TREMATODES

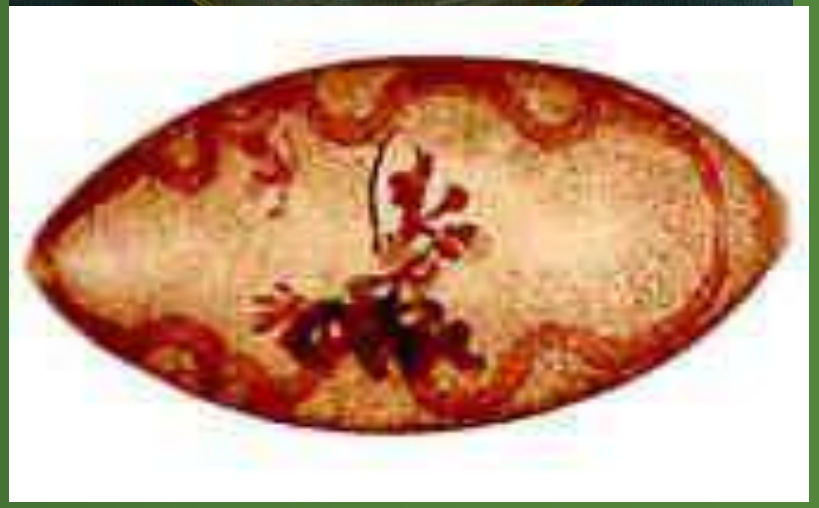
Lung Flukes

Lung Flukes

- *Paragonimus westermani*
- Oriental Lung Fluke

Lung Flukes: *Paragonimus westermani*

- *Paragonimus westermani* adult
  - Hermaphroditic
  - Body covered with spines
  - Reddish brown
  - Resembles a coffee bean
  - Adult worms are found in pairs or in threes in fibrotic capsules or cysts in the lungs



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Lung Flukes: *Paragonimus westermani*

- *Paragonimus westermani*
- ova

Lung Flukes:
Epidemiology of Paragonimiasis

- First Intermediate Host
  - *Brotia asperata* (snail)
  - Where miracidium develops into 1 sporocyst and 2 redial stages of development

Lung Flukes:
Epidemiology of Paragonimiasis

- Second Intermediate Host
  - *Sundathelpusa philippina* or *Parathelpusa grapsoides* (former name)
  - Harbors the metacercaria that is infective to man

Lung Flukes: *Paragonimus westermani*

- Man gets infected after ingestion of raw or insufficiently cooked crabs harboring the metacercariae

