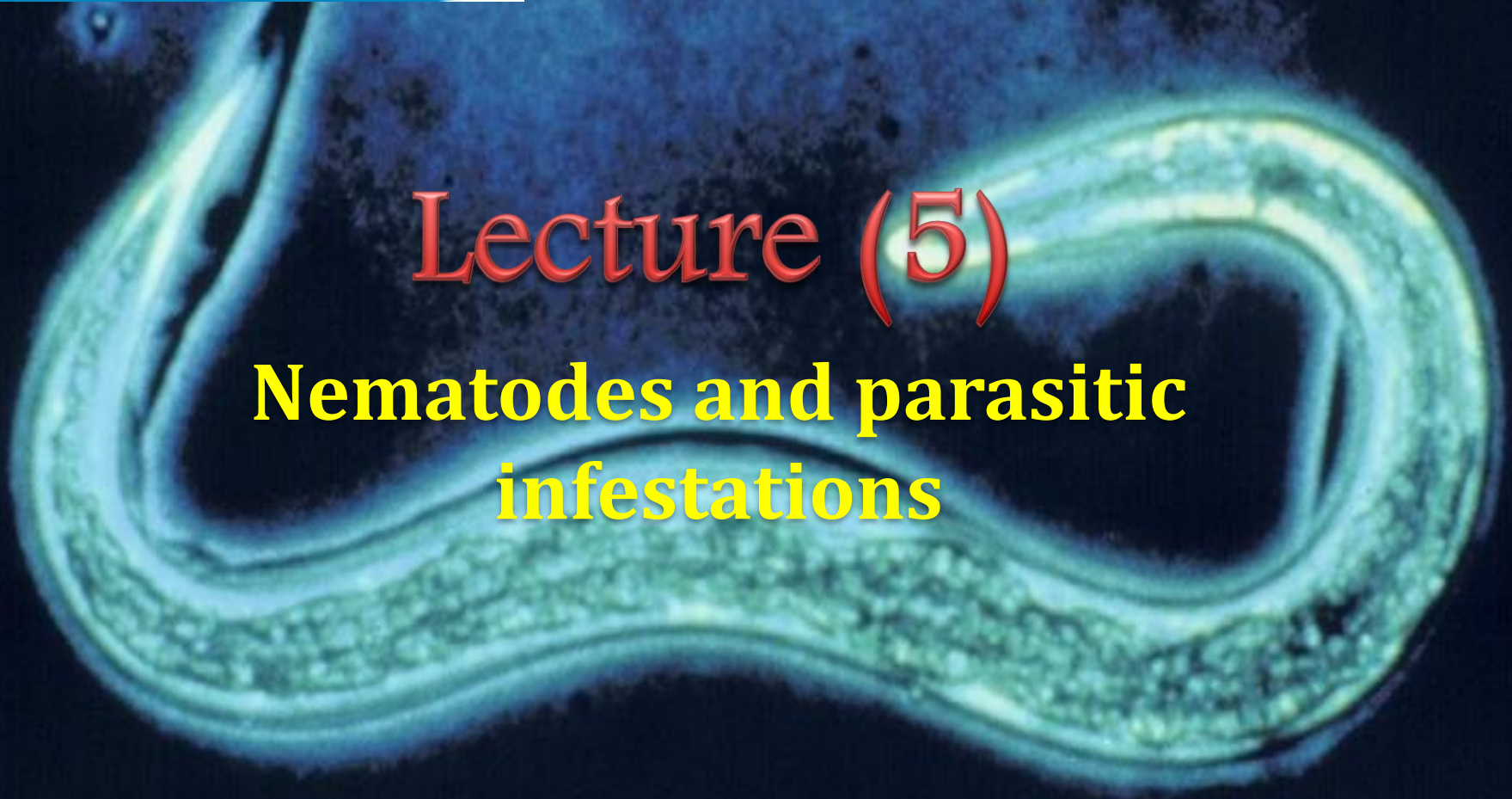




# Lecture (5)

## Nematodes and parasitic infestations



# Phylum Nematoda

## General characters of nematodes:

- 1- They are bilaterally symmetrical, unsegmented triploblastic worms.
- 2- Pseudocoelomate animals with slender cylindrical bodies.
- 3- Alimentary canal is straight and complete with mouth and anus (or cloacal opening).
- 4- Body wall with longitudinal muscles only.

