Lecture 13

Parasitic Helminths and Arthropod Agents and Vectors of Diseases

-Important -In boy's slides -Extra -Notes -In girl's slides

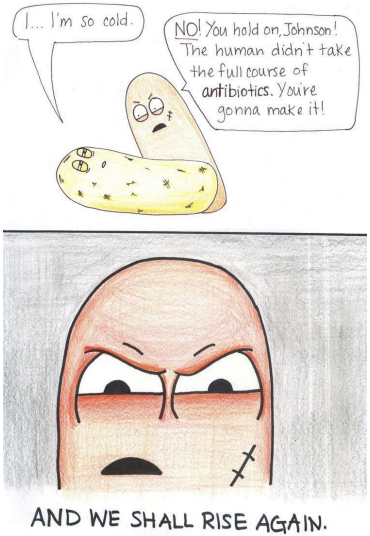
In this link, you will find any correction or notes unmentioned in the team's work. Please check the link below Frequently.
https://docs.google.com/document/d/1WvdeC1atp7J-ZKWOUSukSLsEcosjZ0AqV4z2VcH2TA0/edit?usp=sharing

Reviewed by Razan AlRabah & Khalid Alkhani

MICROBIOLOGY TEAM 438

Objectives:

- ★ Name 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
- **Unicellular** Single cell for all functions	- **Multicellular** Specialized cells
- **Amoebae:** Move by pseudopodia. - **Flagellates:** Move by flagella. - **Ciliates:** Move by cilia. - **Apicomplexia:** (sporozoa) Tissue parasites	**A) Round Worms = Nematodes** - Cylindrical - Unsegmented (Ascaris) **B) Flat Worms** **1) Trematodes:** Leaf-like, unsegmented. **2) Cestodes:** Tape-like, segmented.

Location of Helminthes in The Body

It's only in the tissues NOT the blood

Tissue Helminthes

Intestinal Helminthes

Nematodes (roundworm) Intestinal Nematode

General Features

- Elongated worm, cylindrical, unsegmented, and tapering at both ends. → Pointed at the ends
- Variable in size, measure **<1 cm - 100cm**
- Sex seperate and male is smaller than female → There is a primary host

Example: Ascaris Lumbricoides (roundworm)

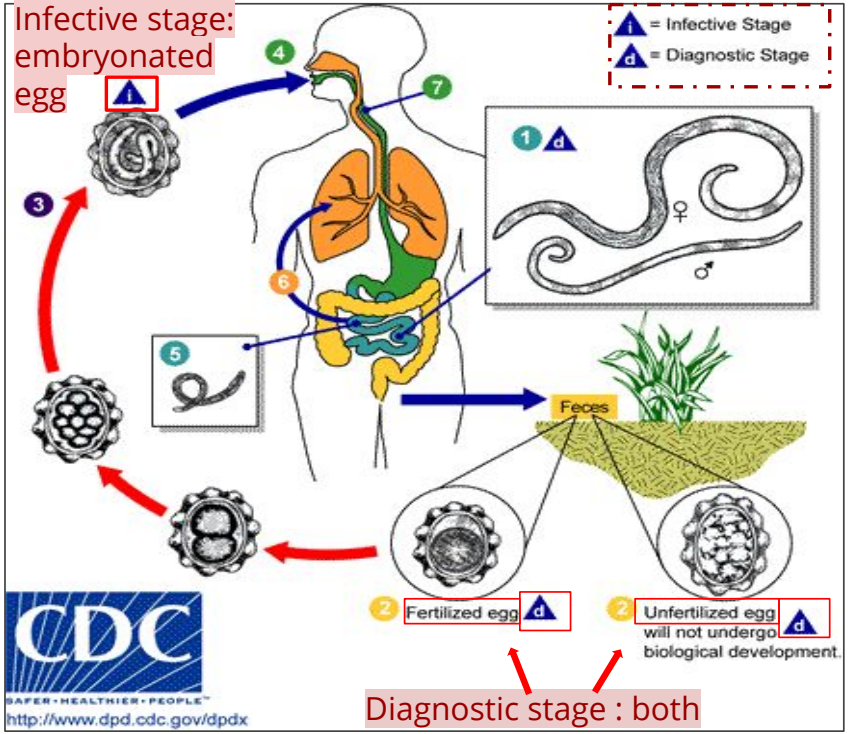
- Most common intestinal helminthes, can cause infection to humans.
- Found in **jejunum** and upper part of **ileum**.
- Female **(20-40 cm)** Male **(10-15 cm)**
- Feed on semi-digested food.
  - Causes malnutrition(the food is not digested yet which means that the body has not absorbed the nutrients)

