

# REPRODUCTION AND DEVELOPMENT

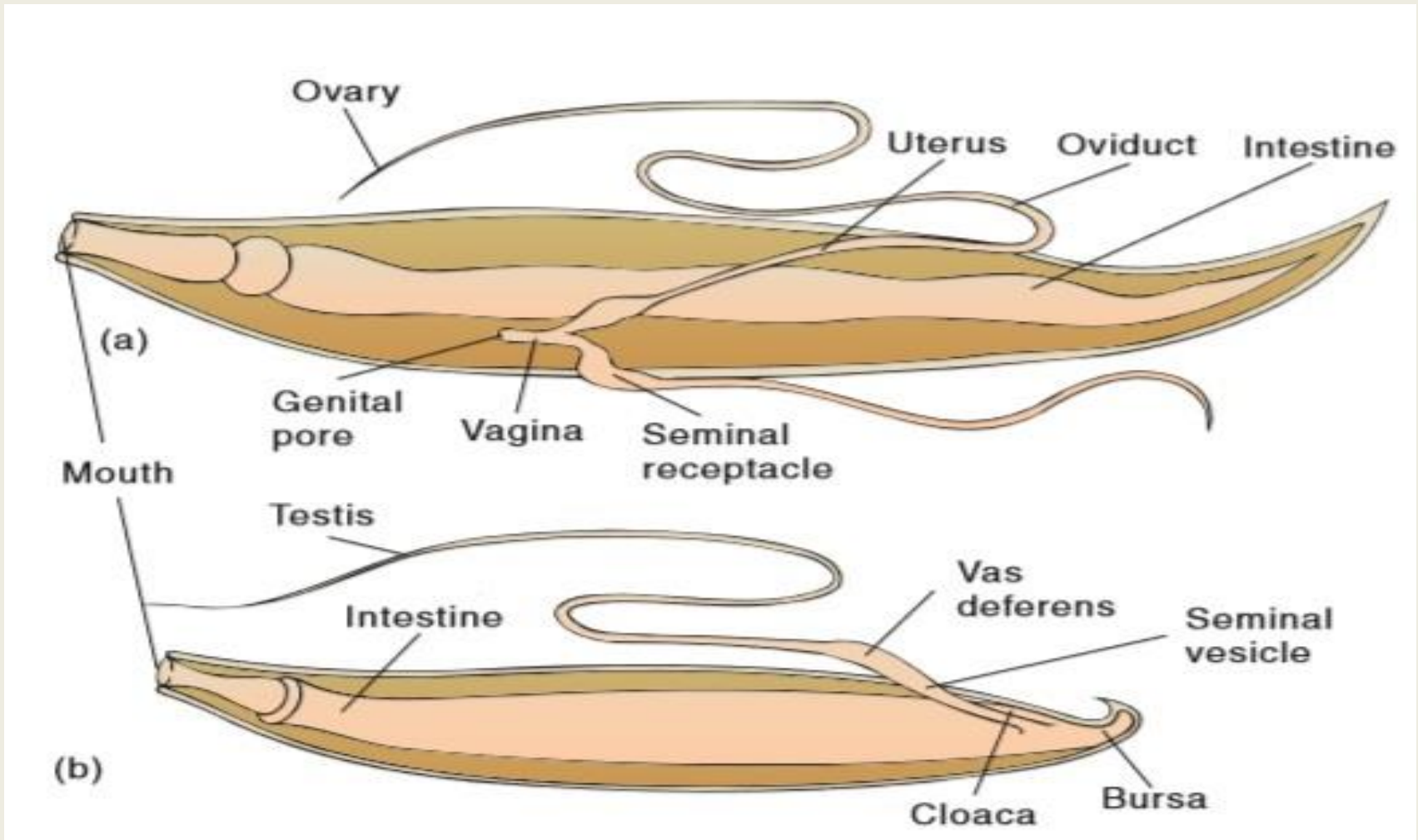
- ✓ Most nematodes are dioecious and dimorphic.
- ✓ The males being smaller than the females.
- ✓ The long, coiled gonads lie free in the pseudocoelom.

## Female Reproductive System

- ✓ The female system consists of a pair of convoluted ovaries.
- ✓ Each ovary is continuous with an oviduct and proximal end is swollen to form a seminal receptacle.
- ✓ Each oviduct becomes a tubular uterus;
- ✓ Two uteri unite to form a vagina that opens to the outside through a genital pore.

