

**Parasitic Helminths
and
Arthropod Agents
and Vectors of
Diseases**

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Parasitic Helminths and Arthropod Agents and Vectors of Diseases

Objectives:

By the end of this lecture the student should be able to :

- Name the three main groups of parasitic helminths and their characteristic morphological features .
- Describe the life cycle of **Ascaris lumbricoides** as an example of parasitic helminths .
- Discuss the role of arthropods as agents and as vectors of diseases in humans.
- Give examples of the main arthropod vectors of diseases.

Classification of Parasites

Protozoa	Helminthes
<p>Unicellular Single cell for all function</p>	<p>Mulicellular Specialized cells</p>
<p>Amoebae: move by pseudopodia.</p> <p>Flagellates: move by flagella.</p> <p>Ciliates : move by cilia</p> <p>Apicomplexia (sporozoa) Tissue parasites</p>	<p>A- <u>Round worms</u> = Nematodes cylindrical, un-segmented(Ascaris)</p> <p>B- <u>Flat worms</u></p> <p>1-Trematodes: leaf-like, un-segmented.</p> <p>2-Cestodes: tape-like, segmented</p>

Location of helminthes in the body:

- Intestinal helminthes:
- Tissue helminthes:

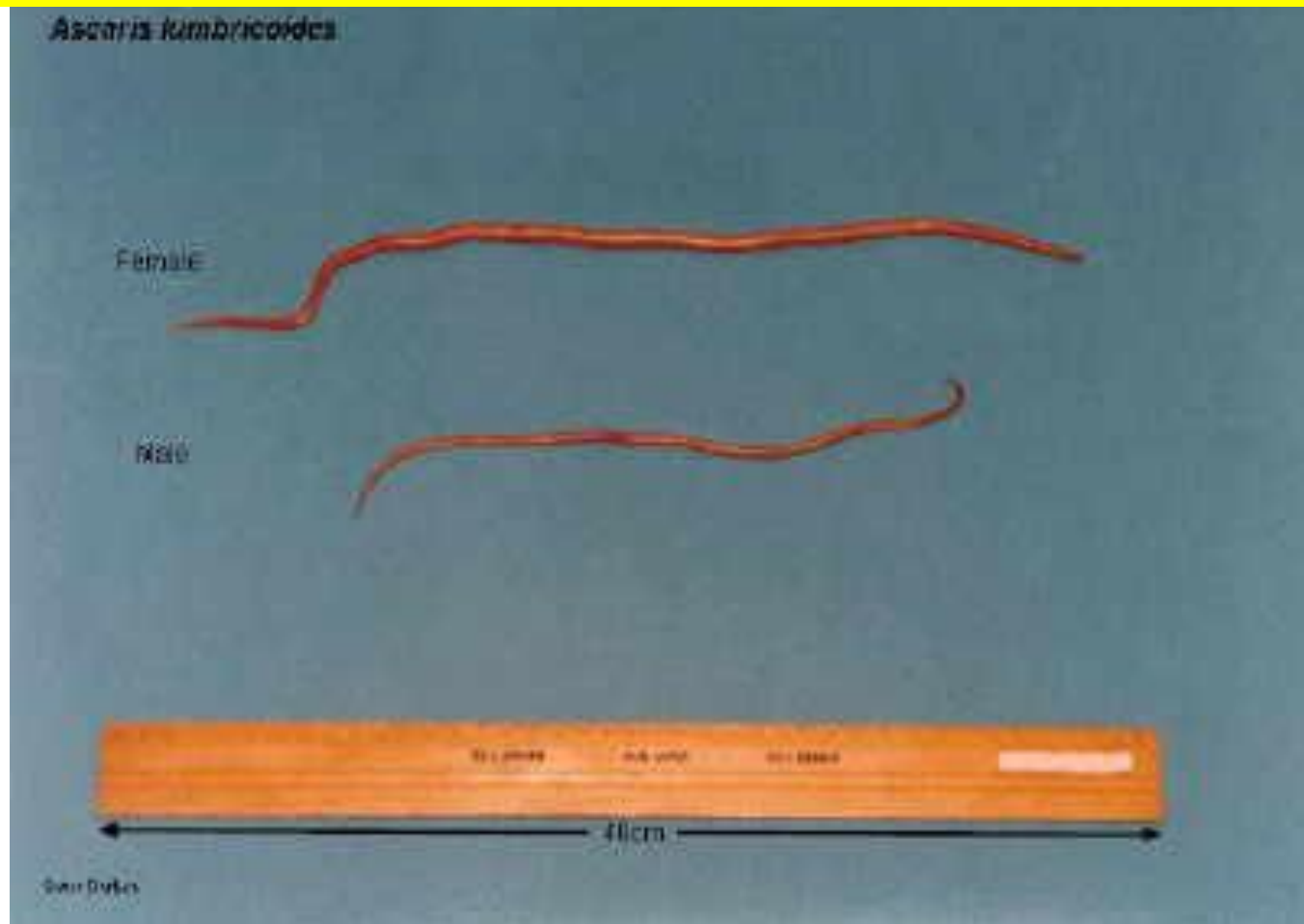
Nematodes (round worm) intestinal Nematode

