Parasitology Lab

Taenia solium

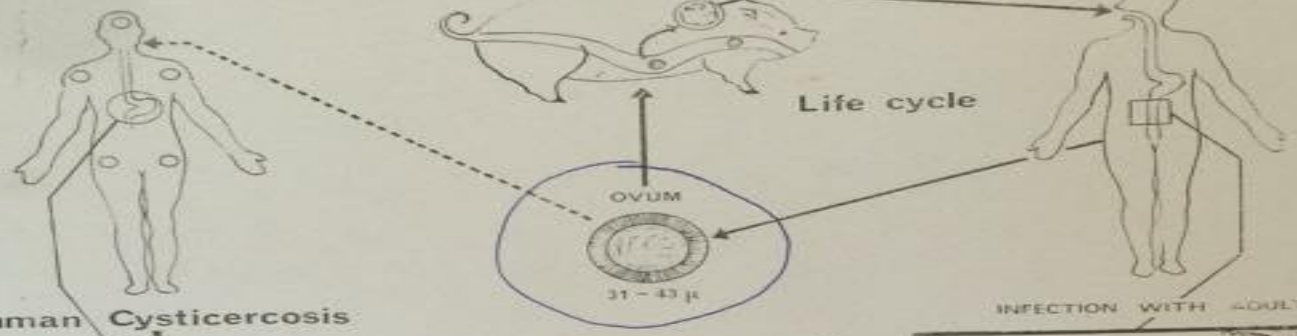
(The pork tape worm)

OCCASIONAL INTERMEDIATE HOST

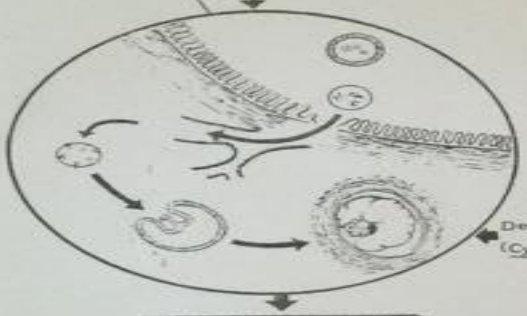
USUAL INTERMEDIATE HOST

Liberated embryo via blood stream to tissue especially muscle

DEFINITIVE HOST (AND RESERVOIR)



Human Cysticercosis

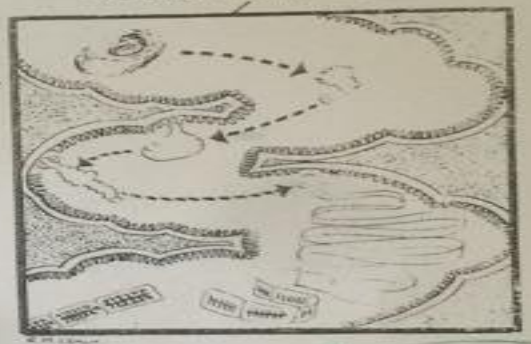


Development of cysticercus (Cysticercus cellulosae — 5 x 8 – 10 mm.)

Section of human brain showing viable larva of T. solium.

Cysticercus is liberated, scolex evaginates, attaches itself to mucosa of small intestine. Develops to adult. Maturation time 3 months. Life span up to 25 years.

INFECTION WITH ADULT



STROBILA

3 metres.
800 – 1000 segments.
4 suckers – 2 rows of large and small hooks 25 – 30.

PROGLOTTID

7 – 12 uterine branches on each side

Geographical distribution = World wide.

PATHOLOGY.

INFECTION WITH LARVAE (CYSTICERCOSIS)

Cysticerci may occur in any site, generally multiple, more frequent in brain and muscle

Excite reaction around especially when they die

- Inflammation
- Fibrosis
- Later sometimes calcification

Leading mainly to

- Focal CNS syndromes (eg epilepsy)
- Blood eosinophilia (10%)

INFECTION WITH ADULTS

Often none

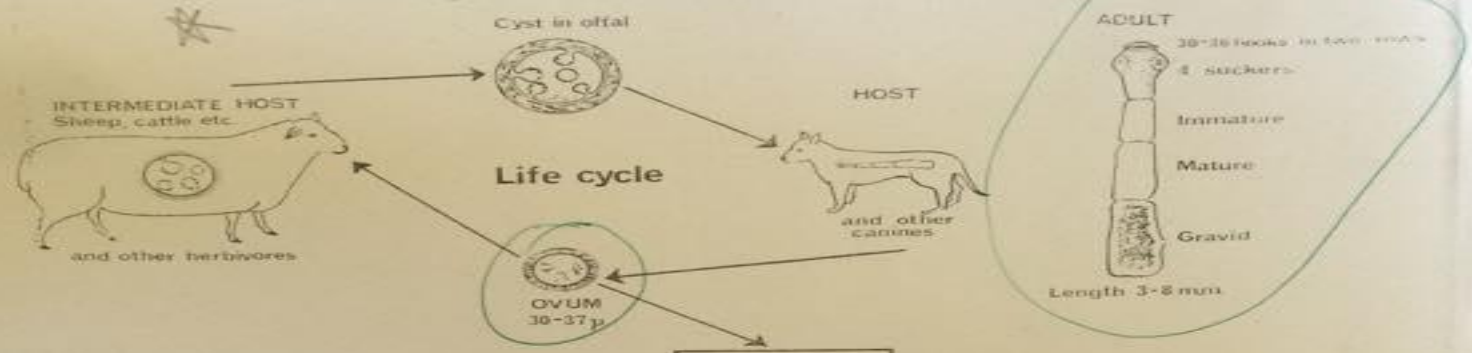
Mild irritation of intestinal mucosa

Eosinophilia up to 25%

Echinococcus granulosus

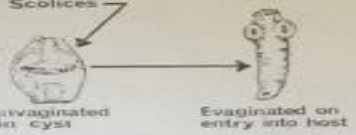
PLATE 18

(Causing Hydatid disease)