## Classification of Phylum Nematoda:

- Phylum Nematoda is classified into 2 main classes:
  1. Class: Secernentea (Phasmidea): It includes:
    - e.g. *Anisakis sp.* (Eel worm).
    - e.g. *Ancylostoma duodenale* (Hook worm).
    - e.g. *Wuchereria bancrofti* ( Pin worm or seat worm).
  2. Class: Aphasmidea: It includes:
    - a. Order: Trichinellida e.g. *Trichinella spiralis*.



# Phylum Nematoda

## *Anisakis* sp.

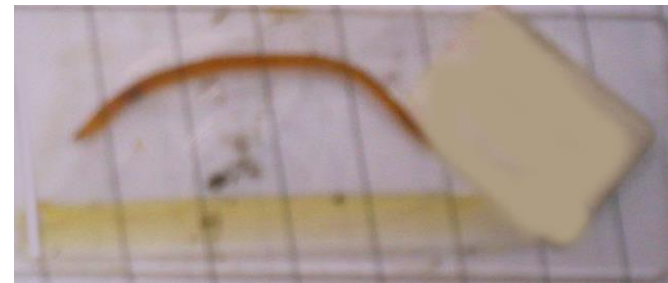
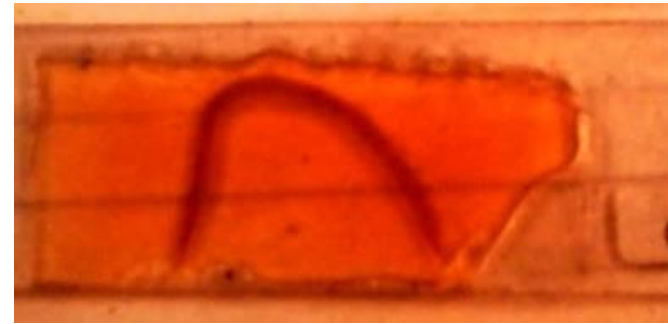
...*Anisakis* is a genus of parasitic nematodes, which have a life cycle involving Fish and marine mammals. They are infective to humans and cause anisakiasis. In response to this parasite, people may subsequently have an allergic reaction, including anaphylaxis, after eating fish that have been infected with *Anisakis* spp.