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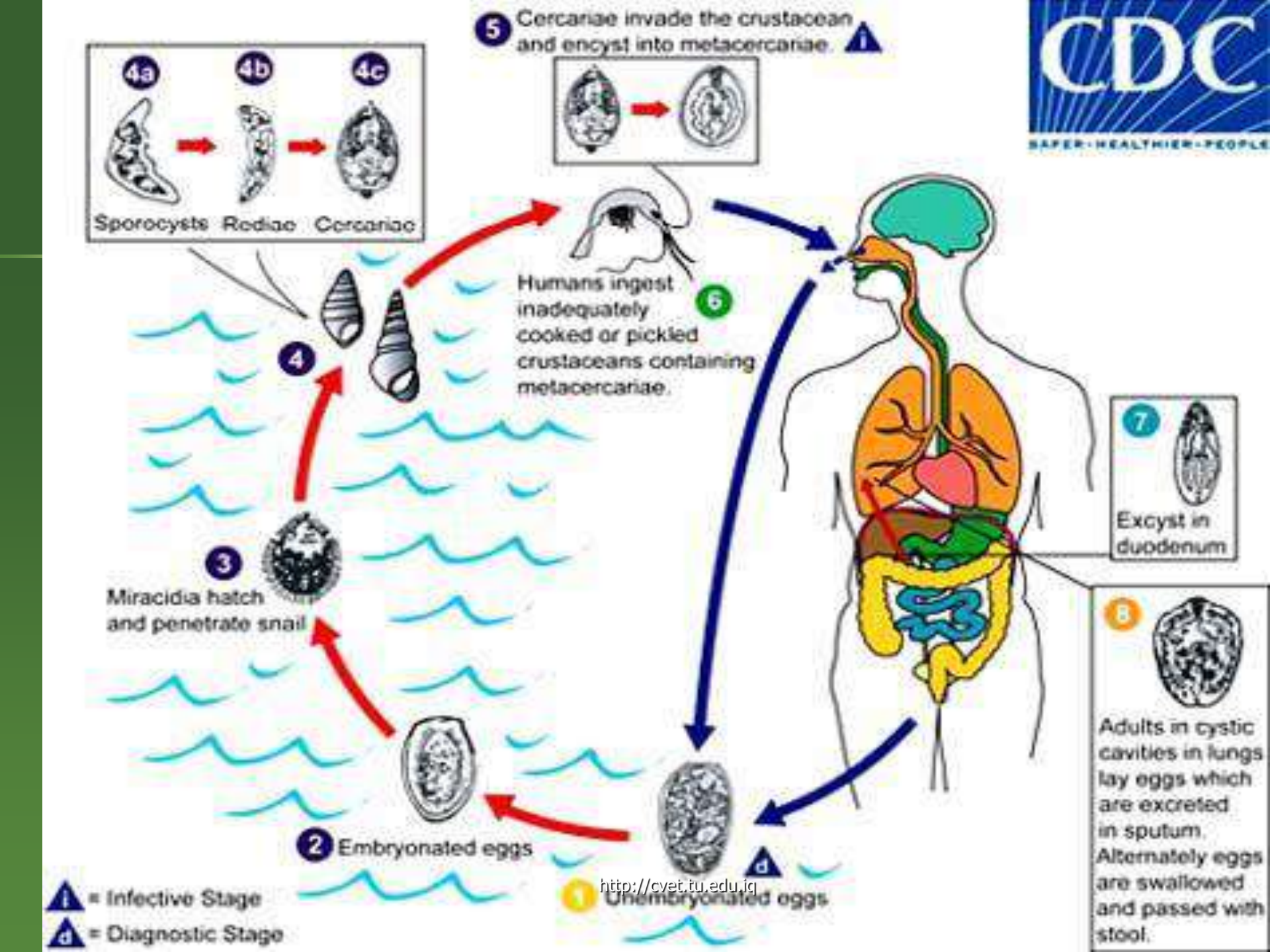
5 Cercariae invade the crustacean and encyst into metacercariae.
i
4a
4b
4c
Sporocysts
Rediae
Cercariae
Humans ingest inadequately cooked or pickled crustaceans containing metacercariae.
6
4
7
Excyst in duodenum
3
Miracidia hatch and penetrate snail
8
Adults in cystic cavities in lungs lay eggs which are excreted in sputum. Alternately eggs are swallowed and passed with stool.
2 Embryonated eggs
d
1 Unembryonated eggs
i = Infective Stage
d = Diagnostic Stage
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Lung Flukes:
Pathogenesis and Clinical Manifestations

- Paragonimiasis
- Acute phase of the disease [period of invasion and migration of larvae]
- may marked by: Pulmonary abnormality ,Hepatosplenomegaly ,
- Eosinophilia , Cough , Urticaria ,abdominal pain , Diarrhea ,Fever .

- Chronic phase [pulmonary manifestation] include:
- Cough ,Hemoptysis , Chest-radiographic abnormalities ,
- Expectoration of discolored sputum[the color being caused by expectorated clusters of
- reddish brown eggs rather than blood].
- *Cases may resemble "Pulmonary* tuberculosis" .

Lung Flukes: Diagnosis of Paragonimiasis

- Radiographs aid in diagnosis
- Definitive diagnosis is based on the finding of ova in the sputum, stool or less frequently in aspirated material from abscesses or pleural effusions
- Multi-dot ELISA