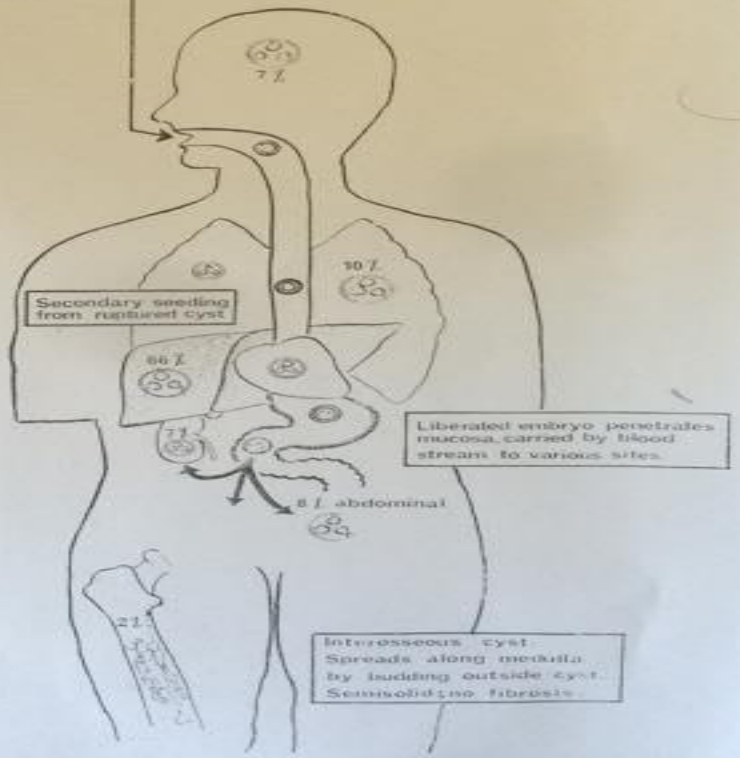


CYST FLUID
Salts
Enzymes
Toxins

HYDATID SAND
Remains of germinal epithelium
Brood capsules
Scolices



Contamination by food and fingers

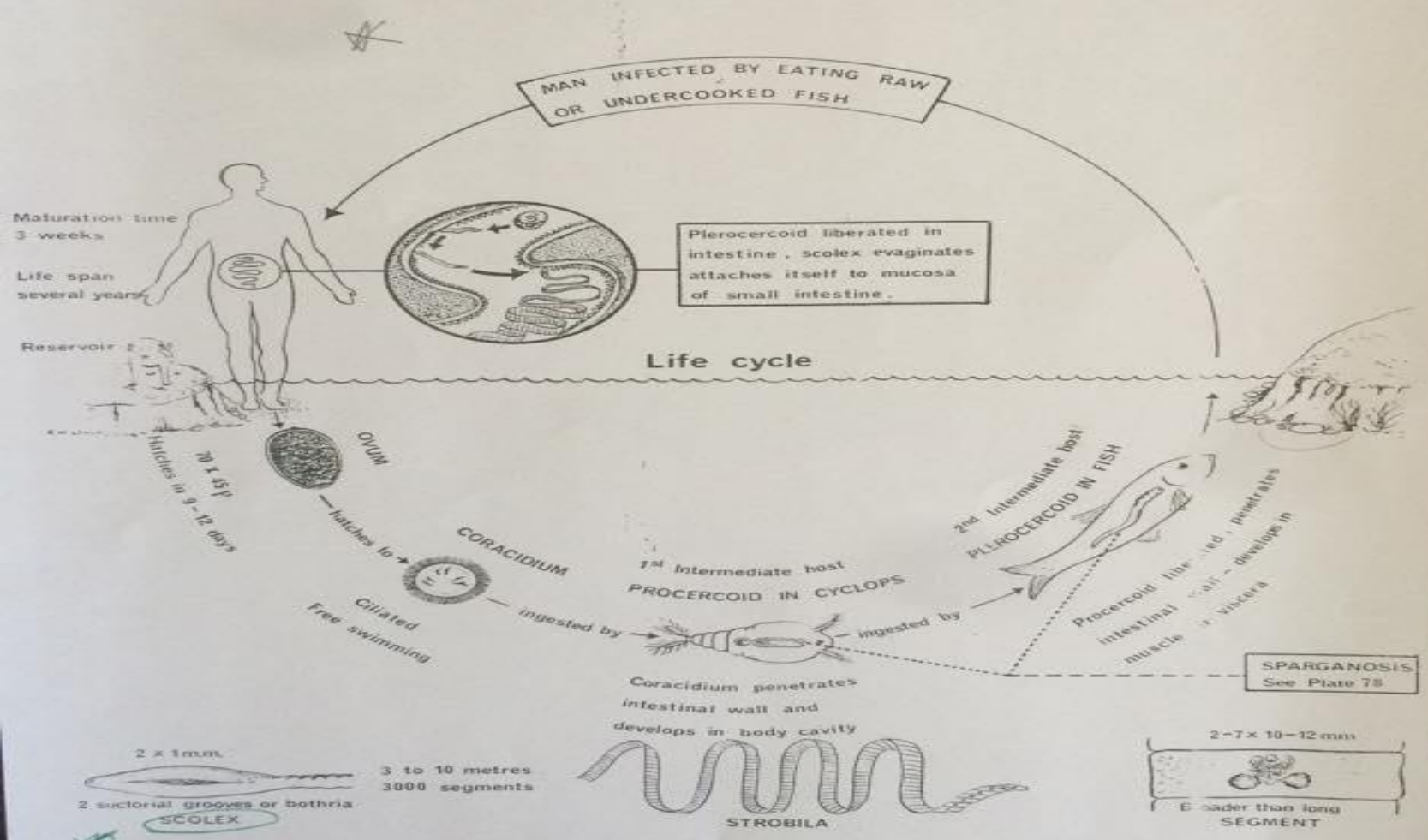


INTEROSSEOUS CYST

Geographical distribution

Dibothriocephalus latus

Syn. Diphyllobothrium latum (broad or fish tape worm).



Geographical distribution = Europe, Asia, Africa, America.

PATHOLOGY

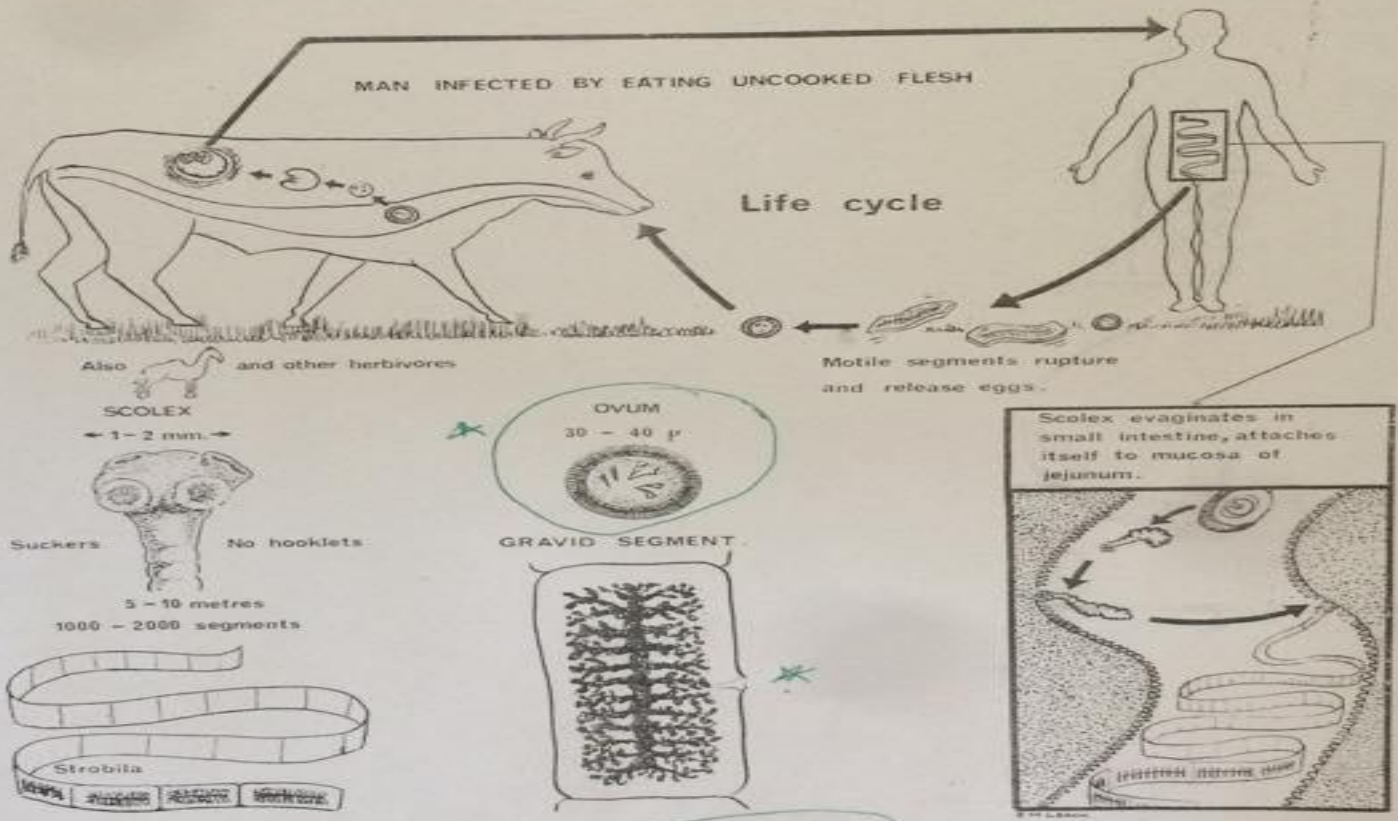
Generally none.