General features

- 1. Elongated worm, cylindrical, unsegmented and tapering at both ends.**
- 2. Variable in size, measure <1 cm to about 100cm.**
- 3. Sex separate and male is smaller than female**



Ascaris lumbricoides (roundworm)



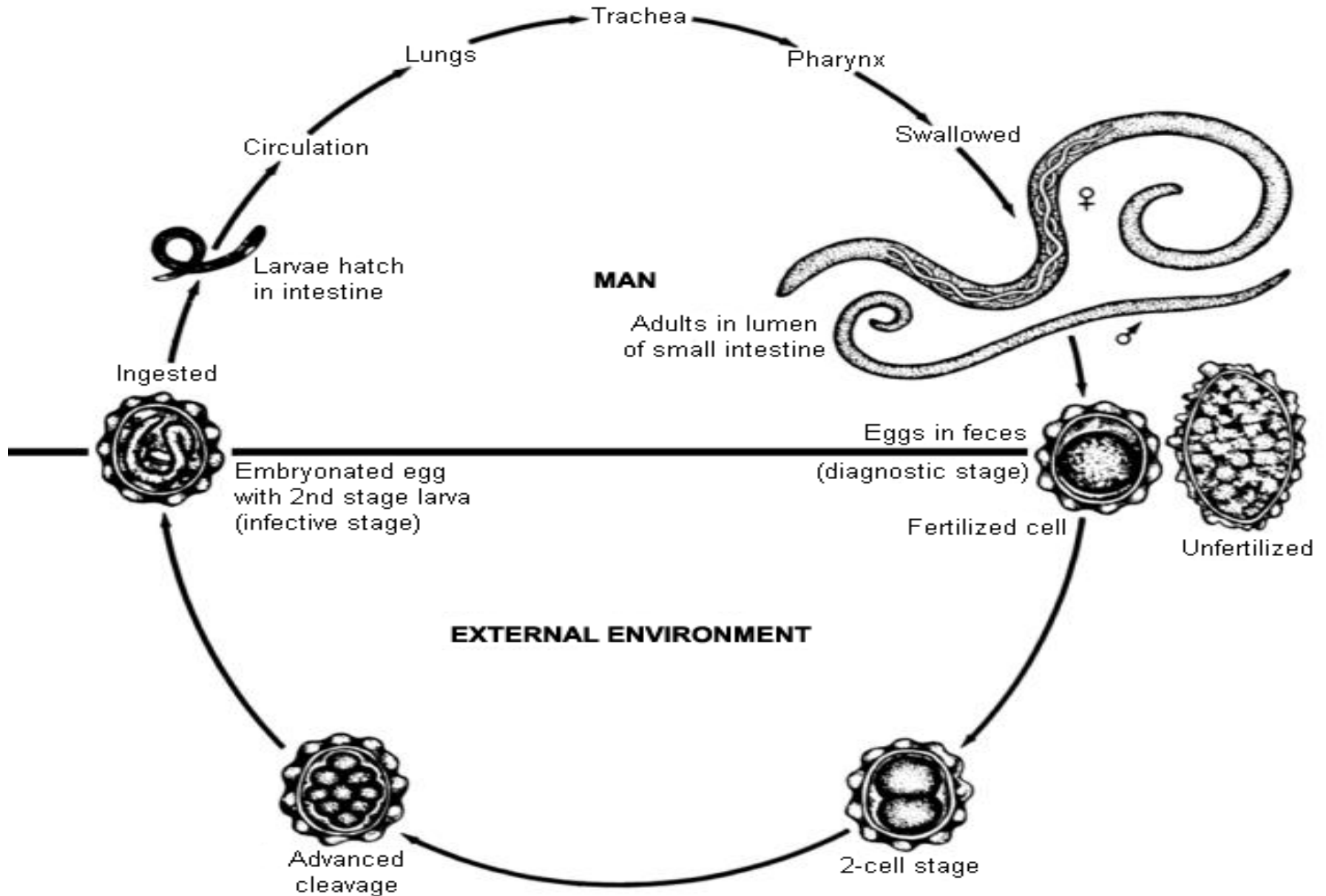
Ascaris lumbricoides (roundworm)