Ascaris Lumbricoides Life Cycle

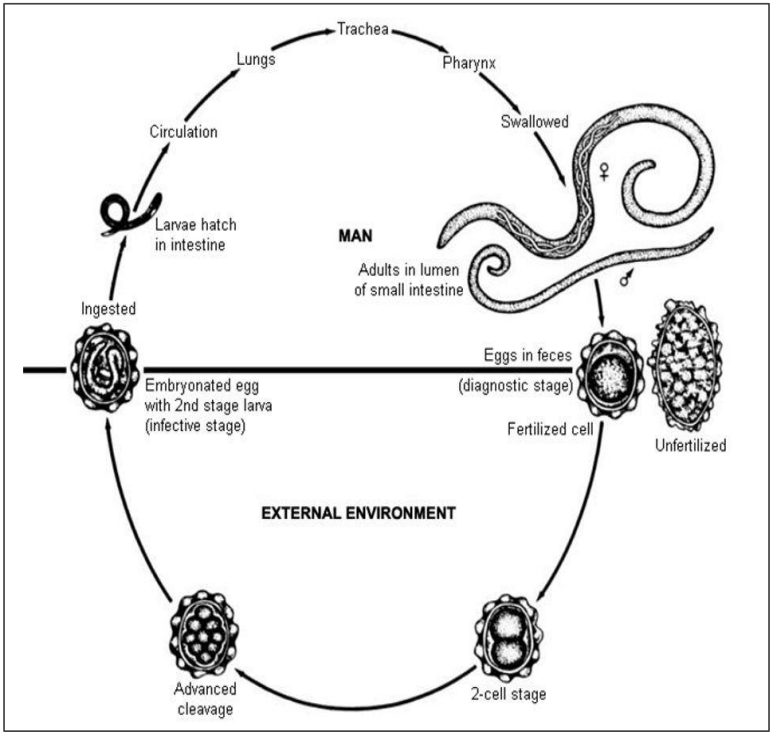
مهم
infective stage + diagnostic stage
Human is the primary host

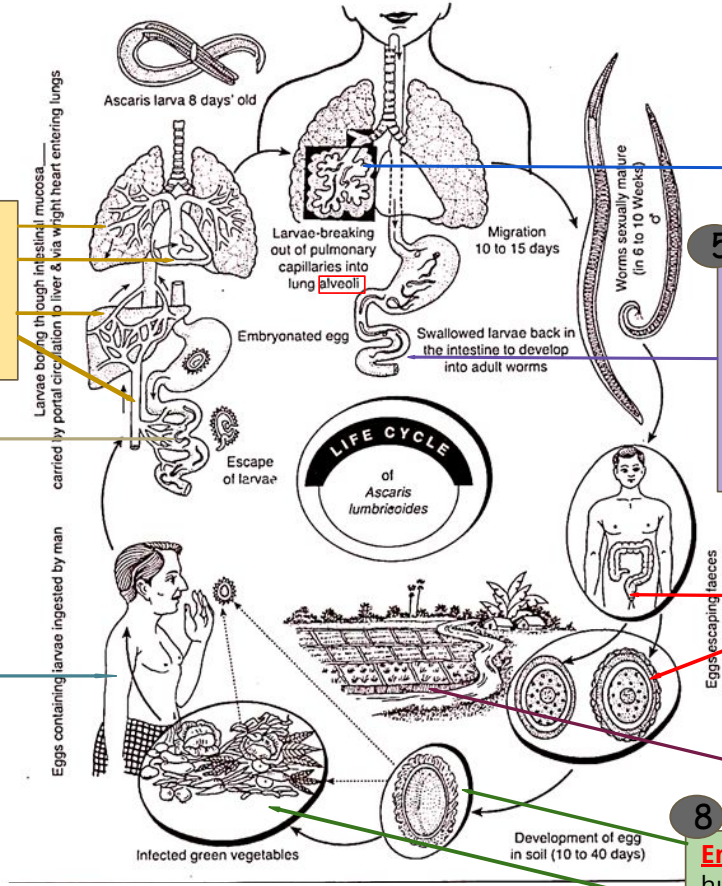
الشرح في السلايد القادم

Infective stage: embryonated egg



Diagnostic stage : both





1 Infection starts when man ingest an **Embryonated egg** contaminated with food or water

2 then this **embryonated egg** become a **Larva** in the duodenum

3 and then penetrate the wall of the **duodenum** , enter the blood stream to the heart , liver and enter the **pulmonary circulation** and stay

4 in the **alveoli** ,where it grow for three weeks

5 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

6 pass in stool as **Fertilized eggs** or **unfertilized eggs**

7 only **fertilized eggs** can be survive in the soil for 2 weeks to become an Embryonated egg

8 **Embryonated egg** ready to infect human with contaminated food.