Occasionally macrocytic anaemia (absorption of B 12 by worm

PLATE I

Taenia saginata

(The beef tape worm)



Geographical distribution : world wide.

PATHOLOGY.

Usually none (*Cysticercus bovis* practically unknown in man.)

Occasionally vague alimentary upset.

Eosinophilia up to 10 %.

LABORATORY DIAGNOSIS.

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(The pork tape worm)

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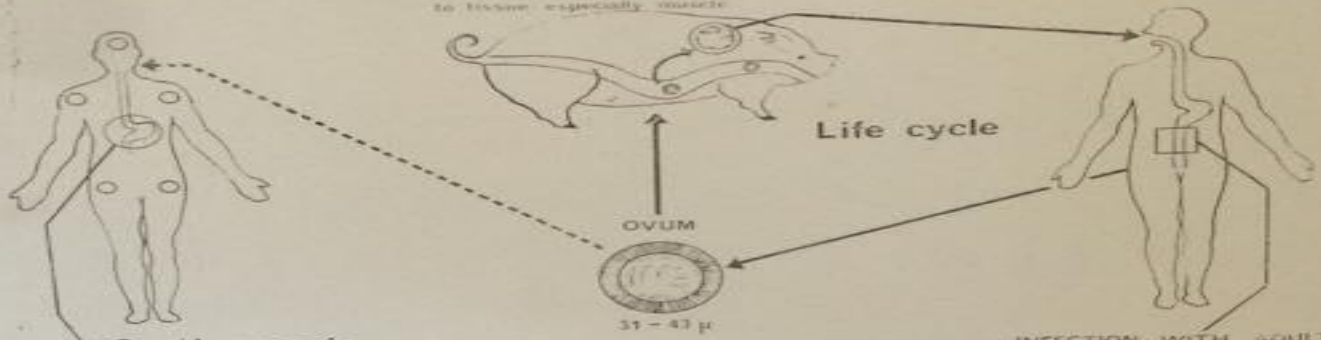

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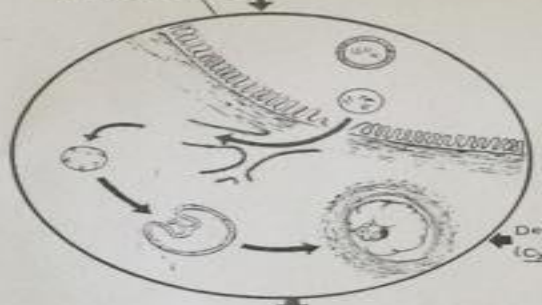

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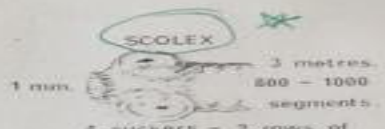

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INFECTION WITH ADULTS

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Eosinophilia up to 25%

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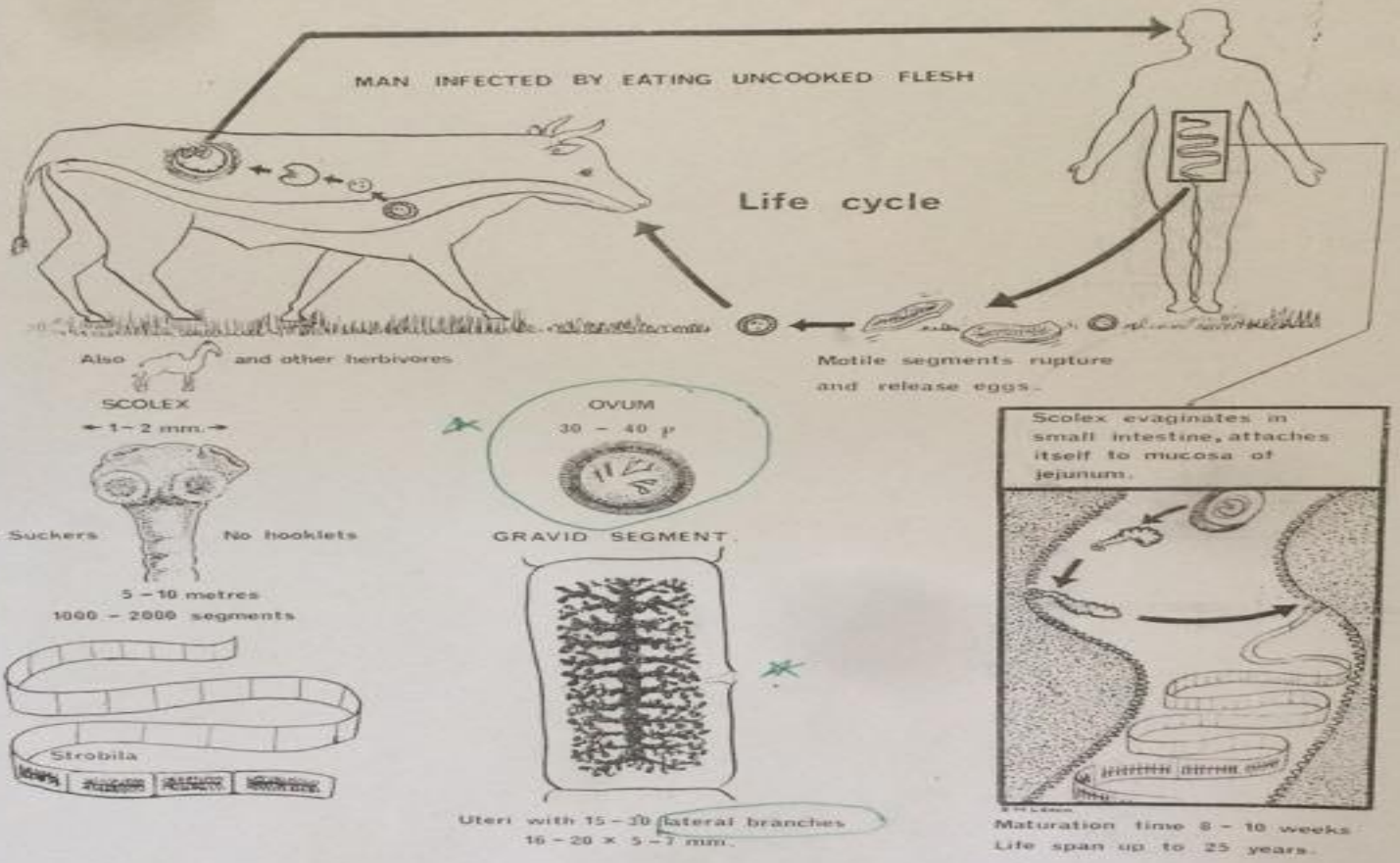
(The beef tape worm)



Geographical distribution = world wide.