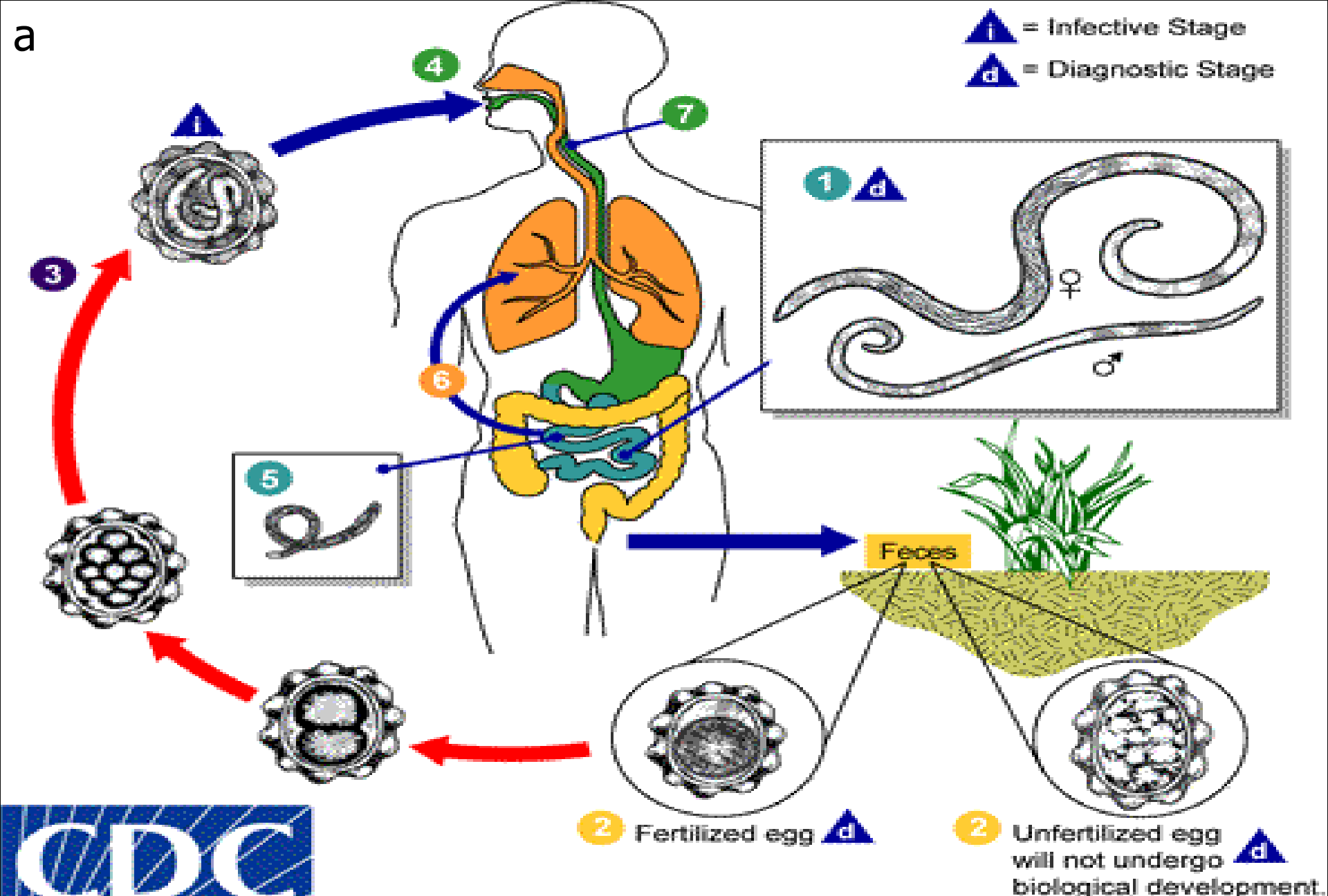
The commonest intestinal helminthes can cause infection to human.