## Male Reproductive System

- ✓ Males are commonly armed with a posterior flap of tissue called a bursa.
- ✓ The bursa aids the male in the transfer of sperm to the female genital pore during copulation



**Fig: Nematode Reproductive Systems.** The reproductive systems of an (a) female and (b) male nematode, such as *Ascaris*. The sizes of the reproductive systems are exaggerated to show details.

## **DEVELOPMENT**

- ✓ After copulation, hydrostatic forces in the pseudocoelom move each fertilized egg to the gonopore.
- ✓ The number of eggs produced varies with the species
- ✓ Some nematodes produce only several hundred eggs, whereas others may produce hundreds of thousands daily.
- ✓ Some nematodes give birth to larvae (ovoviviparity).
- ✓ External factors, such as temperature and moisture, influence the development and hatching of the eggs.
- ✓ Hatching produces a larva that has most adult structures.
- ✓ The larva (juvenile) undergoes four molts.
- ✓ In some species, the first one or two molts may occur before the eggs hatch.



**SOME IMPORTANT NEMATODE  
PARASITES OF HUMANS**

# *Ascaris lumbricoides*: The Giant Intestinal Roundworm of Humans

Adult *Ascaris* (Gr. askaris, intestinal worm) live in the small intestine of humans.

They produce large numbers of eggs that exit with the feces.

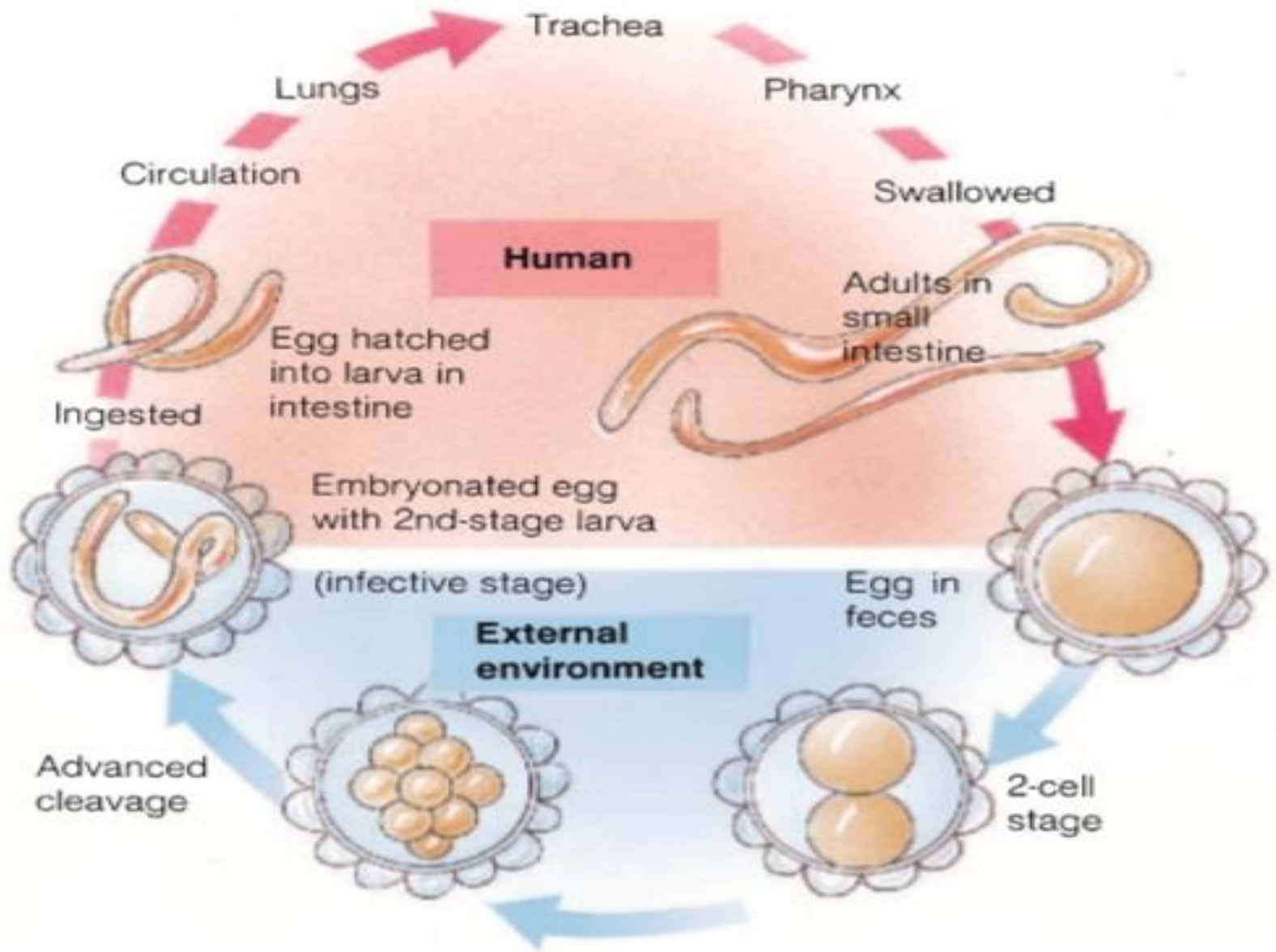
A first-stage larva develops rapidly in the egg, molts, and matures into a second-stage larva, the infective stage.

