

ASCARIS LUMBRICOIDES — LIFE CYCLE

Ascaris lumbricoides is a monogenetic endoparasite found in the intestine of man and cause a disease known as Ascariasis.

① In *Ascaris* the sexes are separate and sexual dimorphism are well marked.

② Male reproductive system of *Ascaris* consists of a single testis. It is a coiled thread like structure. It lies at the anterior part of the body cavity. The testis leads into vas deferens. The vas deferens elongates into a muscular tube, the seminal vesicle. The sperms are stored in the seminal vesicle.

③ The seminal vesicle open into ejaculatory duct which joins with the cloaca. The cloaca dorsally has a pair of penial sacs in which lies two pointed setae or spicules.

④ Female reproductive ~~organ~~ system consists of a pair of ovaries. They are tubular and thread like. Each ovary leads into an oviduct. The oviducts opens anteriorly into uterus. The uterus is a long, muscular and straight tube. The uterus contains fertilized eggs. The uteri of both the sides unite anteriorly to form a median vagina. Vagina opens outside by vulva or gonopore.

Life Cycle:

(Fig)

① The life cycle of *Ascaris* is completed in ^{only} one host i.e. in man. The development is indirect as there is a larval form in their life cycle.

Fertilization: Fertilization is internal. The eggs are fertilized in the oviduct.

Laying eggs: Fertilized eggs are laid by the female in the intestine of man. A female can lay about 2,70,000 eggs in her life time. The eggs are passed out through the faeces of man.

Eggs: The eggs are oval in shape. It is covered three membrane, namely an outer protein layer, a middle shell and inner lipid layer. The egg is resistant to all kinds of water and survive for several years.

Cleavage: The segmentation of egg is holoblastic and unequal. The cleavage is of spiral type and the development is determinate. Cleavage leads to the formation of blastula. The blastula invaginates and become the gastrula. The gastrula develops into a larva called Rhabditiform larva.

Rhabditiform larva is cylindrical in shape. It has a straight alimentary canal with a mouth and the anus. It contains all the parts of the adult Aecaris except the reproductive organs.

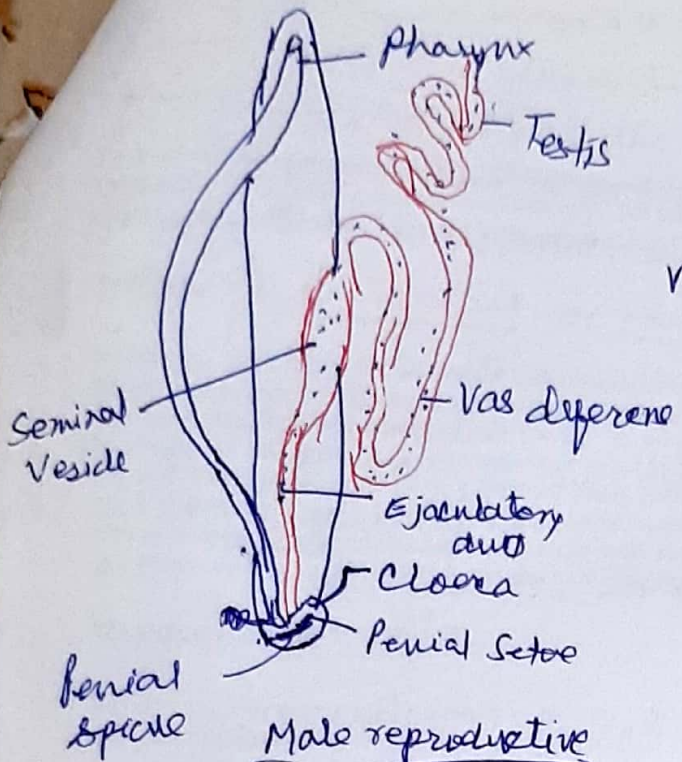
Infection: (Fig)

The rhabditiform larva remains in the egg. Further development occur when it enters the host. It enters the host through contaminated food and water. When the eggs enter the intestine of man, the egg membranes dissolved and the Rhabditiform larva is released.