PATHOLOGY.

Usually none (Cysticercus bovis practically unknown in man.)

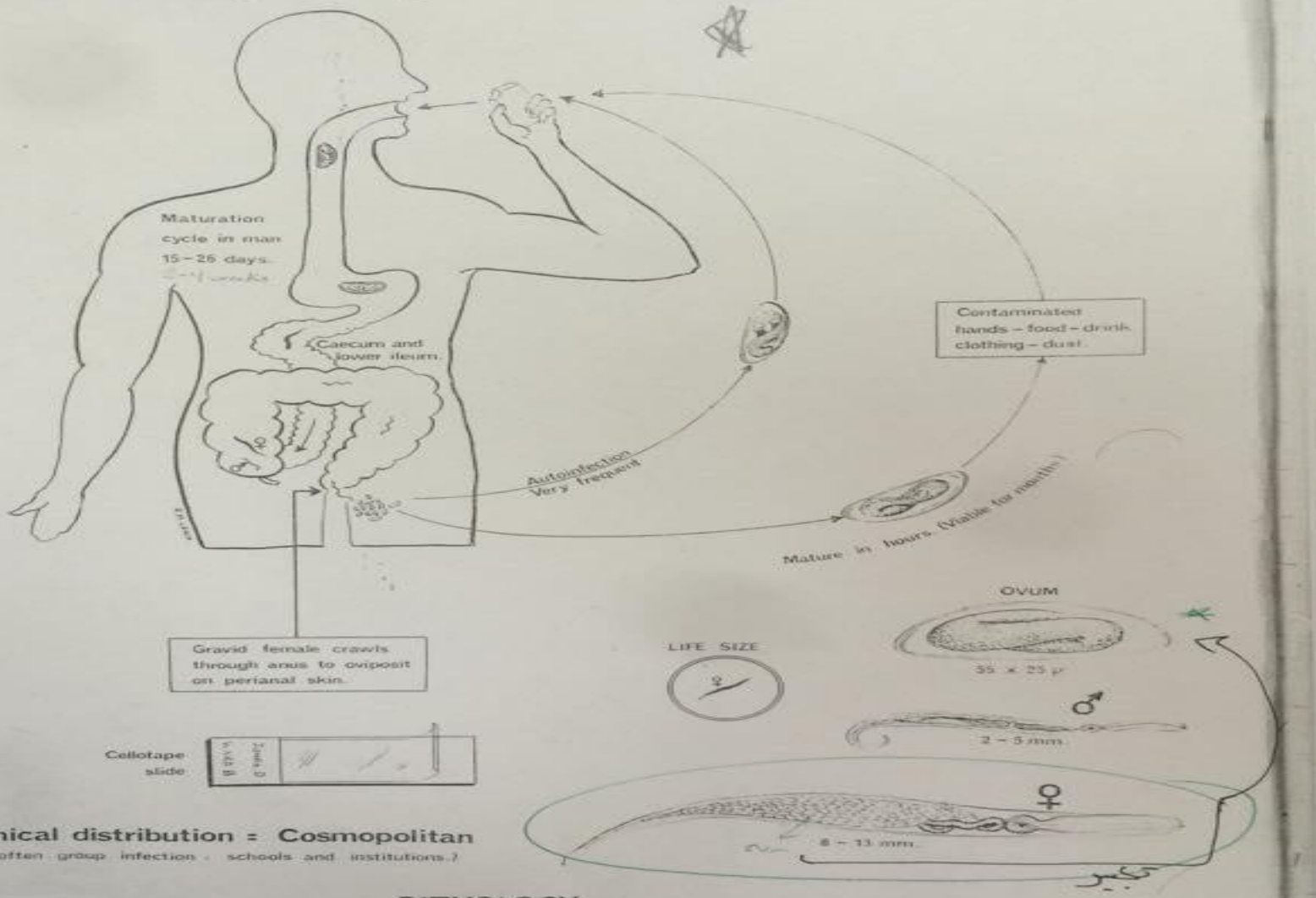
Occasionally vague alimentary upset.

Eosinophilia up to 10 %.

LABORATORY DIAGNOSIS.

Enterobius vermicularis. (Thread, pin or seat worm)

Syn. Oxyuris vermicularis.



eographical distribution = Cosmopolitan

(often group infection : schools and institutions.)