Lung Flukes:
Treatment of Paragonimiasis

- Praziquantel
- Bithionol

Intestinal Flukes Heterophyids

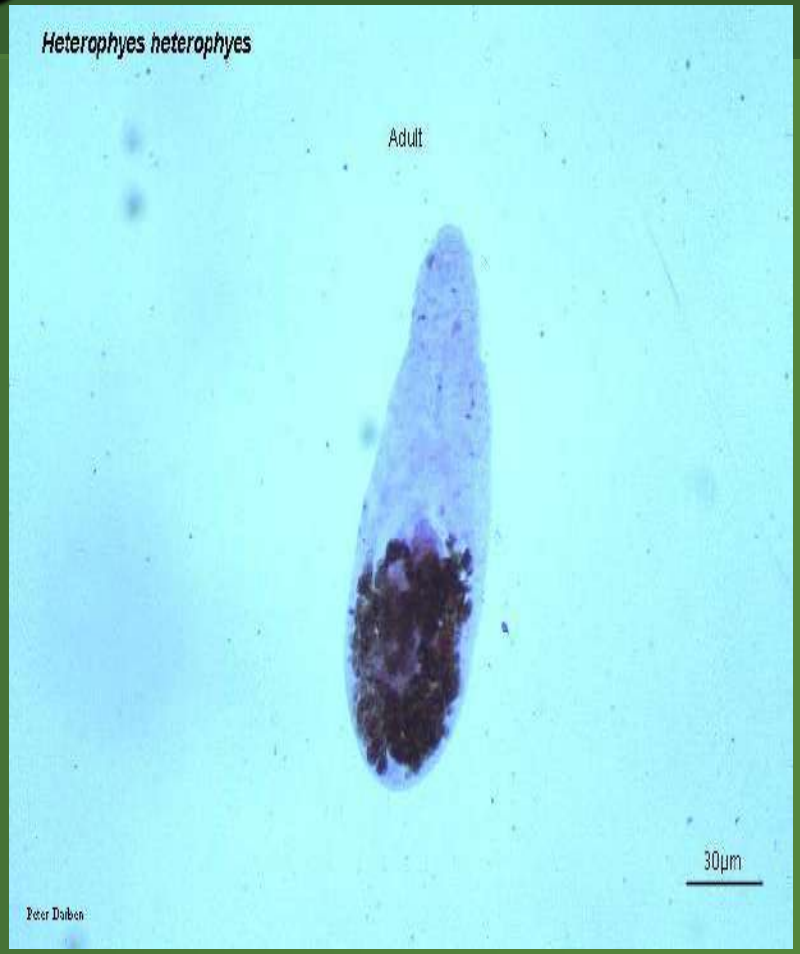
- Many species live in the intestine of fish-eating hosts:
  - *Heterophys heterophyes*
  - *Metagonimus yokogawai*
  - *Haplorchis taichui*
  - *Haplorchis yokogawai*

Intestinal Flukes Heterophyids

- Mode of transmission is by ingestion of metacercariae encysted in fish
- Metacercariae in the abdomen excysts, liberating a larva that attaches to the intestinal wall

Intestinal Flukes Heterophyids

- *Heterophyes heterophyes* Adult
  - Elongated
  - Oval or pyriform
  - Measures less than 2 mm in length
  - Integument has fine scale-like spines
  - Some species have gonotyl or genital sucker



Intestinal Flukes Heterophyids

- *Heterophyes heterophyes*

- Ova
  - Light brown in color
  - Ovoid in shape
  - Operculated
  - A fully developed symmetrical miracidium is already present
  - Operculum fits into the egg smoothly
  - No abopercular protuberance like that of *Clonochis sinensis* ovum