### Health implications

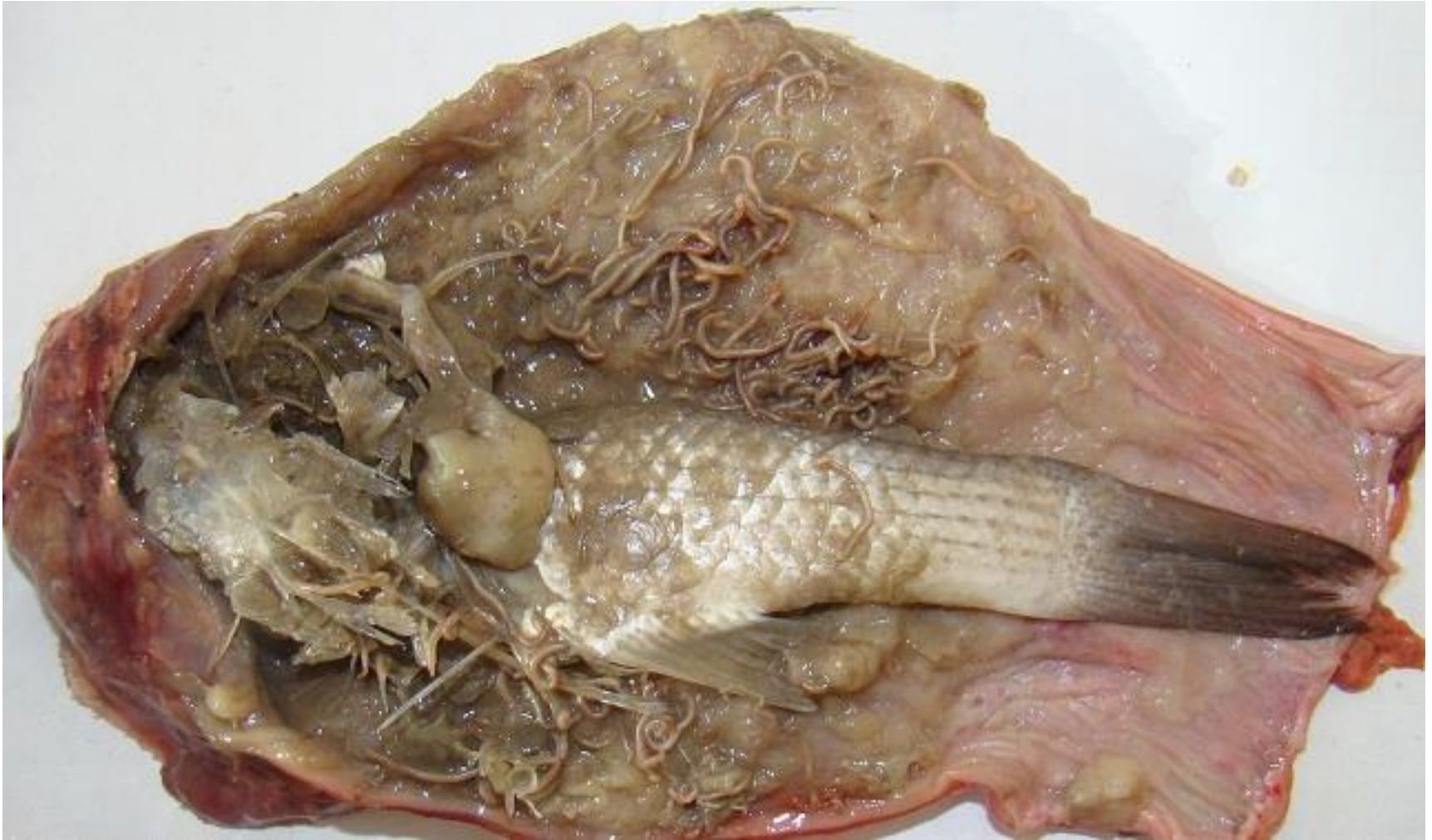
...Anisakids pose a risk to human health in two ways: through intestinal infection with worms from the eating of unprocessed fish, and through allergic reactions to chemicals left by the worms in fish flesh.

### Treatment

...Infection can lead to bowel obstruction, which may require surgery, although there are case reports of treatment with albendazole alone (avoiding surgery) being successful. Intestinal perforation (an emergency) is also possible