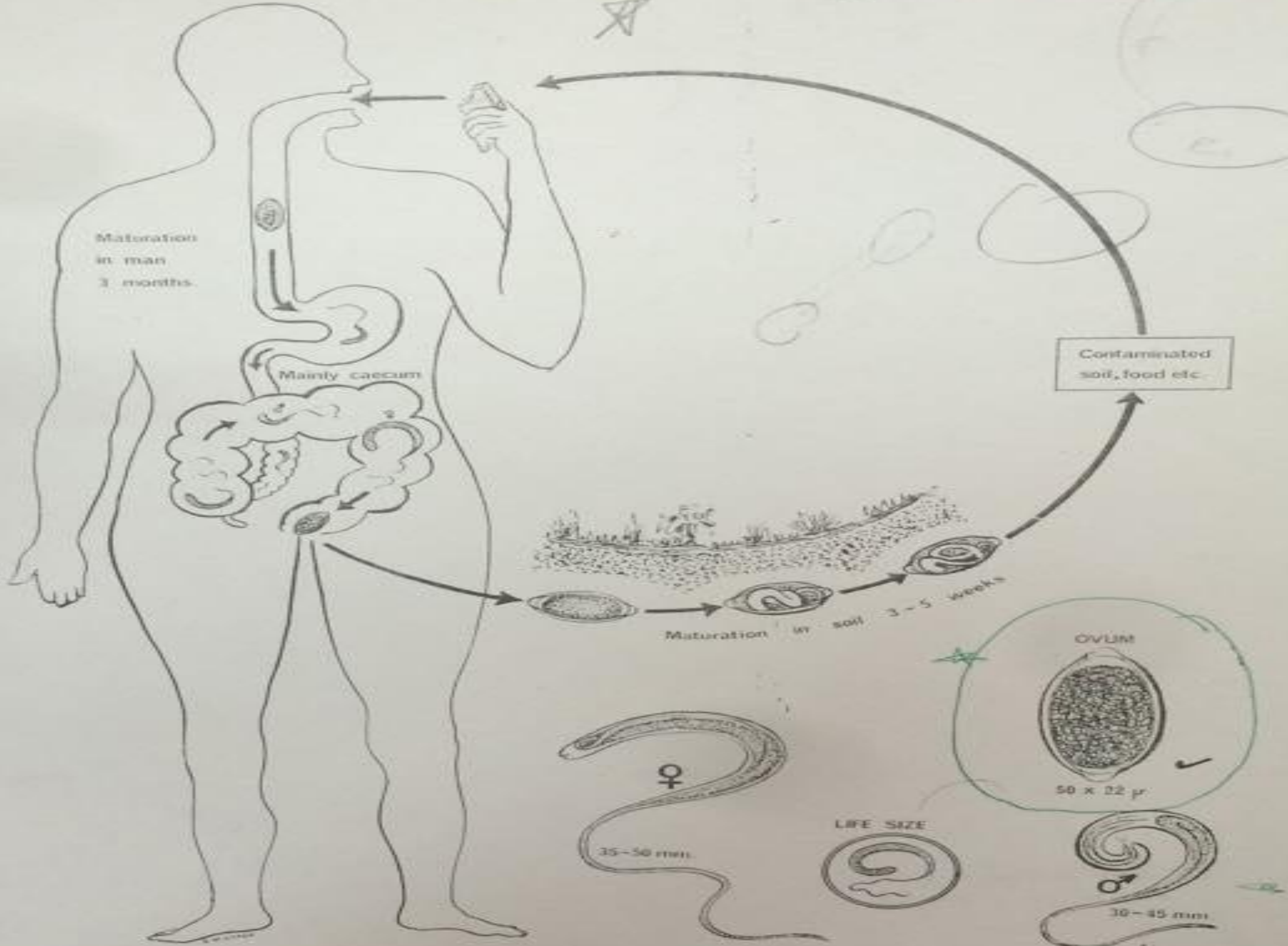
PATHOLOGY

1. Pruritus ani and vulvae
2. Occasionally associated with obstructive appendicitis
3. Eosinophilia up to 10 %

LABORATORY DIAGNOSIS

Syn. Trichocephalus trichiura.

Trichuris trichiura -



Geographical distribution : Cosmopolitan

PATHOLOGY

1. Generally none.
2. Very heavy infection – local inflammation – abdominal discomfort – diarrhoea – eosinophilia up to 25 %.

LABORATORY DIAGNOSIS

Balantidium coli ✓

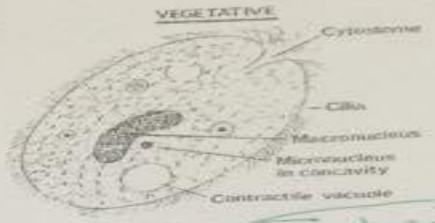
(Causing balantidiasis)

PLATE 69

Classification

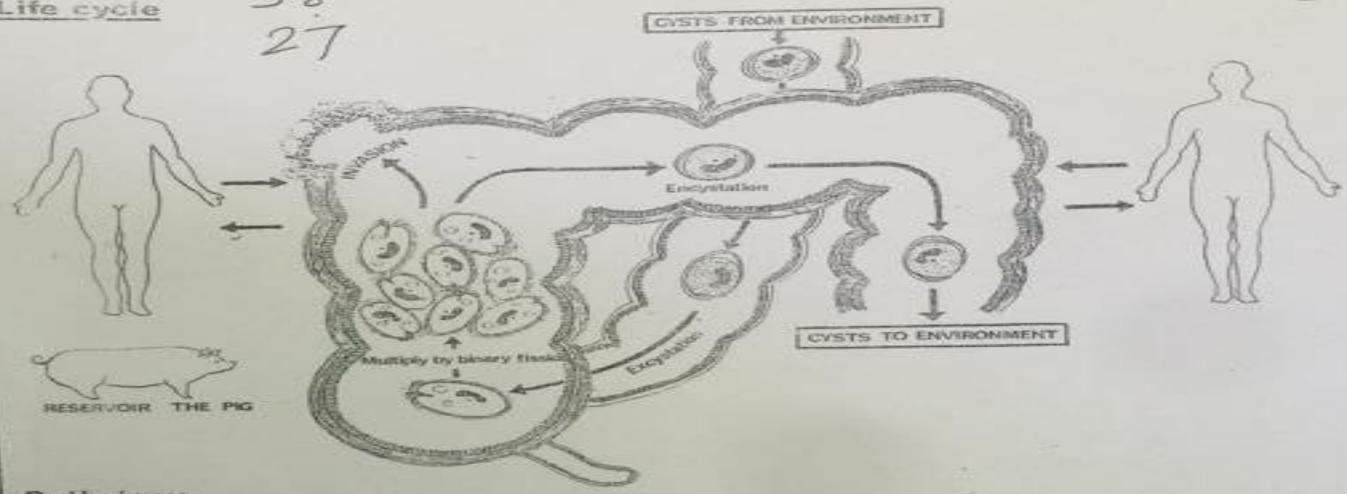
Class PROTOZOA → **Ciliata**
Move by cilia
Generally have mouth (cytosome)
Oesophagus and anal opening

Genus **Balantidium**
Ovoid
Coarse cilia
Contractile vacuoles
Horseshoe or kidney shaped macronucleus
Reproduce by binary fission



Trophozoite

Life cycle



Pathology

INVADE like E. histolytica by { MOTILITY / CYTOLYTIC FERMENT

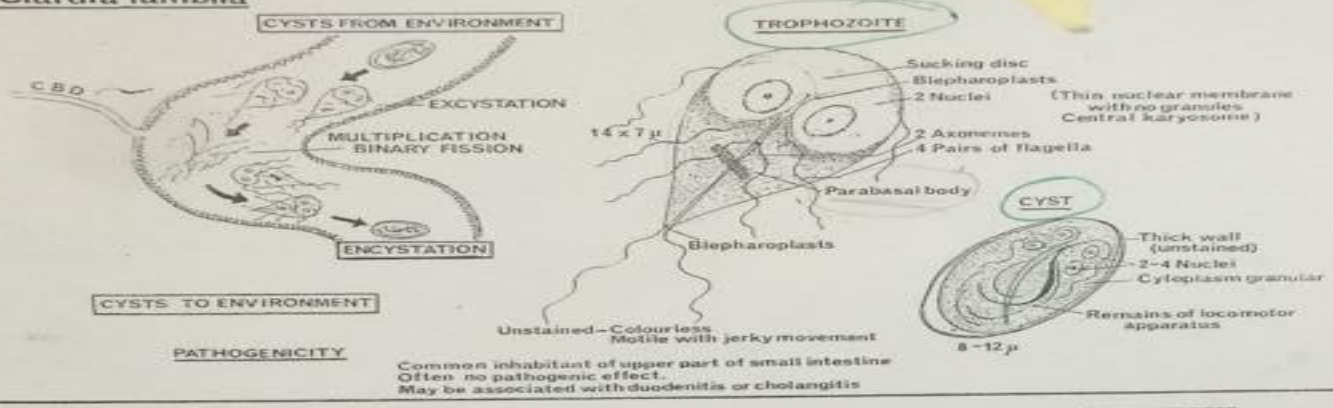
ULCERS wider–mouthed than in amoebic dysentery
SECONDARY INFECTION frequent so cellular infiltration around
LOCALISED to intestine
NO extra-intestinal spread
COMPLICATIONS –perforation