The larvae penetrate the intestinal wall and are carried via the circulation to the lungs

When a human ingests embryonated eggs, they hatch in the intestine.

They molt twice in the lungs, migrate up the trachea, and are swallowed.

The worms attain sexual maturity in the intestine, mate, and begin egg production.



**Fig: Life Cycle of *Ascaris lumbricoides*.**

# *Enterobius vermicularis*: Human Pinworm Pinworms

Adult *Enterobius vermicularis* become established in the lower region of the large intestine.

At night, gravid females migrate out of the cecum to the perianal area

they deposit eggs containing a first-stage larva

eggs hatch

The larvae molt four times in the small intestine and migrate to the large intestine

humans ingest eggs

Adults mate, and females soon begin egg production

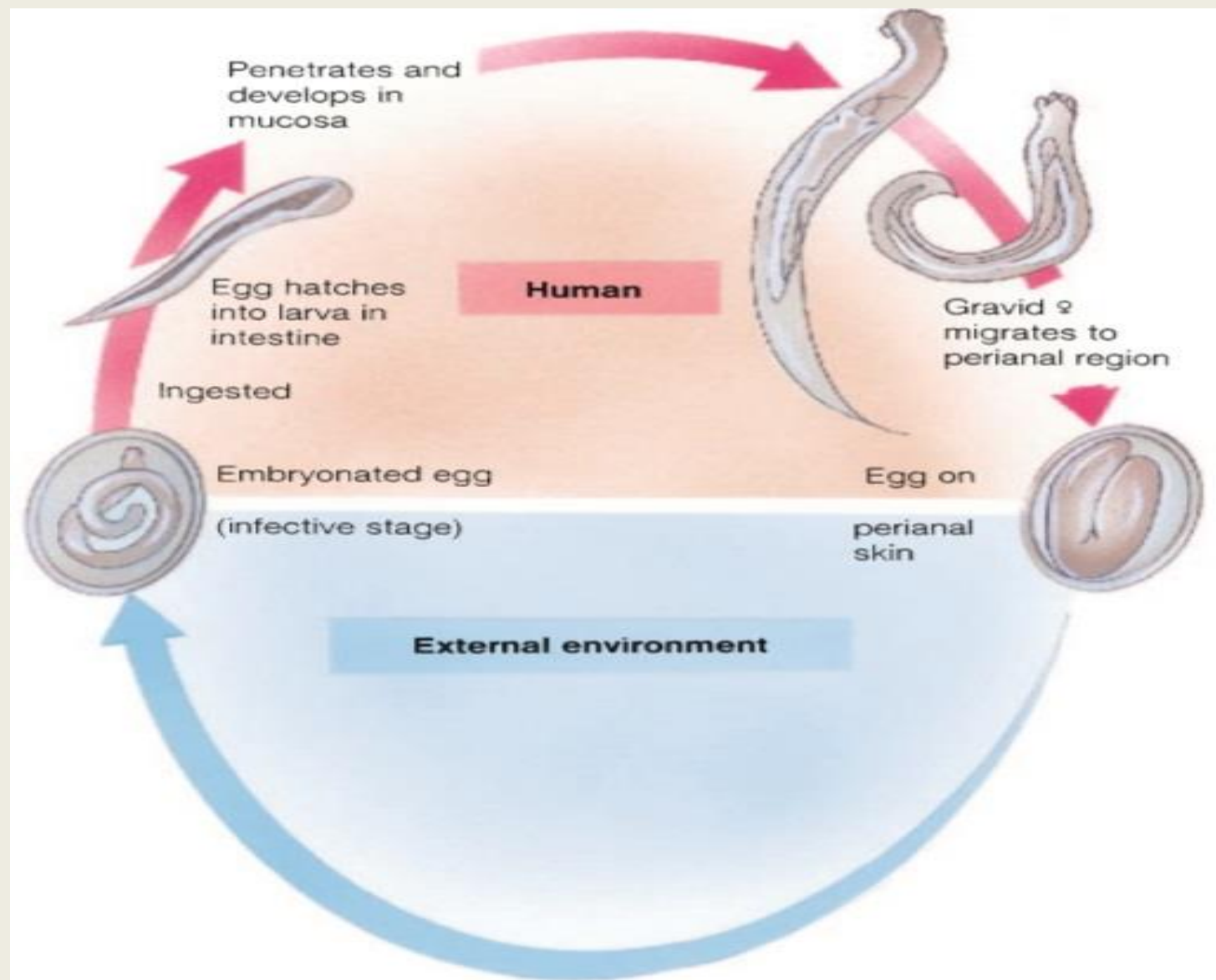


Fig: Life Cycle of *Enterobius vermicularis*.



# *Necator americanus*: The New World or American hookworm

The adults live in the small intestine.

they hold onto the intestinal wall with teeth and feed on blood and tissue fluids

Individual females may produce as many as 10,000 eggs daily, which pass out of the body in the feces.

Humans become infected when the filariform larva penetrates the skin, usually between the toes

It molts and becomes the infective filariform (the infective third-stage larva of some nematodes) larva

An egg hatches on warm, moist soil and releases a small rhabditiform (the first- and second-stage juveniles of some nematodes) larva.

The larva burrows through the skin to reach the circulatory system.