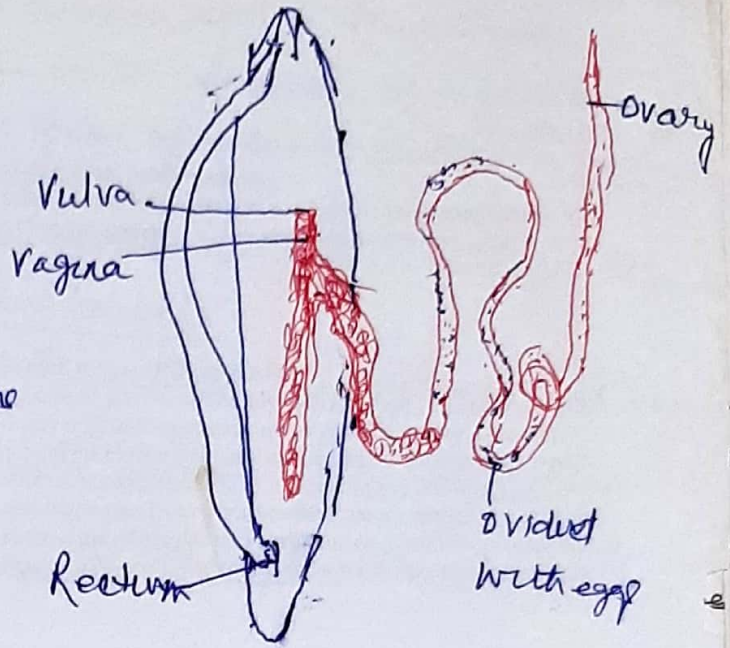
Extra-intestinal Migration:

The newly hatched Rhabditiform larva does not remain in the intestine. It goes out of the intestine for a tour for about 10 days. The tour undertaken by the Rhabditiform larva ~~out of~~ outside the intestine are called extra-intestinal migration.

It penetrates through the intestinal wall and reaches the mesenteric blood vessels. Then it reaches the liver through hepatic portal vein.



Male reproductive organ of Ascaris



Female reproductive organ of Ascaris

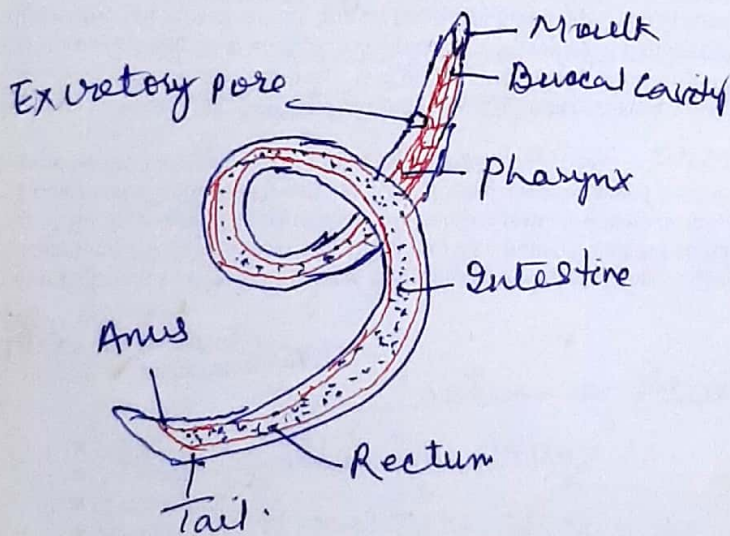


Fig - Rhabditiform larva of Ascaris.

Pathogenesis:

- ① Ascaris causes a disease called Ascariasis.
- ② Ascaris depends on the severity of infections. When Ascaris shares the food of man, it causes weakness, anaemia and eosinophilia.
- ③ When the worm damage the intestinal mucosa. It lead to enteritis or peritonitis.
- ④ When the parasite enters the appendix, it causes appendicitis.
- ⑤ When the parasite damages the liver, it causes hepatitis.
- ⑥ When the parasite damages the lungs, it cause Pneumonia.

Prevention: Infection of Ascaris is prevented by the following methods:

- ① Human faeces should be safely disposed underground.
- ② Fruits and vegetables should be thoroughly washed.
- ③ Hand should be properly washed before eating.
- ④ Finger nails should be regularly cut.

Treatment:

The infection of Ascaris can be treated by the following drugs:

1. A mixture of the oil roots of Chenopodium and tetrachloroethylene is an effective drug for Ascaris eradication.
2. Piperazine citrate.
3. Tetramisole.
4. Dithazarine.
5. Hetrazan etc.

—X—

From the liver it enters the heart via hepatic vein and post caval vein.

From the heart it enters the lungs through pulmonary arteries. In the lungs it enters the alveoli where it lives for some days and grows.

From the alveoli of lungs it passes through the bronchus into the trachea and then the throat. It then moves into the oesophagus. Finally it reaches the small intestine and grows into adult.

Moulting:

Moulting is the shedding of outer cuticle. Rhabditiform larva moults four times before it becomes the adult. When it is inside the egg, it moults for the first time. In the alveolus of the lungs, it moults twice. The fourth moulting occurs in the intestine. This moulting converts the larva into an adult.