***Anisakis* sp. larval stage  
L3...in fishes (infective stage  
to humans and fish eaters)**



**Photographs of a fish showing the heavy infestation with anisakid larvae**

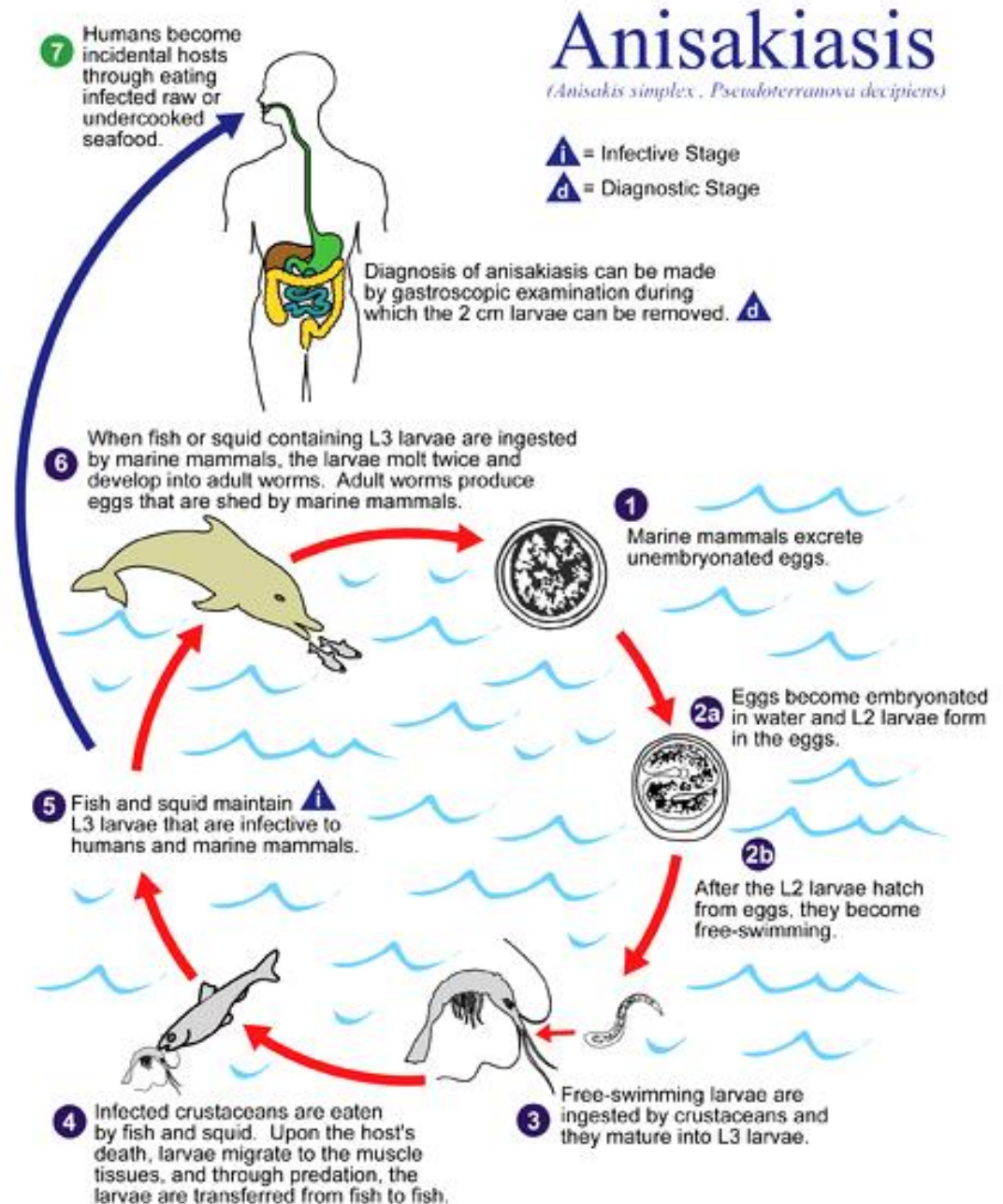
## Life cycle of *Anisakis* sp.

..You must know from this life cycle:

..The life cycle includes a crustacean, fish, and human can be accidentally infected.

...L3 larvae of nematodes are the infective stages to man being infected through eating of infected raw or undercooked seafood.

...Diagnostic stage:  
Diagnosis can be made by gastroscopic examination during which the 2 cm larvae can be removed.



## *Wuchereria bancrofti*

...Is a parasitic filarial nematode (roundworm) spread by a mosquito vector .It causes lymphatic filariasis. If the infection is left untreated, it can develop into a chronic disease called elephantiasis.