The rest of its life cycle is similar to that of *Ascaris*

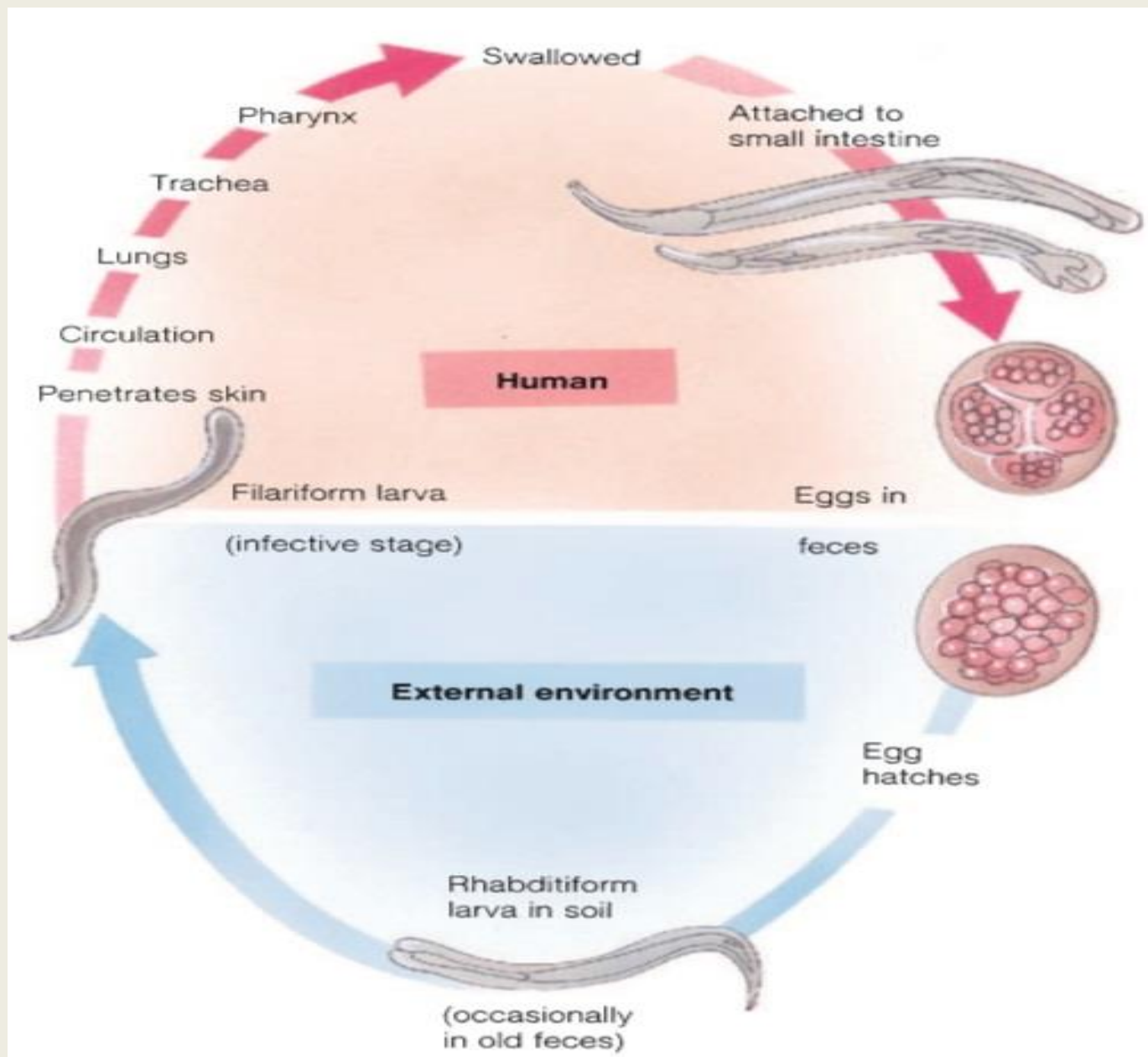


Fig: Life Cycle of *Necator americanus*.

# *Trichinella spiralis*: The Porkworm

Adult *Trichinella* (Gr. trichinos, hair) *spiralis* live in the mucosa of the small intestine of humans and other omnivores (e.g., the pig).

Humans most often become infected by eating improperly cooked pork products

Once ingested, the larvae excyst in the stomach and make their way to the small intestine

In the intestine, adult females give birth to young larvae that then enter the circulatory system and are carried to skeletal (striated) muscles of the same host

Another host must ingest infective meat (muscle) to continue the life cycle

they molt four times and develop into adults

The young larvae encyst in the skeletal muscles and remain infective for many years.

The disease this nematode causes is called trichinosis.