Pathogenicity

Migrating Larva → Not an adult worm

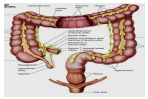
- Ascaris pneumonia
- Sometimes larva reach aberrant sites like brain, heart, or spinal cord, can cause unusual disturbance.

Adult Worm

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

+intussusception


Intestinal obstruction


Normal intestine

intussusception: يدخل جزء من الأمعاء على الثاني (كل ما كانت الديدان اكثر كانت حركتها اكثر و هذا يؤدي ان الأمعاء تدخل على بعض)

Intestinal obstruction: كثرة الديدان تسبب انسداد للأمعاء

Flat worms

Trematodes

- Leaf-like
- Un-segmented.

Fasciola Hepatica

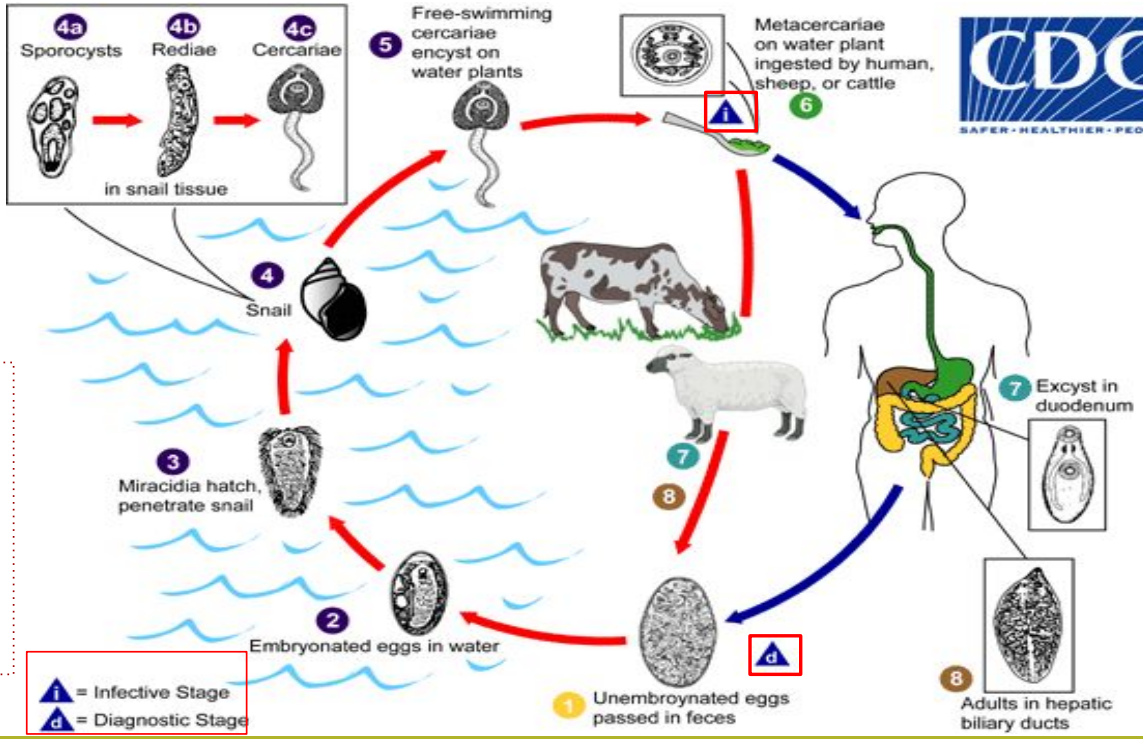
Cestodes

- Tape-like
- Segmented

Taeina Saginata

Fasciola Hepatica

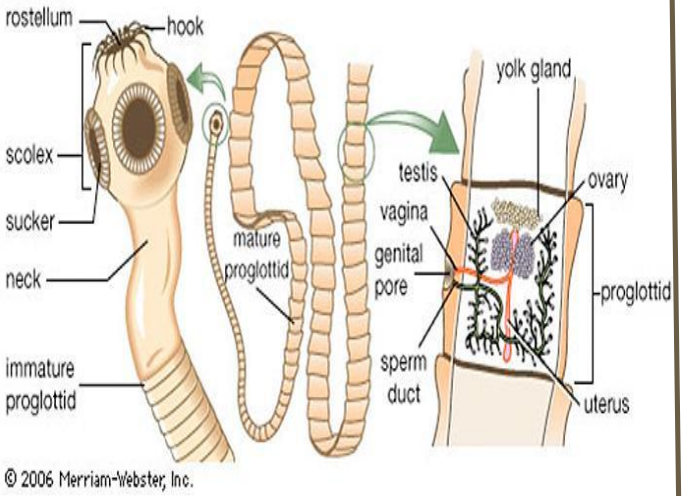
مهم
infective stage + diagnostic stage



You need to remember that:
-The disease is caused by :**termatodes flat worms**

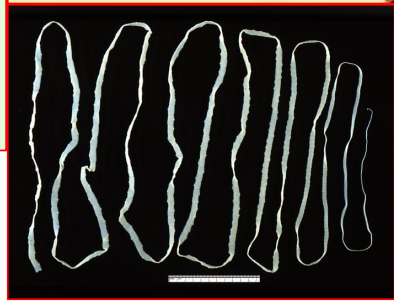
-It causes : biliary obstruction and jaundice

Cestode



Taenia saginata
Example of a Cestode,Tapelike worm segmented.

It causes:GIT discomfort , diarrhea and vomiting.



MEDICAL IMPORTANCE OF ARTHROPODS (الحشرات)

1)As aetiologic (الحشرة بحد ذاتها تسبب المرض)**agents (causes) of diseases.**

- ★ Tissue damage Scabies الجرب ⟶ Caused by mites ⟶ Cause tissue damage
- ★ Induction of hypersensitivity reactions.
- ★ Injection of poisons Scorpions العقرب.
- ★ Entomophobia (acarophobia) حالة نفسية خوف من الحشرات