- Found in **jejunum** and upper part of **ileum**.
- Female (**20-40 cm**) which is longer than male (**10-15 cm**) .
- Feed on semi digested food.



Ascaris lumbricoides life cycle





Life cycle of Ascais Lumbricoides

Infection starts when man ingest an **Embryonated egg** contaminated with food or water, then this **embryonated egg** become a **Larva** in the duodenum, and penetrate the wall of the **duodenum** , enter the blood stream to the heart , liver and enter the **pulmonary circulation** and stay in the **alveoli** ,where it grow for three weeks then **Larva** passes from respiratory system to be **coughed up** ,swallowed ,returned back to the small intestine where it mature to adults male &female ,fertilization take place producing eggs which pass in stool as **Fertilized eggs** or **unfertilized eggs** ,only **fertilized eggs** can be survive in the soil for 2 weeks to become an **Embryonated egg** ready to infect human with contaminated food.

Pathogenicity

■ 1-Migrating LARVA :

- *Ascaris pneumonia* , some times LARVA reach aberrant sites like brain ,heart or spinal cord can cause unusual disturbance.

■ 2-Adult WORM:

- *The worm consumes proteins and vitamins from host's diet and leads to malnutrition.*
- *Can cause intussusception, intestinal ulcers and in massive infection can cause intestinal obstruction.*