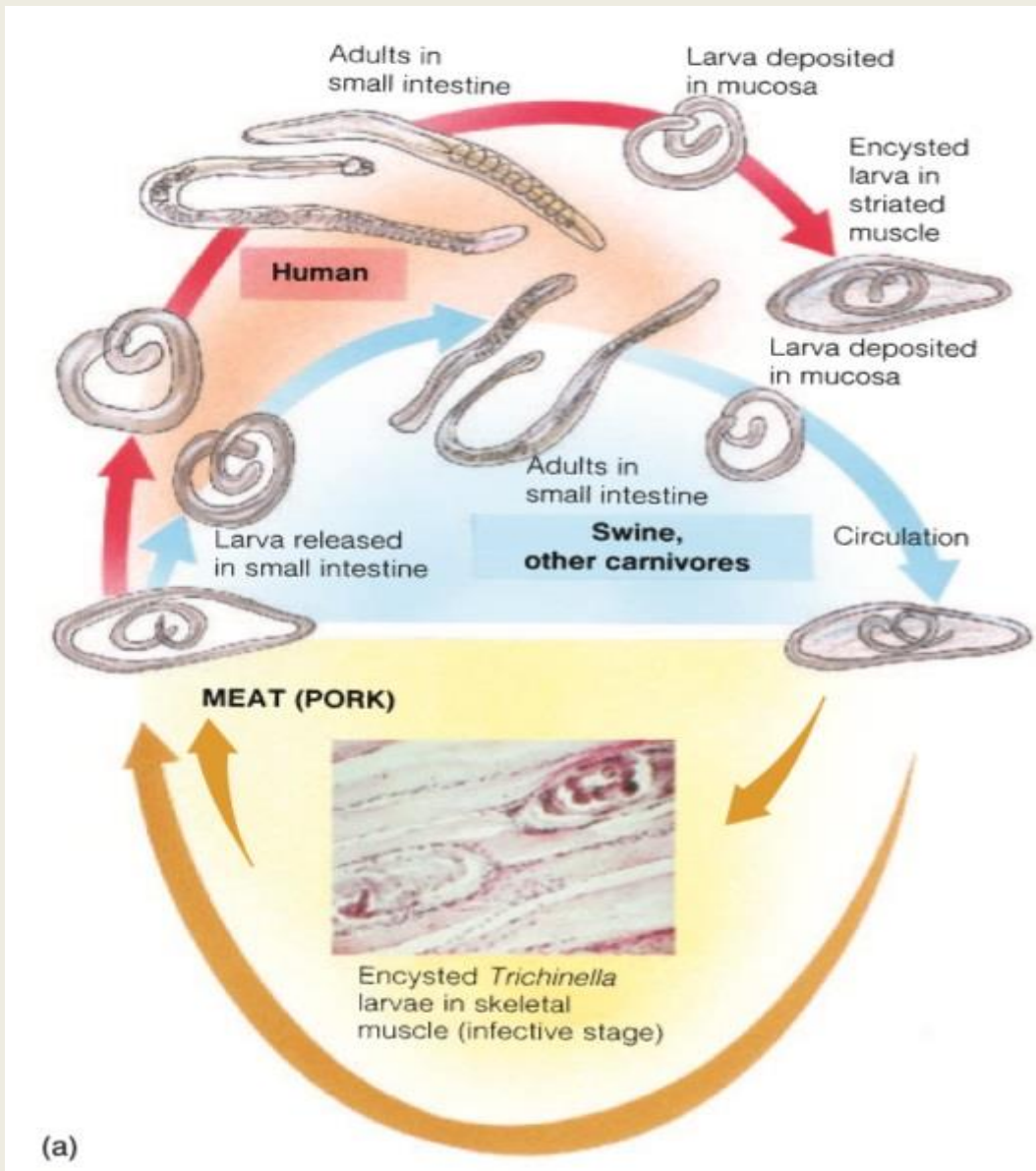


Fig (a): Life Cycle of *Trichinella spiralis*.