Medical Importance of Arthropods

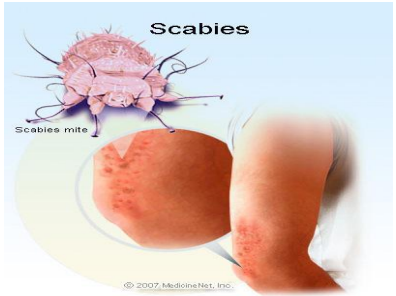
2) As vector of diseases:

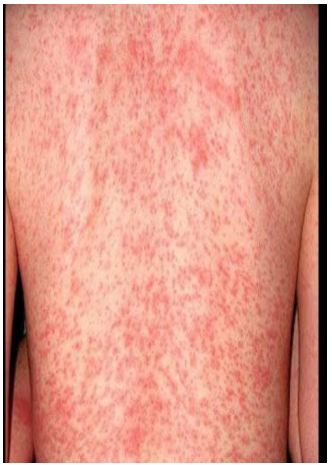
I. Mechanical transmission - simple carriage of pathogens e.g flies.
II. Biological transmission:
   - ★ cyclical :cyclical change only but does not multiply in the body of the vector e.g: filarial parasite.
   - ★ propagative (يدخل الفايروس في الحشرة ويتكاثر ويكبر): when the disease agent undergo no cyclical change but multiplies in the vector e.g: plaque bacillie in rat fleas.
   - ★ Cyclo-propagative :the disease agent undergoes cyclical change and multiply in the body of arthropods e.g: Malaria in mosquito.

III. Transovarian transmission: transmitted as vector from arthropods parents to offspring as ricketsis carried within ticks.

Scabies الجرب

Scabies as tissue damage example of Arthropod As aetiologic agents (causes) of diseases. تفضل بعض الأماكن مثل بين الأصابع





Arthropods of medical important

Class *Insecta* الحشرات	Class *Arachnida* العناكب	Class *Crustacea* القشريات
• Muscid flies:housefly,Tsetse fly • Myiasis-producing flies . • Mosquitoes البعوض: *Anopheles, Aedes Culex* • Sandfly ذباب الرمل (*Phlebotomus)* • Black fly*(Simulium)* • Fleas البراغيث • Lice(*Pediculus,Phthirus)* القمل • Bugs:*Cimex,Triatoma* البق • Bees النحل	• Scorpions العقارب • Spiders العناكب • Ticks: القراد hard, soft • Mites السوس -*Sarcoptes scabiei,* -dust mites	• Water flea *(Cyclops)*