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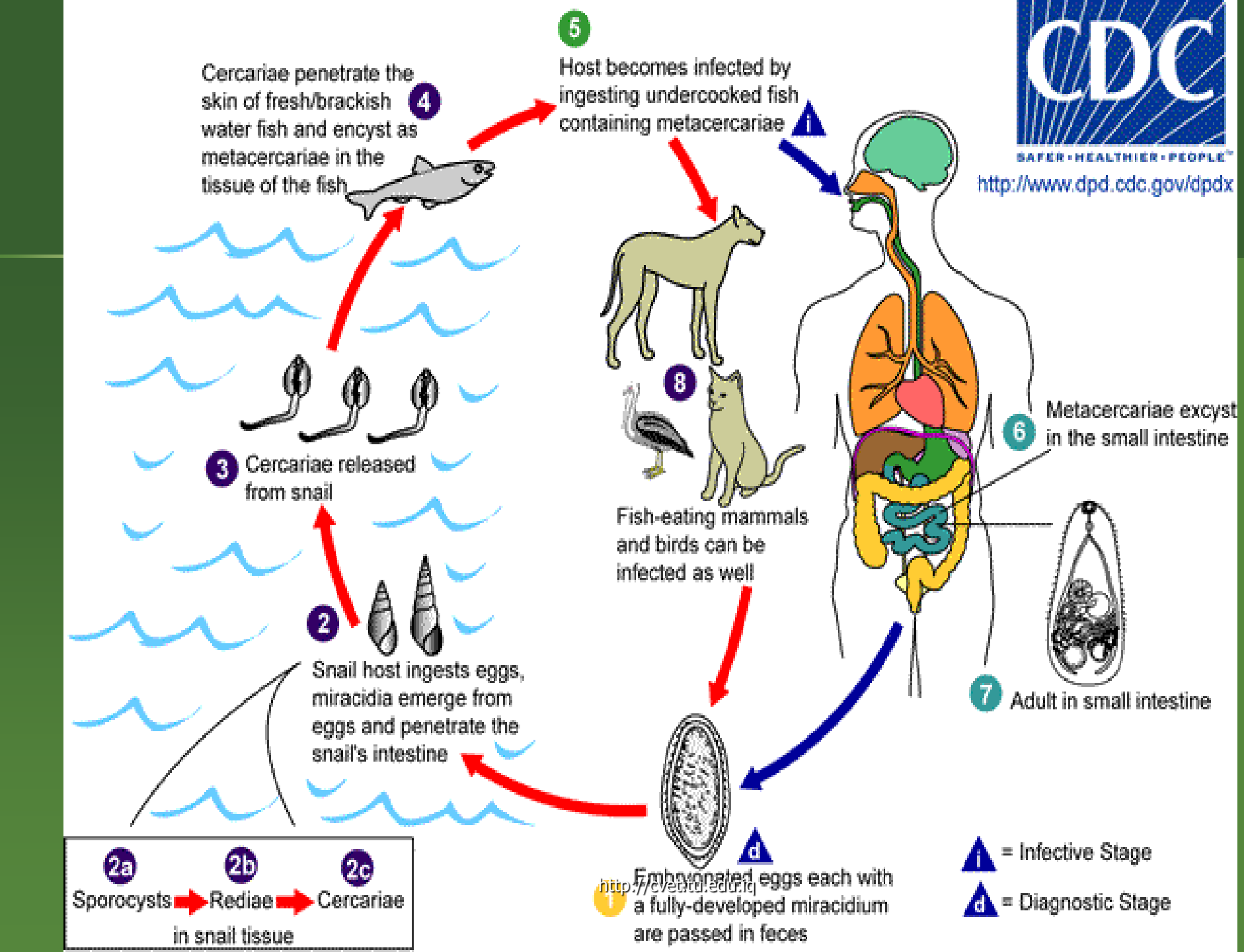

CDC
SAFER • HEALTHIER • PEOPLE™
http://www.dpd.cdc.gov/dpdx
5
Host becomes infected by ingesting undercooked fish containing metacercariae
i
4
Cercariae penetrate the skin of fresh/brackish water fish and encyst as metacercariae in the tissue of the fish
8
Fish-eating mammals and birds can be infected as well
6
Metacercariae excyst in the small intestine
7
Adult in small intestine
3
Cercariae released from snail
2
Snail host ingests eggs, miracidia emerge from eggs and penetrate the snail's intestine
d
Embryonated eggs each with a fully-developed miracidium are passed in feces
1
2a
Sporocysts
2b
Rediae
2c
Cercariae
in snail tissue
i = Infective Stage
d = Diagnostic Stage
http://cvetad.edu.iq