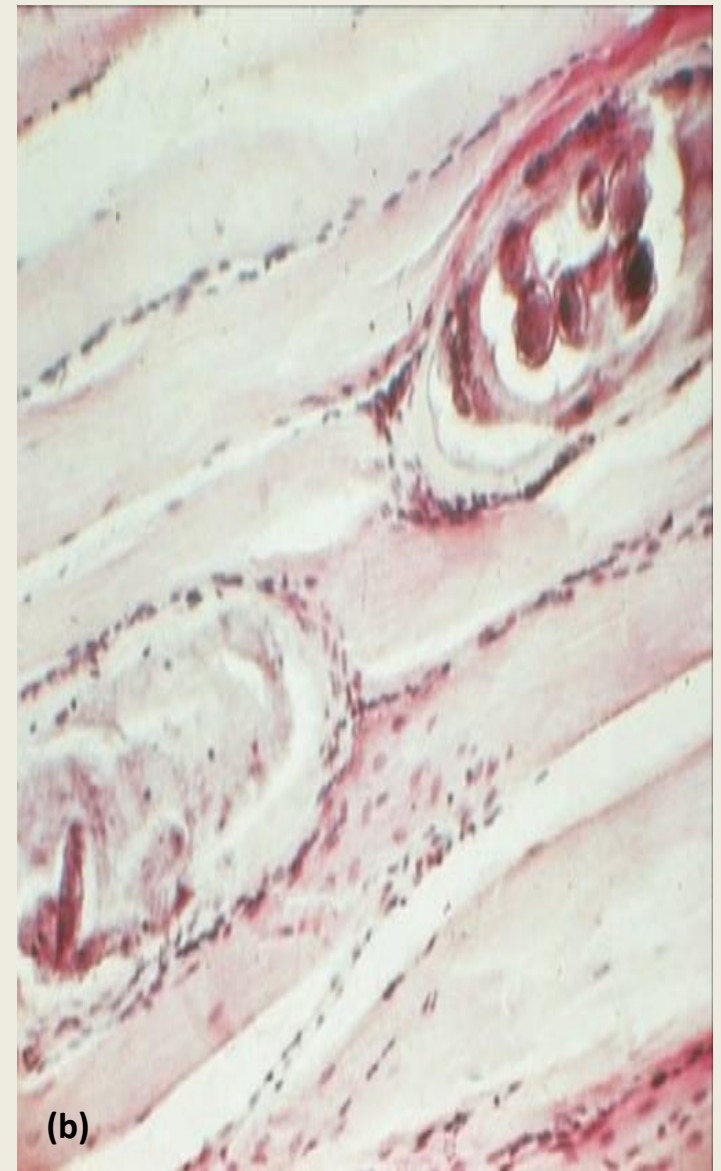


Fig (b): showing two encysted larvae in skeletal muscle