Laboratory diagnosis

Trophozoites in diarrhoea
Cysts in semi-formed and formed stools

The Intestinal Flagellates

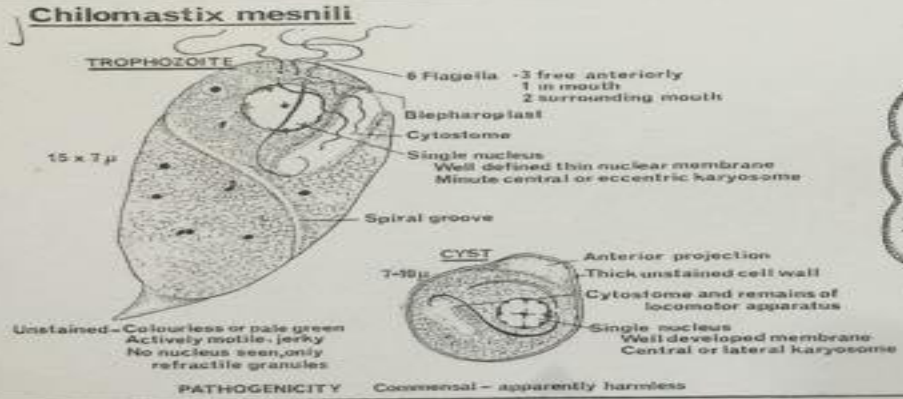
Giardia lamblia

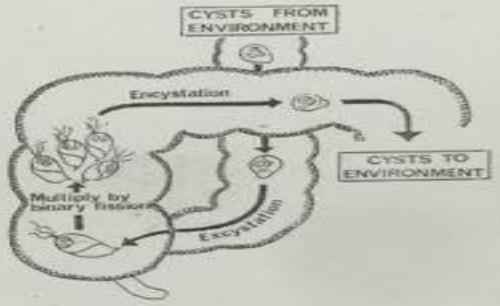


PATHOGENICITY

Common inhabitant of upper part of small intestine
Often no pathogenic effect.
May be associated with duodenitis or cholangitis

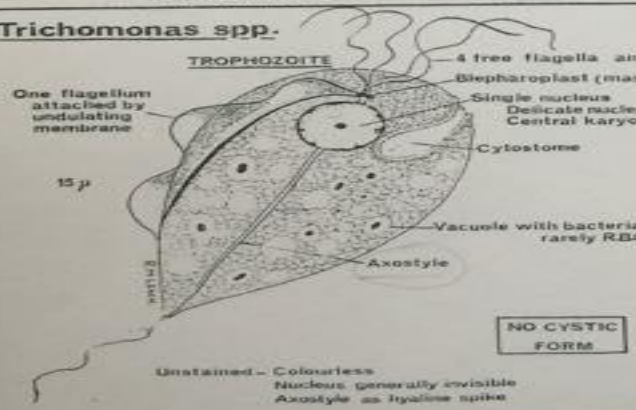
Chilomastix mesnili





PATHOGENICITY Commensal – apparently harmless

Trichomonas spp.



T. hominis (As illustrated)

TROPHOZOITES FROM DAMP ENVIRONMENT

HABITAT Small and large intestine

TROPHOZOITES TO ENVIRONMENT

PATHOGENICITY Found in diarrhoea but no proof that it is pathogenic

T. vaginalis

Morphologically as T. hominis but no free posterior flagellum beyond undulating membrane
Marked parabasal body

HABITAT Urethra in ♂
Vagina in ♀

PATHOGENICITY Possible cause of non-specific urethritis and vaginitis

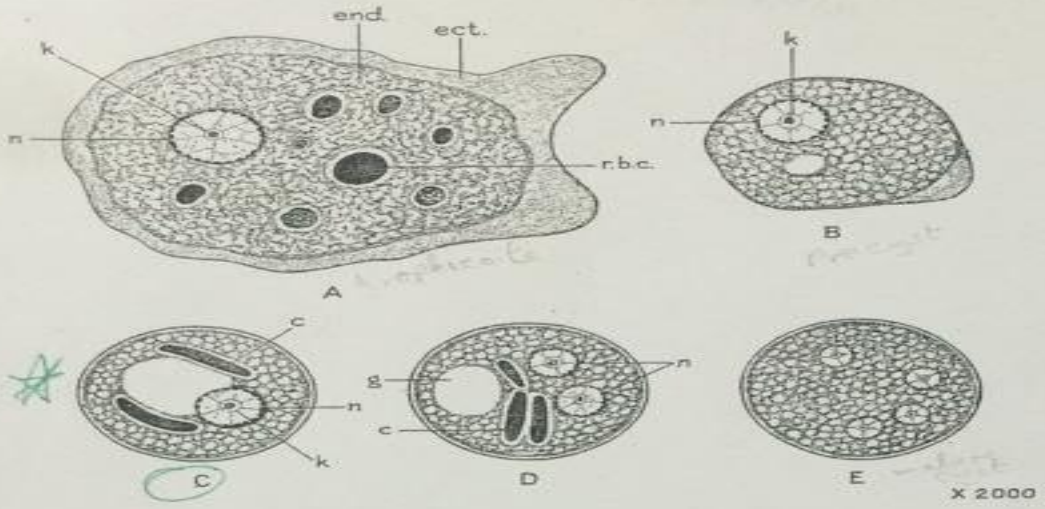


Figure 3–2. Schematic representation of *Entamoeba histolytica*. **A.** Trophozoite containing red blood cells undergoing digestion. **B.** Precystic ameba devoid of cytoplasmic inclusions. **C.** Young uninucleate cyst. **D.** Binucleate cyst. **E.** Mature quadrinucleate cyst. c = chromatoid bodies; ect. = ectoplasm; end. = endoplasm; g = glycogen vacuole; k = karyosome; n = nucleus; r.b.c. = red blood cells.

Pseudopodial action is sluggish, and there is no progressive movement.

The cysts (Fig. 3–2; see also Fig. 17–6) are round or oval, slightly asymmetrical hyaline bodies, 10 to 20 μ in diameter, with a smooth, refractile, nonstaining wall about 0.5 μ thick. The cytoplasm of the young cysts contains vacuoles with glycogen and dark-staining, refractive, sausage-shaped bars with rounded ends. These chromatoid bodies, which are reported to contain ribonucleic and deoxyribonucleic acid and phosphates, tend to disappear as the cyst matures, so that they may be absent in about half of the cysts. Both types of cytoplasmic inclusions are believed to represent stored food. The immature cyst has a single nucleus, about one third of its diameter, while the mature infective cyst contains four smaller nuclei, rarely more. Thus, cysts containing from one to four nuclei may be passed in the feces. *E. hartmanni*, morphologically identical with *E. histolytica* and previously called the small race ameba (cysts 5 to 8 μ and trophozoites 6 to 10 μ), are nonpathogenic.