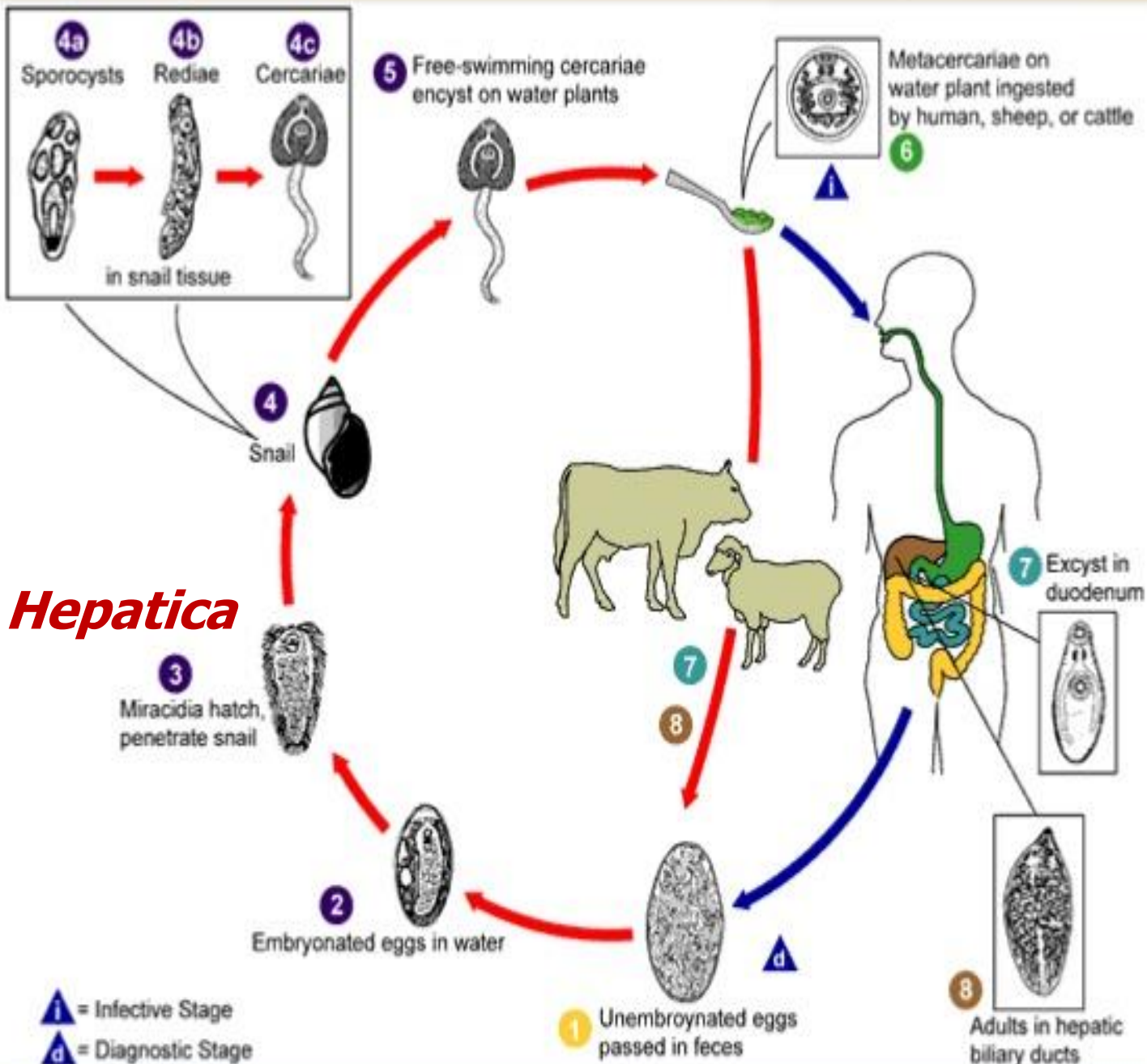


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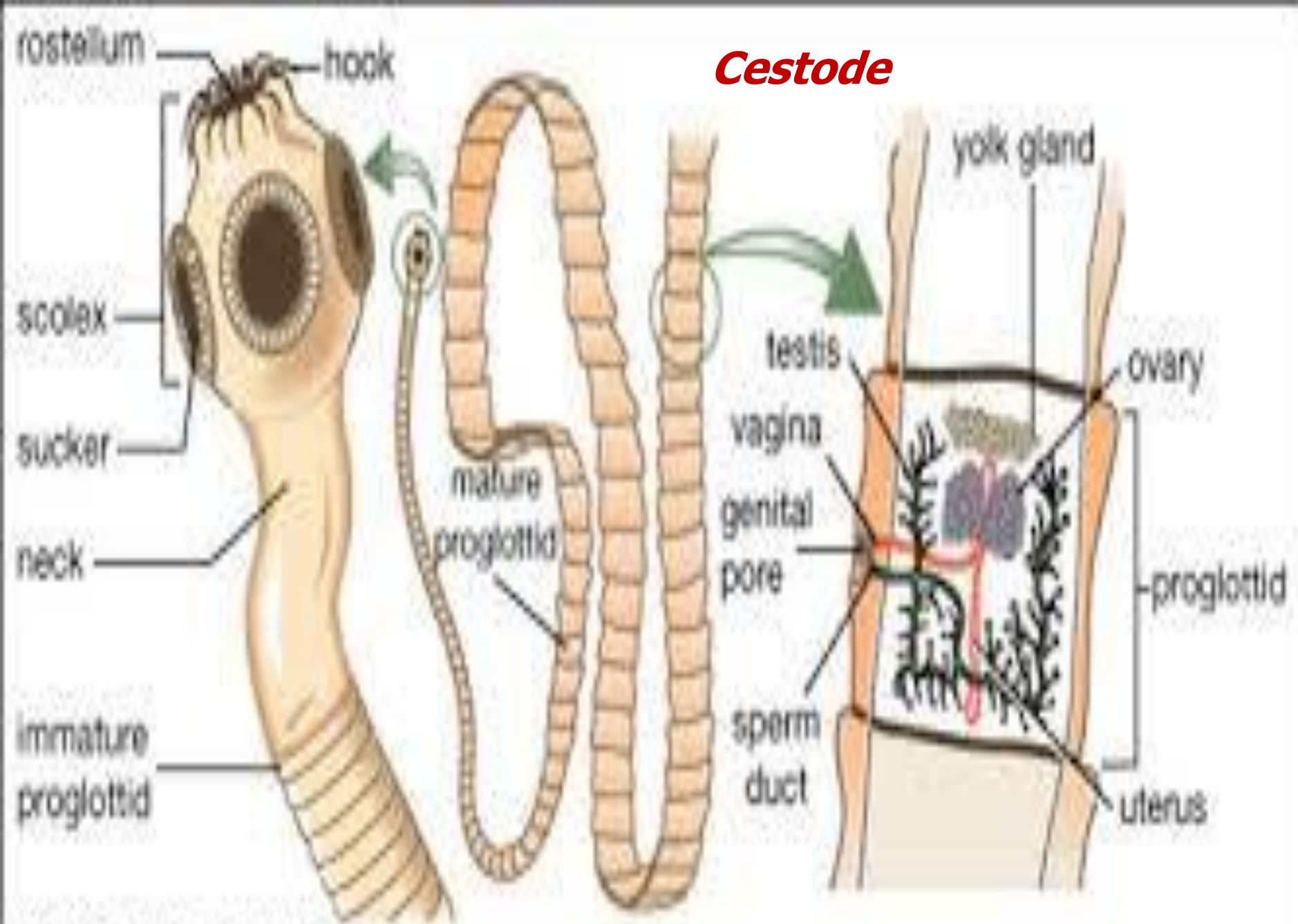
The Trematodes flat worm , un-segmented ,leaf like fasciola hepatica, causing Biliary Obstruction and Jaundice .

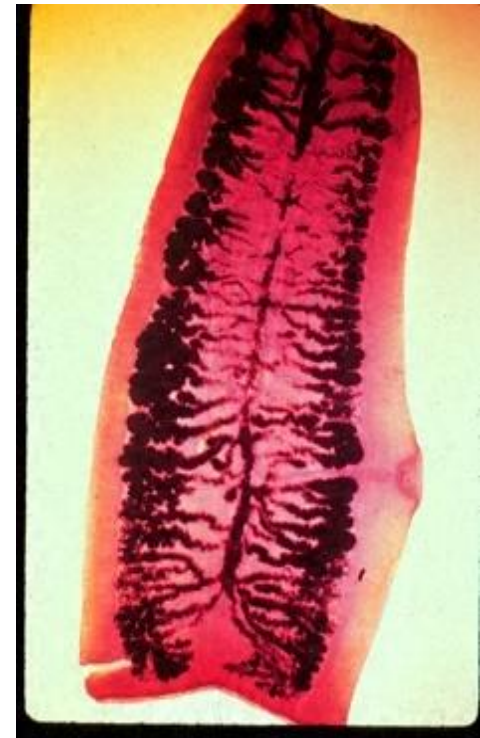
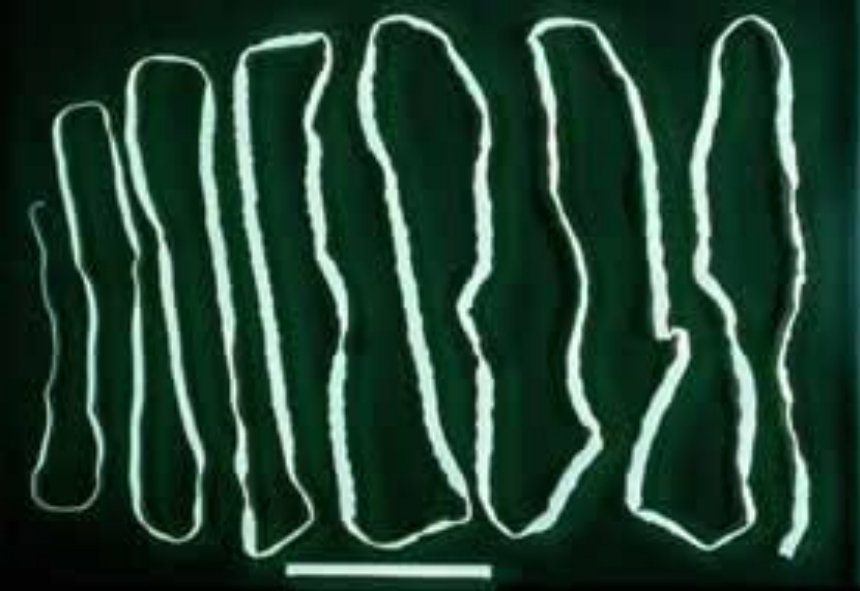