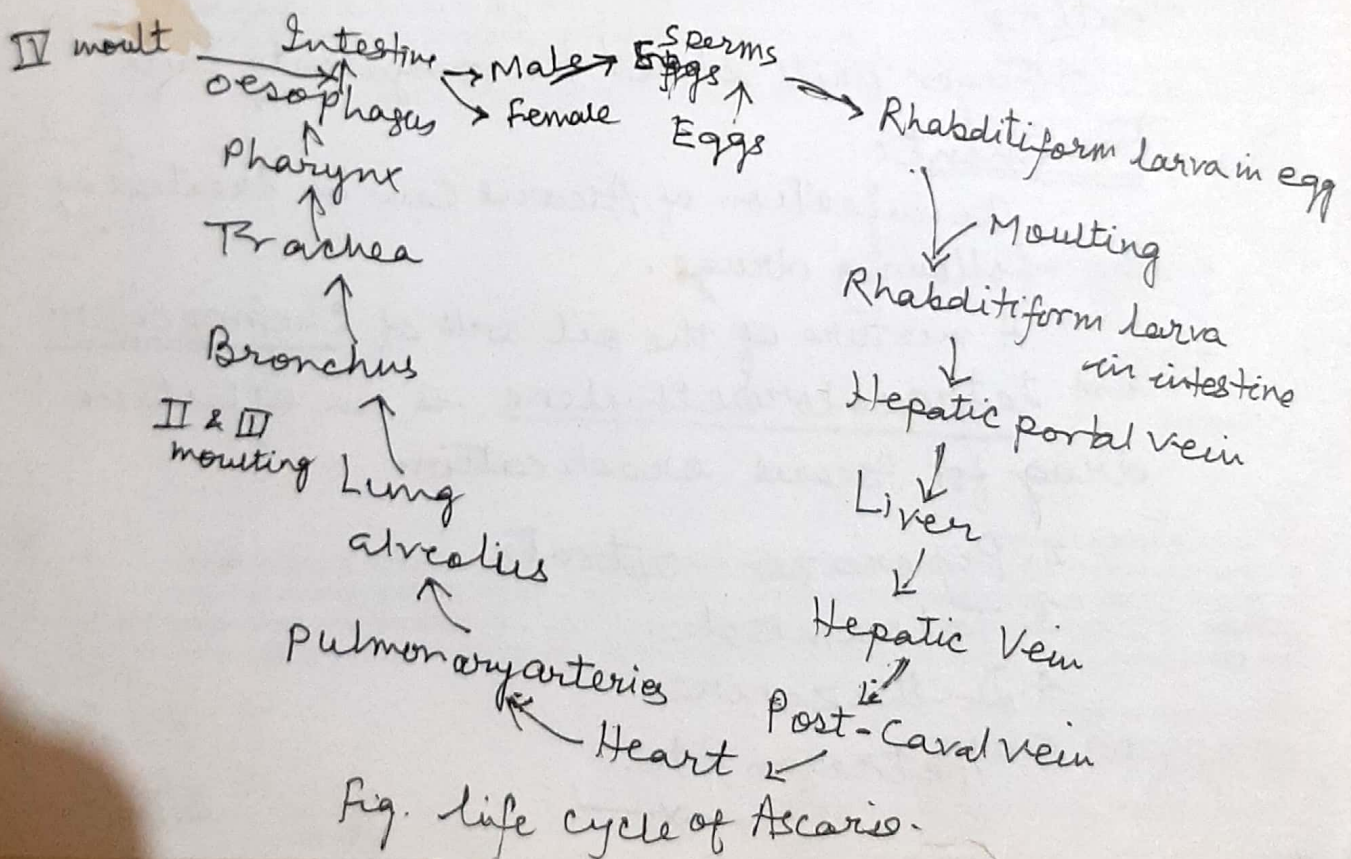
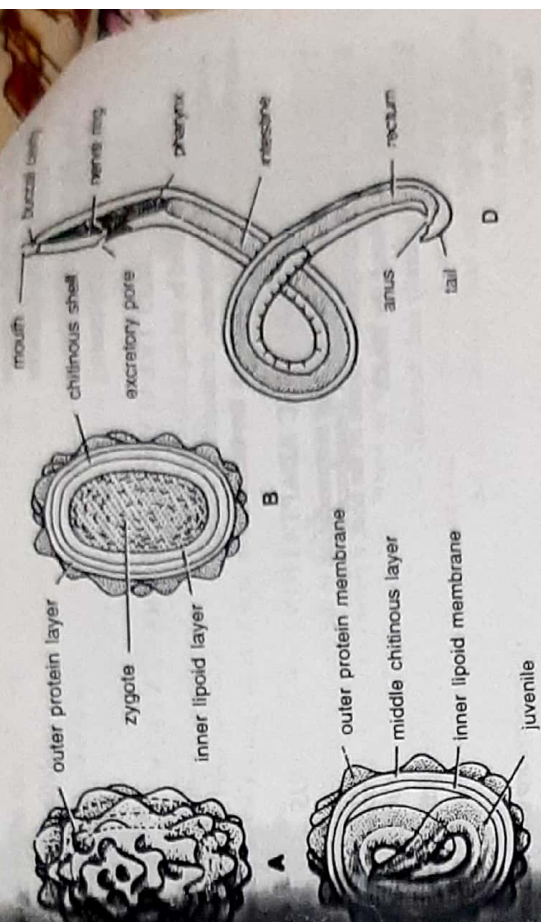