...*W. bancrofti* carry out their life cycle in two hosts . Human beings serve as the definitive host and mosquitoes as their intermediate hosts .The adult parasites reside in the lymphatics of the human host. The first-stage larvae, known as **microfilariae** ,are present in the circulation .They migrate between the deep and the peripheral circulation .*W. bancrofti* is a periodic strain that exhibits nocturnal periodicity. (During the day, they are present in the deep veins, and during the night, they migrate to the peripheral circulation) .



**Microfilariae of *W. bancrofti* in peripheral blood of humans**

### **Control**

Prevention focuses on protecting against mosquito bites in endemic regions. Insect repellents and mosquito nets are useful to protect against mosquito bites .

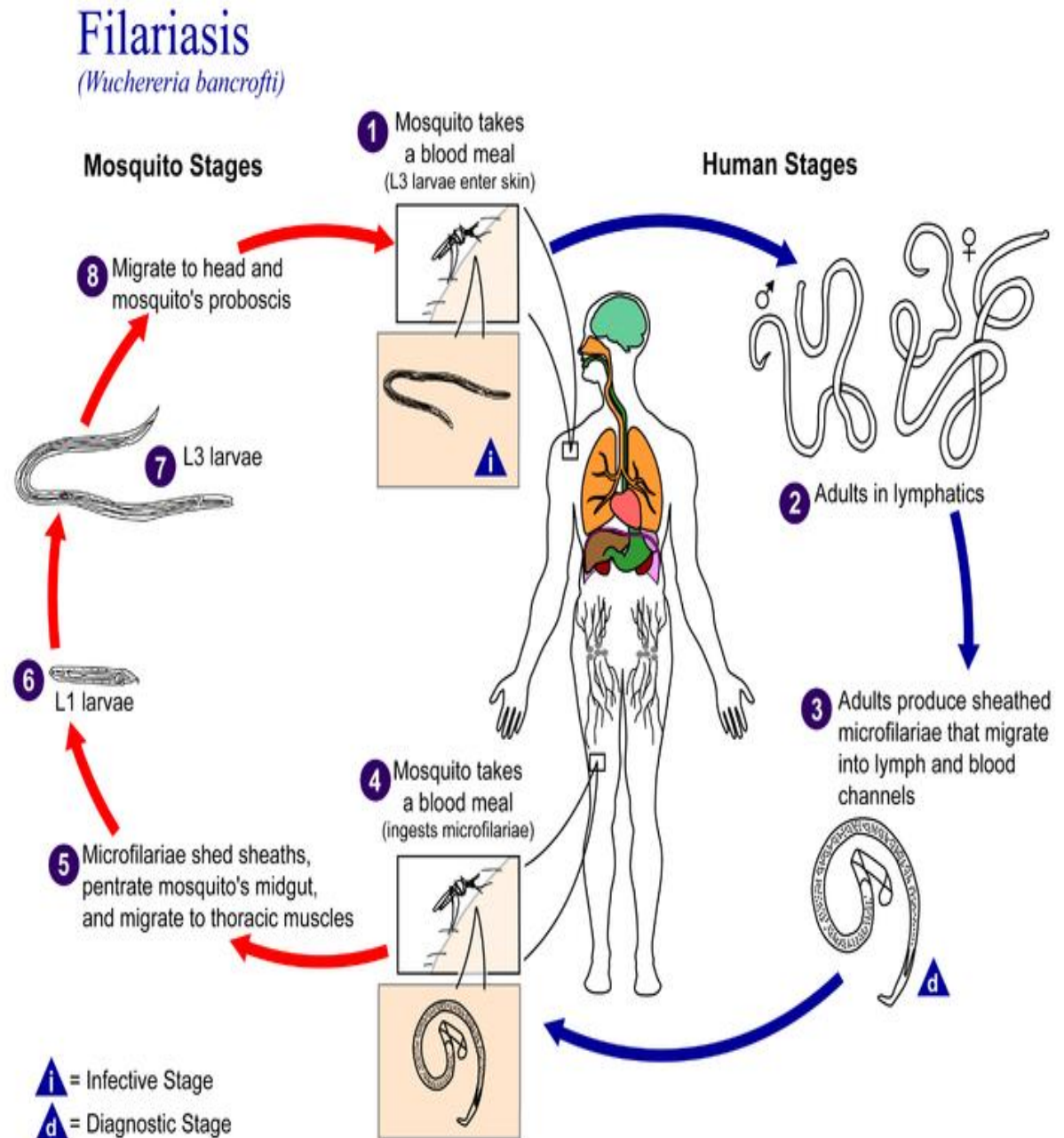
# Life cycle of *W. bancrofti*

..You must know from this life cycle:

..The life cycle includes a man as final host and mosquito as intermediate host.

...L3 larvae of nematodes are the infective stages to man being infected through insect bite.

...Diagnostic stage:  
Diagnosis can be made by the examination of blood to record the microfilaria stage.





Photographs of Elephantiasis



## *Ancylostoma duodenale*

..... It is a parasitic nematode worm and commonly known as Old World hookworm. It lives in the small intestine of hosts such as humans, cats and dogs .

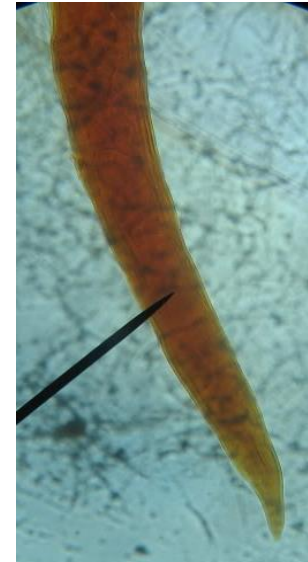
...When a filariform larva L3 (infective stage) swallowed by a human, the larva enters the blood circulation. It is then carried to the lungs, coughed up, and swallowed back into the small intestine.



