in the biliary tree, marked and transient elevation of cholestatic enzyme(alkaline phosphatase) levels occurs, often in association with increased amylase and .eosinophilia (as many as 60%)

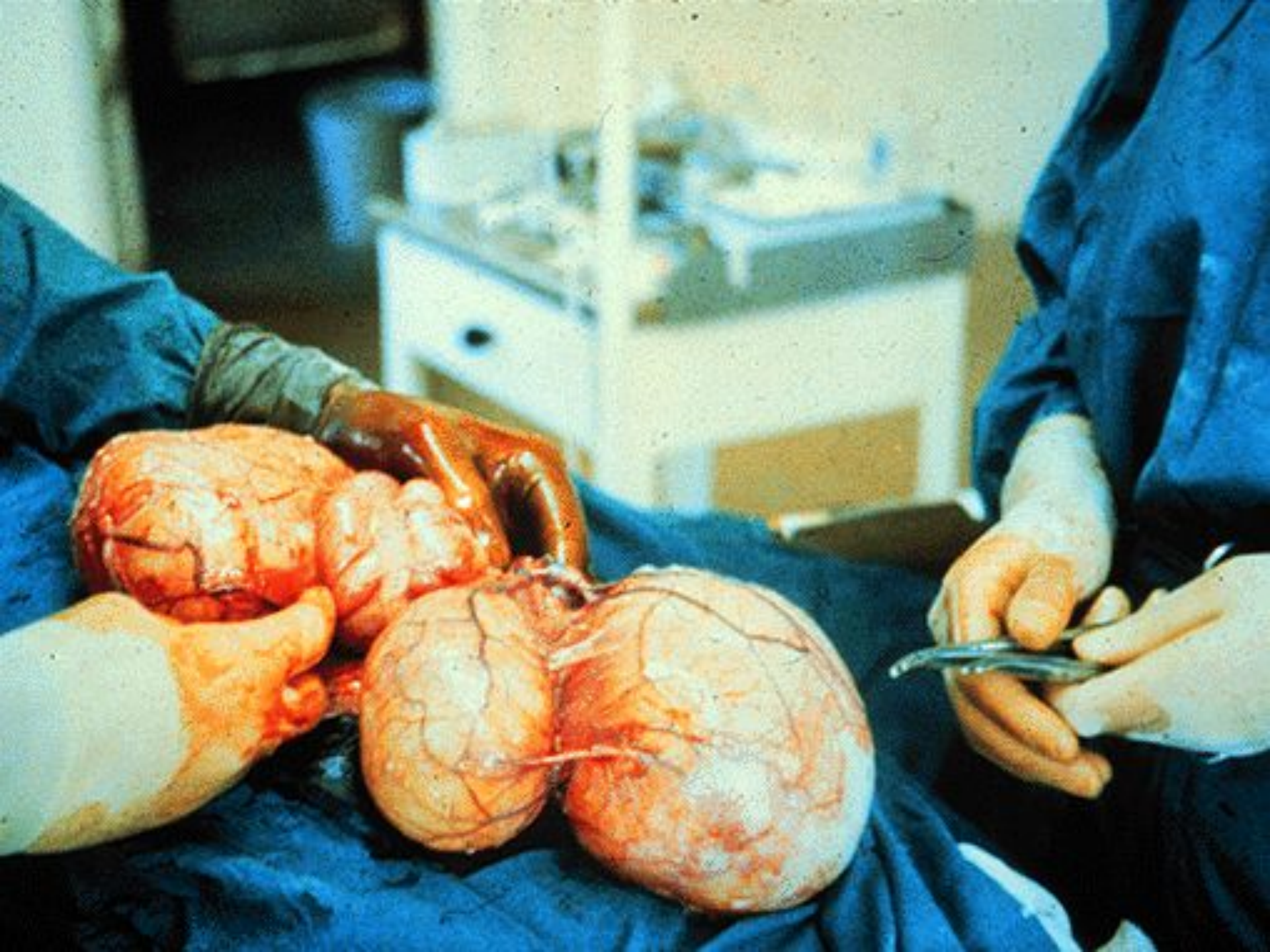
Casoni or intradermal test ●

Indirect hemagglutination test and ○ enzyme-linked immunosorbent assay are the most widely used methods for detection of anti-Echinococcus antibodies (immunoglobulin G [IgG]). These tests give false positive results in cases of schistosomiasis and nematode infestations that is why they are not specific for diagnosing hydatid .diseases

Treatment

:A- Surgical

Surgery was the only treatment available before the introduction of antihelminthic drugs. It is considered the first choice of treatment for hydatid cyst disease but is associated with considerable morbidity, and recurrence rates (2-25%)



B- Medical

• ●
**Two benzimidazolic drugs, mebendazole and ●
albendazole, are well tolerated but show
different efficacy**

**Praziquantel : it belongs to isoquinoline group •
and has been widely used in schistosomiasis
and it has been shown to be a most active and
rapid scolocidal agent but it has poor effect on
germinal layer so it is of choice for prophylaxis
in pre and post operative period in order to
prevent secondary implantation of spilled
protoscoleces**

Thank you

Next lecture  Trematodes:Schistosomiasis

Stay home