Fig. life cycle of Ascaris.



Ascaris. A—An entire mammulated egg; B—T.S. of a mammulated egg; C—Embryonated egg in section; D—Rhabditiform larva.

The life-history of *Ascaris lumbricoides* can be depicted in a cyclic way as follows:

Swallowed by human being → Fertilized egg → Larvae (develop inside egg shell and moult twice) → Intestine (hatching) → Rhabditiform larvae → Hepatic portal vein → Liver → Right side of heart → Pulmonary artery → to cell stage. Gastrotula.

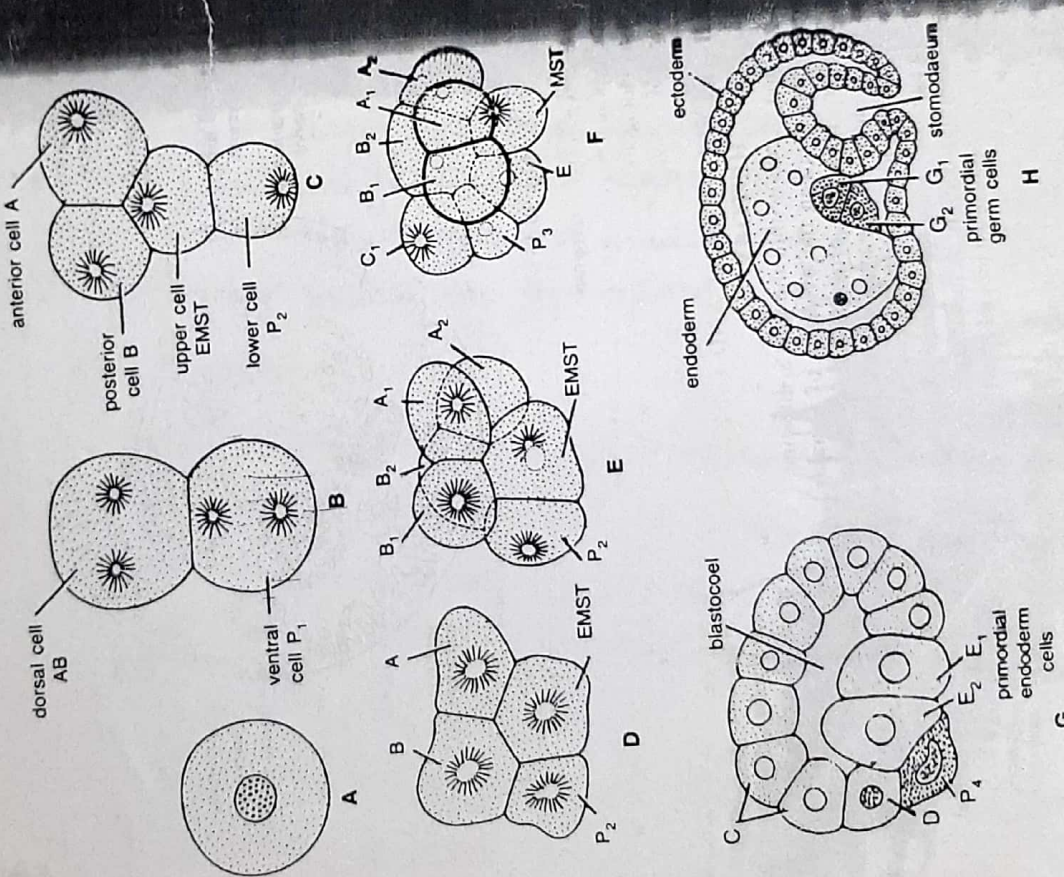


Fig. 30.17. *Ascaris*. A—Various stages of spiral and determinate cleavage. A—Fertilized egg; B—Four-cell stage (T-shaped); C—Six-cell stage (rhomboidal); D—Four-cell stage (T-shaped); E—Six-cell stage; F—Six-cell stage; G—Blastocoel; H—Median saggittal section through blastula.