Fasciola Hepatica

i = Infective Stage
d = Diagnostic Stage

Cestode





***Taenia saginata* Ex of a Cestode, Tapelike worm segmented. GIT discomfort, diarrhea and vomiting.**



MEDICAL IMPORTANCE OF ARTHROPODS

- 1) As aetiologic agents (causes) of diseases.
 - Tissue damage **Scabies**
 - Induction of hypersensitivity reactions.
 - Injection of poisons **Scorpions العقرب.**
 - Entomophobia (acarophobia)
- 2) As vectors of diseases:
 - I: Mechanical transmission - simple carriage of pathogens. **flies**
 - II: Biological transmission:
 - cyclical **filarial parasite**
 - propagative **e,g;plaque bacillie in rat fleas**
 - cyclopropagative **e,g;Malaria in mosquito**
 - III: Transovarian transmission **as rickettsis carried within ticks.**

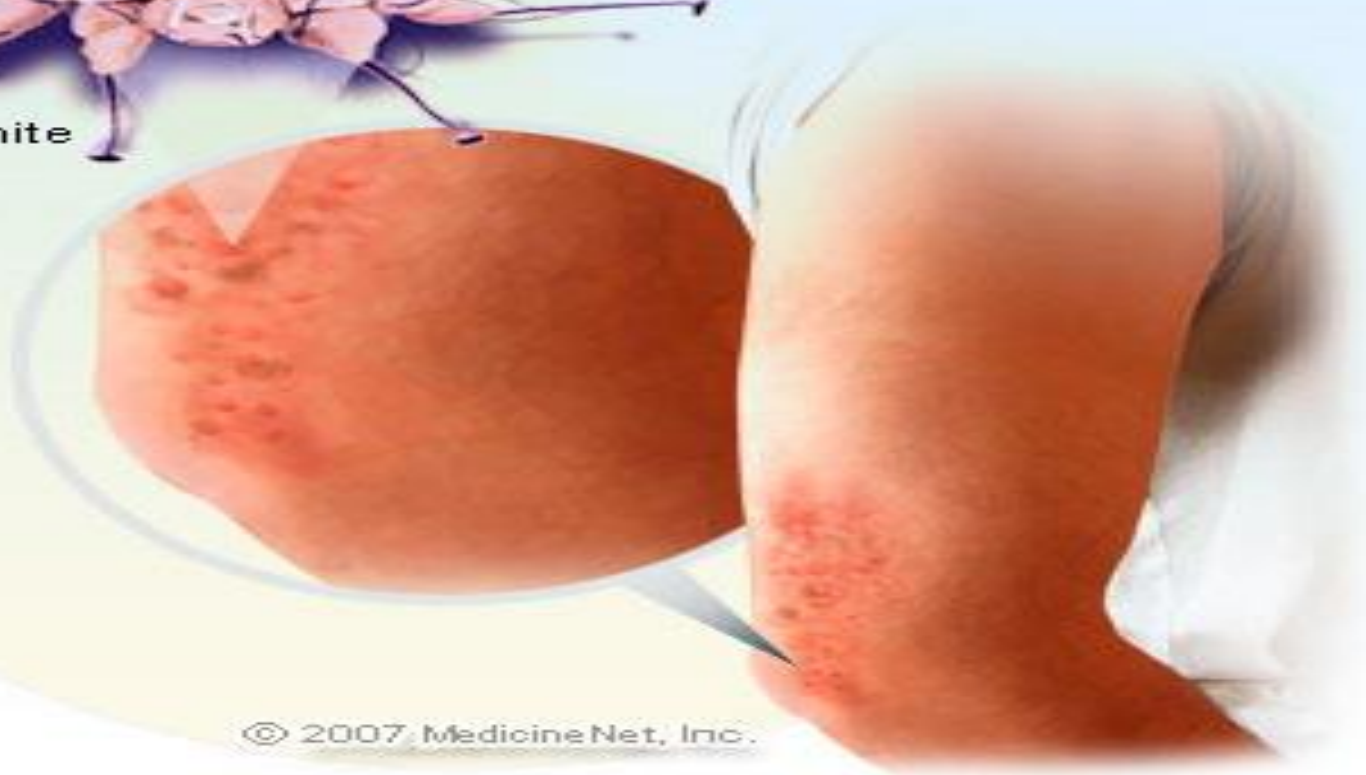
**Scabies as tissue damage example of
Arthropod As aetiologic agents (causes) of
diseases.**