Intestinal Flukes

Heterophyes heterophyes

Pathogenesis and Clinical Manifestations

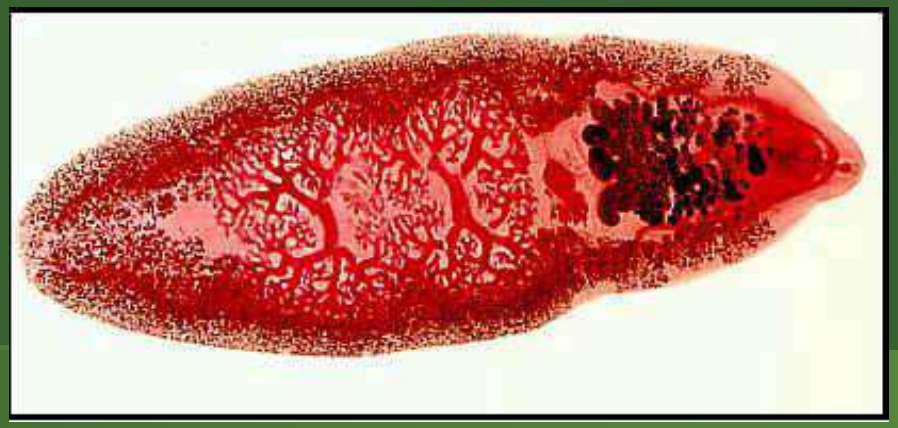
- Heterophyiasis
- Inflammation at the site of attachment
- Manifesations are consistent with peptic ulcer
  - Upper abdominal discomfort
  - Gurgling abdomen

Fasciolopsis Buski

Fasciolopsis buski

Fasciolopsis buski is prevalent in Southeast Asia and lives in humans and pigs' intestines, so it is also called Asia Giant Intestinal Fluke. The prevalence of fasciolopiasis is related to growing water plants and feeding pigs on water plants.

I. morphology



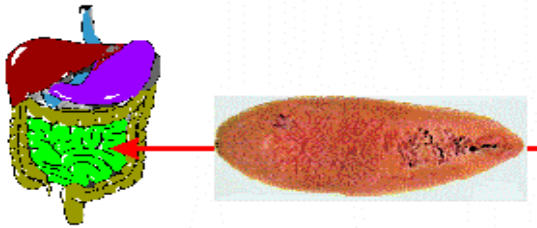
1. Adult: the body is long elliptic, flesh-colored, looks like a slice of raw meat. The size is about 20-75× 8-20 ×1-3mm, the largest one of human trematodes. The ventral sucker is near by the much smaller oral sucker. Two coral-liked testes are located in the posterior half of the body.

2. egg is oval in shape, slight yellow in color, 130-140×80-85μ(the largest helminth egg). The thinner shell with an operculum encloses an ovum and 20-40 yolk cells.

II. Life cycle

1. Site of inhabitation: small intestine
2. Infective stage: metacercaria
3. Infective mode: eating raw water plants with metacercariae
4. Medium of water plants: chestnut, water bamboo and caltrop
5. Intermediate hosts: Planorbis snail
6. Reservoir host: pig
7. Life span: 1-4 years

THE LIFE CYCLE OF *FASCIOLOPSIS BUSKI*



The adult, sexually mature parasite resides in the host's small intestine.

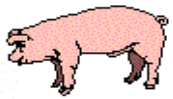
Eggs are passed in the host's feces.

The eggs hatch, producing a free-swimming miracidium.

The miracidium infects the first intermediate host, a snail.

The parasite reproduces asexually in the snail, producing cercariae.

The cercariae leave the snail and encyst on edible vegetation, producing metacercariae.



The metacercaria is ingested by the definitive host and "excysts" in the small intestine.

(Parasites and Parasitological Resources)

III. Pathology and Symptomatology

- Pathogenicity; *the disease called* ' Fasciolopsiasis' .
- due to Traumatic, Mechanical, and Toxic effects .

1. Enteritis due to the attachment of the adults manifests abdominal discomfort, nausea, vomiting and diarrhea.

2. Malnutrition results from the worms sharing food with the host and diarrhea . Manifests anemia, edema of leg and face even ascites.

Intestinal Flukes
Diagnosis
Pathogenesis and Clinical Manifestations

- Detection of eggs in the stool using Kato Katz method

- Care must be taken to distinguish them from *Clonorchis* and *Opistorchis* ova

Intestinal Flukes
Treatment
Pathogenesis and Clinical Manifestations

- Praziquantel
  - 25 mg/kg in 3 doses for 1 day

- Thanks