The habitat of *E. histolytica* trophozoites is the wall and lumen of the colon, especially in the cecal and sigmoidorectal regions. They multiply by binary fission, the nucleus dividing by a modified mitosis. Reproduction also takes place via cyst formation, since eight amebulae are produced by the metacystic amebas after excystation (Fig. 3–3). Encystment is essential for transmission, since only the mature cyst is infectious. *E. histolytica* has traditionally been considered an anaerobe because it grows best under reduced oxygen tension. Yet, the parasite readily consumes oxygen when it is provided even though it has no mitochondria, cytochromes, or functional tricarbox-

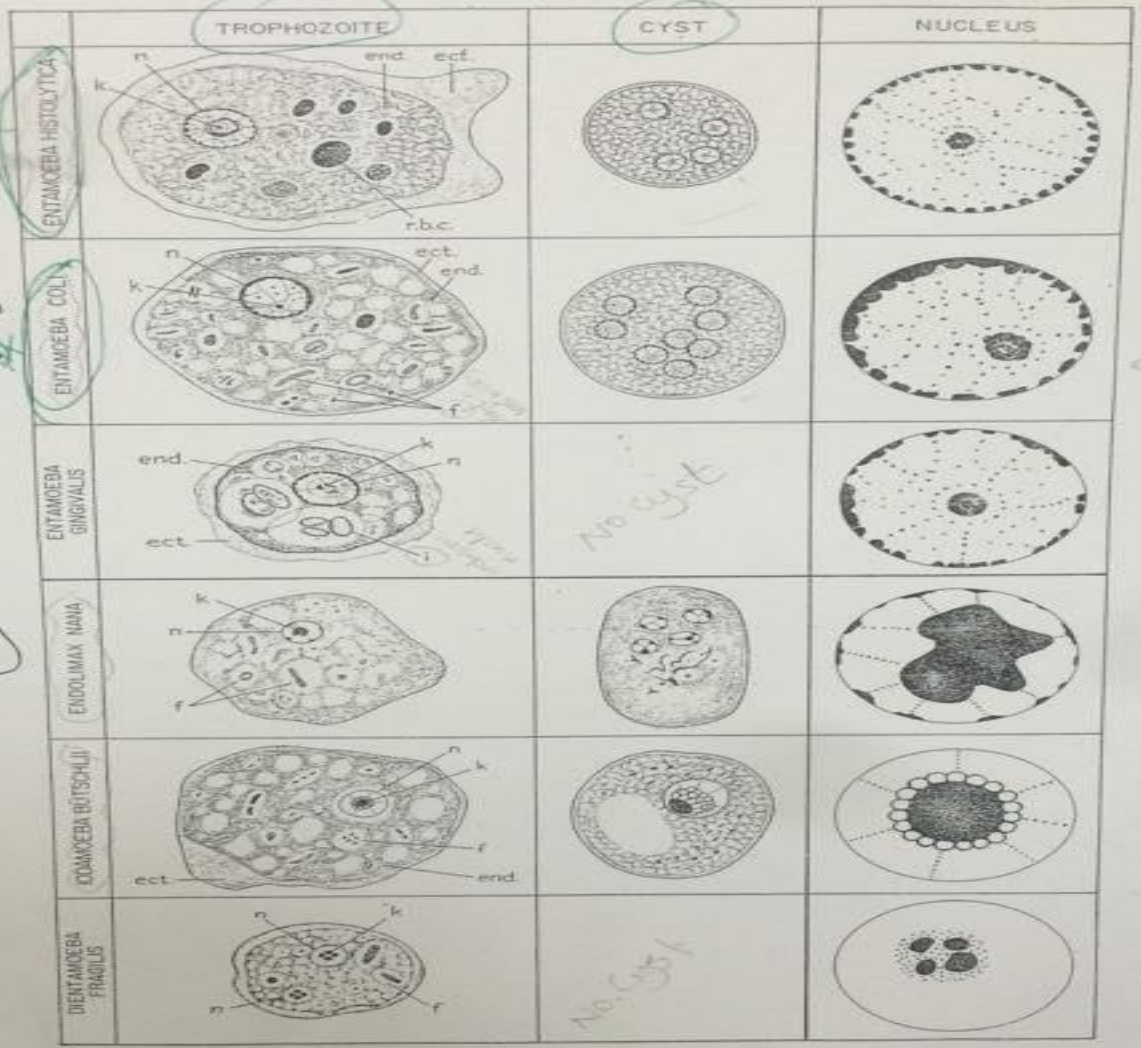


Figure 3–1. Comparative morphology of the amebas of man and schematic representation of their nuclei. Trophozoites and cysts of *Entamoeba histolytica, E. coli,* and *E. gingivalis* and of *Endolimax nana, Iodamoeba bütschlii,* and *Dientamoeba fragilis.* ect. = ectoplasm; end. = endoplasm; f = food vacuoles; i = inclusion nuclei; k = karyosome; n = nucleus; r.b.c. = red blood cells.

Trematoda (cont.)

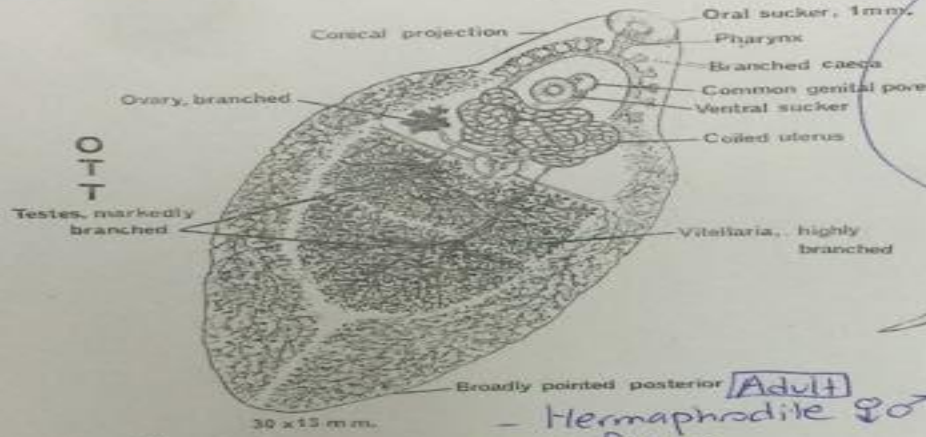
FAMILY **FASCIOLIDAE**

Fasciola hepatica

(The sheep liver fluke)

MORPHOLOGY

ADULT



Adult
- Hermaphrodite ♀♂
- leaf-like

Life cycle
Pathology
Occurrence
} See plate 24.

OVUM

130 – 150 x 63 – 90 μ.

CERCARIA

ENCYSTED METACERCARIA

Fasciola gigantica

(The giant liver fluke)

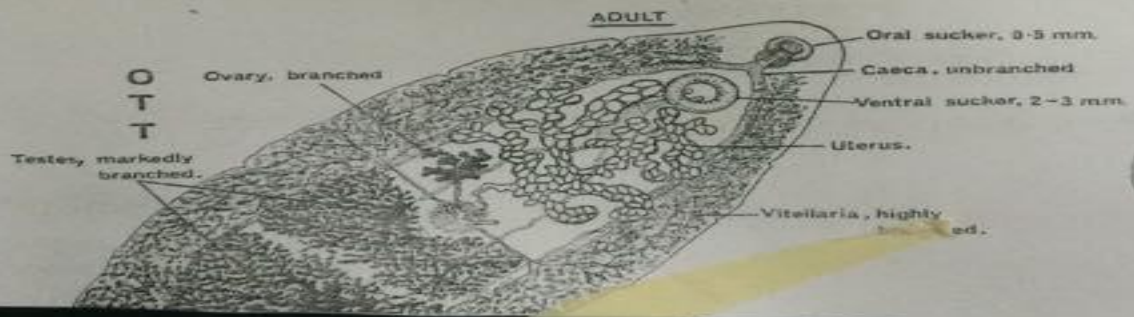
Similar to F. hepatica somewhat larger eggs. 160 – 190 x 70 – 90 μ.

Occurrence In herbivores in Africa and Far East.
Occasionally described in man.