Scabies



Scabies mite



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Scabies

الجرب

ARTHROPODS OF MEDICAL IMPORTANCE

Class <i>Insecta</i> الحشرات	Class <i>Arachnida</i> العناكب	Class القشريات <i>Crustacea</i>
<ul style="list-style-type: none"> ● Muscid flies: housefly, Tsetse fly ● Myiasis-producing flies . ● Mosquitoes البعوض: <i>Anopheles, Aedes Culex</i> ● Sandfly ذباب الرمل (<i>Phlebotomus</i>) ● Black fly (<i>Simulium</i>) ● Fleas البراغيث ● Lice (<i>Pediculus, Phthirus</i>) القمل ● Bugs: <i>Cimex, Triatoma</i> البق ● Bees النحل 	<ul style="list-style-type: none"> ● Scorpions العقارب ● Spiders العناكب ● Ticks: القراد hard, soft ● Mites السوس -<i>Sarcoptes scabiei</i>, -dust mites 	<ul style="list-style-type: none"> ● Water flea (<i>Cyclops</i>)

Important arthropod vectors for human diseases

House fly (<i>Musca domestica</i>)	Mechanical transmission of many viruses, bacteria and parasites.
Mosquitoes البعوض	Anopheles : malaria filariasis Culex: filariasis, viruses Aedes: yellow fever, dengue fever, Rift Valley Fever
Lice القمل	Body louse: vector for: Relapsing fever, typhus and trench fever.
Fleas البراغيث	Rat flea is vector for plague due to Yersinia pestis.
Ticks القراد	Soft ticks , some are vectors for : Borrelia burgdorferi Hard ticks Include vectors for Babesiosis (protozoa), Q fever, and Rocky mountain spotted fever :
Tse tse fly (<i>Glossina</i>) ذبابة التسي	Vector for African Trypanosomiasis (African sleeping sickness)
Black fly (<i>Simulium</i>) /ذبابة السوداء	Vector for Onchocerca (river blindness)
Sand fly (<i>Phlebotomus</i>) ذبابة الرمل	Vectors for leishmania .
Cyclops	Vector for Dracunculus medinensis

LICE القمل

Louse(singular) , Lice (pleural)

Pediculus humanus



Head louse

Louse eggs (nits)



sand fly transmit *Leishmania*