Important arthropod vectors for human diseases

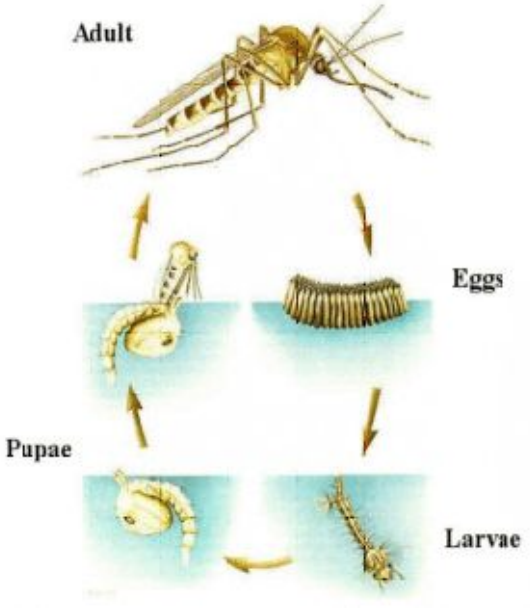
House fly *(Musca domestica)*	Mechanical transmission of many viruses, bacteria and parasites.
Mosquitoes البعوض **Vector for malaria**	Anopheles :**malaria** filariasis Culex: filariasis, viruses Aedes: yellow fever, dengue fever, Rift Valley Fever
Lice القمل	Body louse: vector for: Relapsing fever,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

LICE -Louse(singular) , Lice (pleural)- القمل

Pediculus humanus

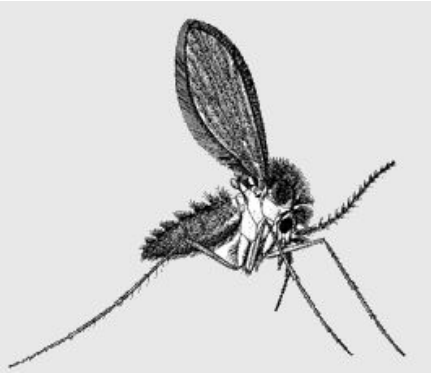
Mosquitoes :

- ★ Cosmopolitan , more than 3000 species.
- ★ Larval and pupal stages always aquatic
- ★ Mouth parts in female adapted to piercing and sucking blood.
- ★ Genus and species distinguished by morphology of adult and developmental stages.
- ★ **cyclo-propagative**



Malaria

Sandfly transmit **Leishmania**



Questions:

MCQ's:

Q1- leaf-like, un-segmented worms:
A)Amoebae
B)Apicomplexa
C)Trematodes=
D)Cestodes

Q2-Elongated worm, cylindrical, unsegmented and tapering at both ends:
A)Cestodes
B)Nematodes=
C)Apicomplexa
D)Flagellates

1	2	3	4	5
C	B	B	D	A

Q3-the infective stage in Ascaris lumbricoides life cycle:
A)underutilized egg
B)larva (embryonic egg)=
C)fertilized egg
D)cell stage

Q4-Faciola Hepatica is caused by…. and it causes….
A) termatodes, fever
B)cestodes, jaundice
C)ascaris lumbricoids, biliary obstruction
D)termatodes, jaundice

Q5- Tse tse fly is the vector for:
A)African Trynanosomiasis =
B)Leishmania
C)Onchocerca
D)Q fever

Questions:

T/F:

Q1- male is smaller than female in Nematodes ( )

Q2- Sand fly is the vector for leishmania ( )

Q3-Migrating larva worms consumes proteins and vitamins from host's diet and leads to malnutrition ( )

Q4-Taenia saginata Example of Trematodes ( )

Q5- Scabies as tissue damage example of Arthropod ( )

1	2	3	4	5
T	T	F	F	T

Team Leaders:

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- ★ بدر القرني

Members:

- ★ سارة يوسف الفليج
- ★ أميرة الزهراني
- ★ غادة السدحان
- ★ نجود العلي
- ★ جود الخليفة
- ★ دينا عورتاني
- ★ ريناد المطوع
- ★ سارة الهلال
- ★ طيبة الزيد
- ★ لينا النصار
- ★ ميسون آل تميم
- ★ نورة المزروع
- ★ سارة الخليفي
- ★ رغد الخشان
- ★ لينا العصيمي

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- ★ عبدالله الداود
- ★ عبدالرحمن البديوي
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