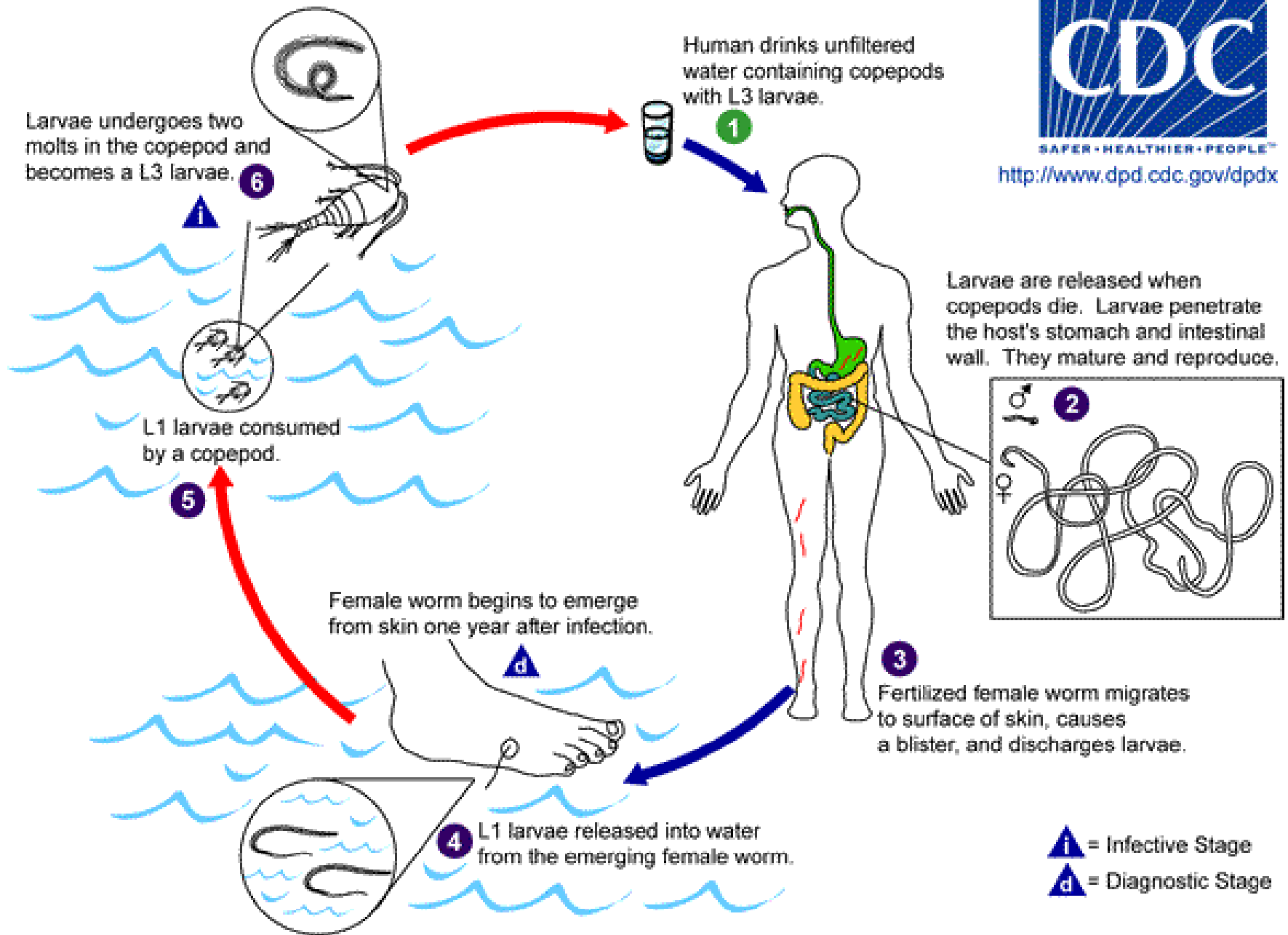
The L1 larva released from a hole in the skin



male



female



## *Trichinella spiralis*

...*Trichinella spiralis* is a nematode [parasite](#), occurring in rats, pigs, bears and humans, and is responsible for the disease [trichinosis](#). It is sometimes referred to as the "pork worm" due to it being found commonly in undercooked pork products.

...*Trichinella spiralis* has a direct life cycle, it completes all stages of development in one host. The larval forms are encapsulated as a small cystic structure within the infected host. Humans typically become infected when they eat improperly cooked pork or *Trichinella* infected meat.



**Encapsulated larvae encysted in the striated muscle of pig**

...Cooking pork meat properly or by freezing pork, *Trichinella* infection can be prevented. However, freezing pork is not an effective method for killing larvae. One way to prevent trichinellosis is to cook meat to safe temperatures. A food thermometer should be used to measure the internal temperature of cooked meat. Do not sample meat until it is cooked.

To help prevent *Trichinella* infection in animal populations, do not allow pigs or wild animals to eat uncooked meat, scraps, or carcasses of any animals, including rats, which may be infected with *Trichinella*