Fasciolopsis buski

(The large intestinal fluke)

ADULT



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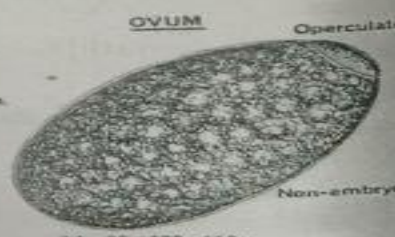
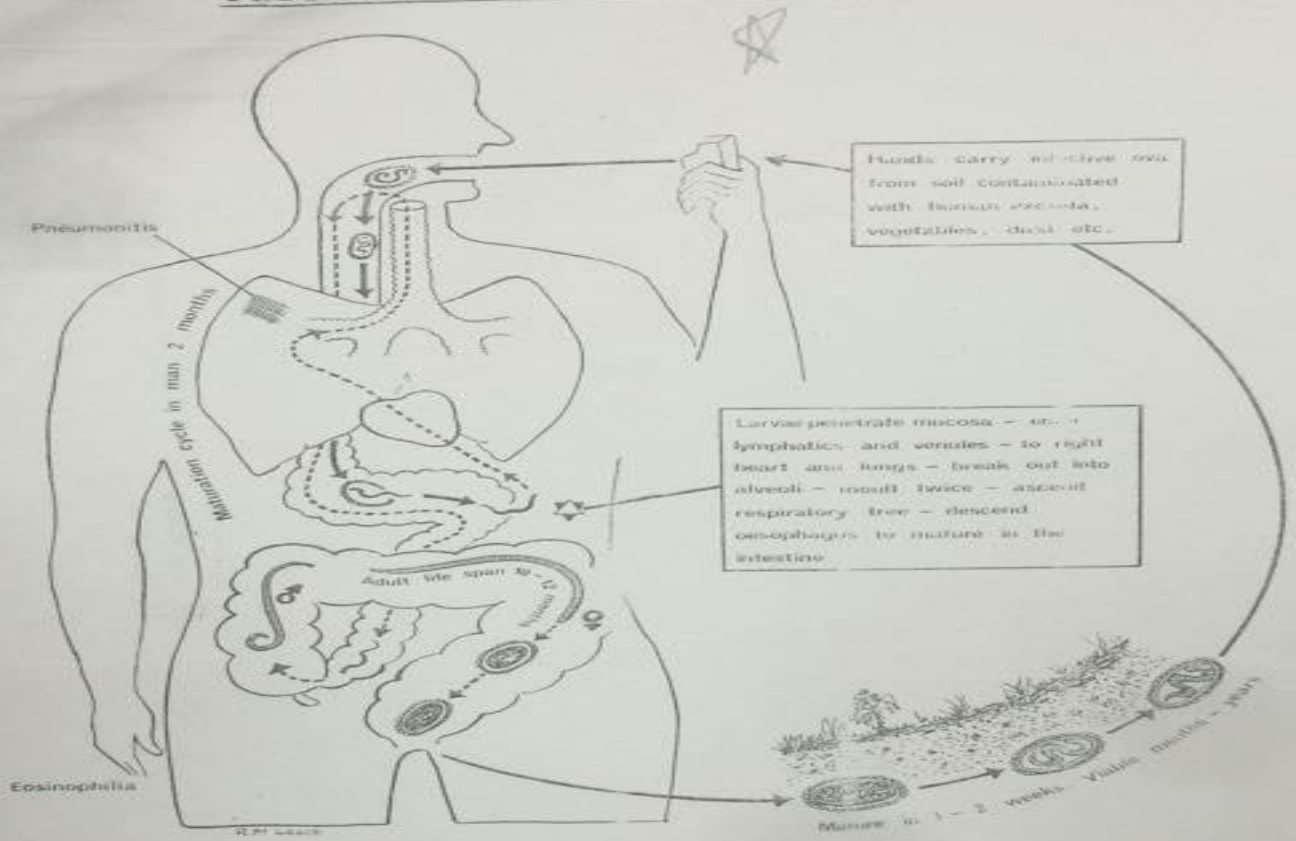


80 – 85 x 130 – 140 μ.

Ascaris lumbricoides (The round worm)



OVA


Normal form
60 × 45 μ


Decorticated


Embryonated


Unfertilised


Head of adult to show arrangement of the three lips

Geographical distribution = World wide.

ADULTS

♂ 150 – 200 × 2 – 4 mm.

♀ 200 – 350 × 3 – 6 mm.

PATHOLOGY

LARVAE Allergy, eosinophilia and pneumonitis. Occasionally ectopic larvae in other organs with local inflammation and necrosis.

ADULTS Obstruction of intestine, bile ducts and trachea have been reported.

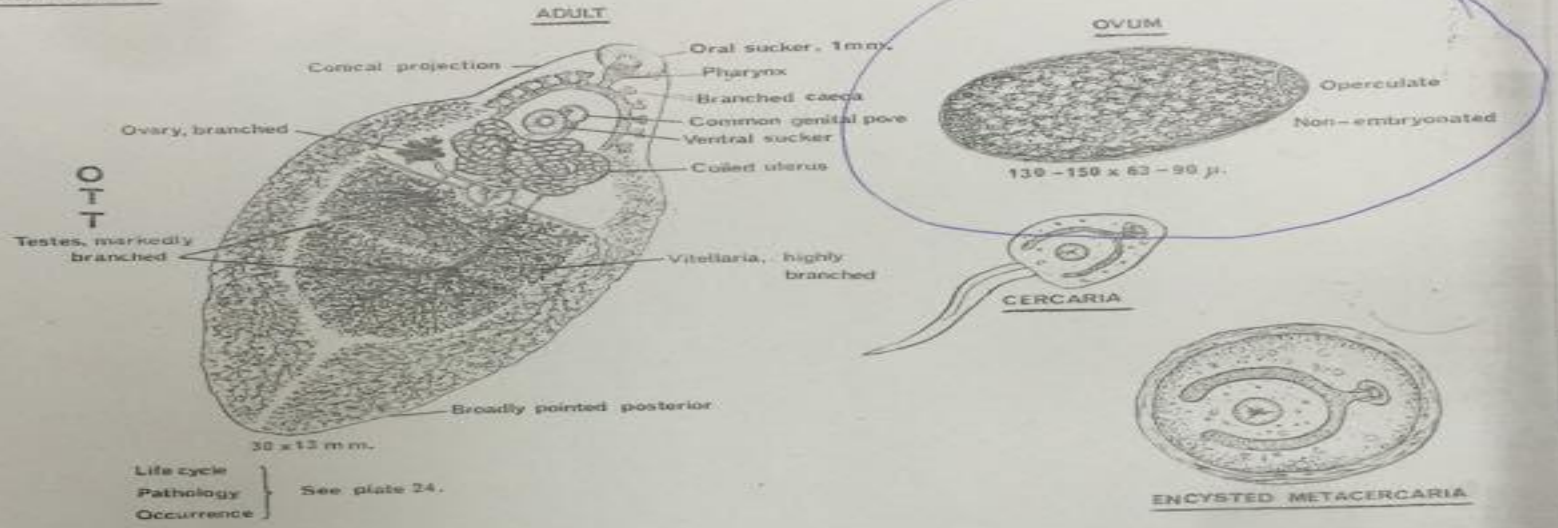
Trematoda (cont.)

FAMILY **FASCIOLIDAE**

Fasciola hepatica

(The sheep liver fluke)

MORPHOLOGY



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