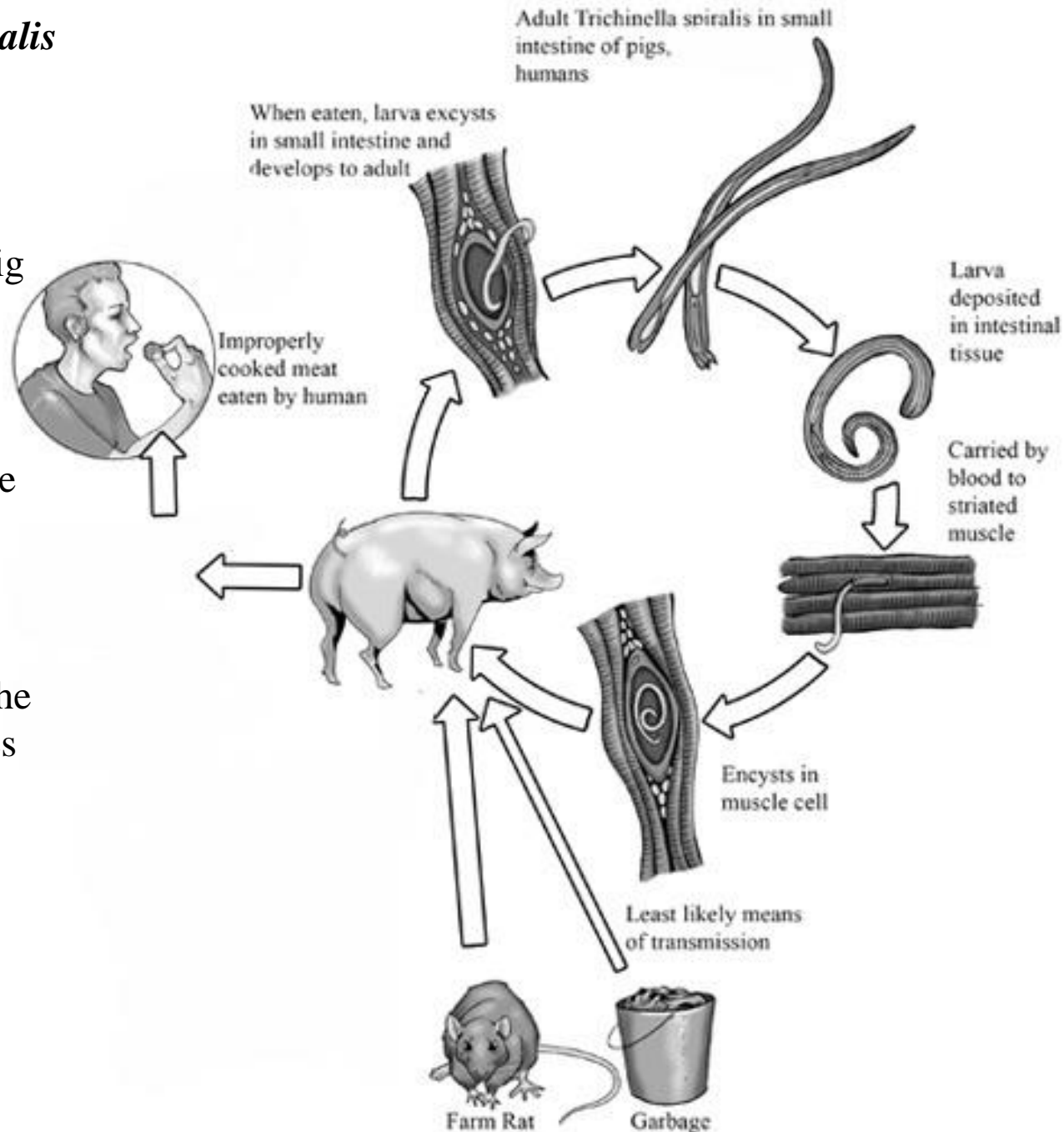
## Life cycle of *Trichinella spiralis*

..You must know from this life cycle:

..The life cycle includes a pig or man.

...the encapsulated larva encysted in the striated muscle of pig is the infective stage to human or other pig hosts.

...Diagnostic stage:  
Diagnosis can be made by the examination striated muscles of pig to record the encapsulated larvae.



THANK YOU

A watercolor illustration featuring the words "THANK YOU" in a black, serif font. The text is surrounded by various autumn-themed elements: several leaves in shades of red, pink, and orange, some with white vein patterns; small clusters of green berries; and a few small, starburst-like decorative marks. The overall style is soft and artistic, typical of watercolor painting.