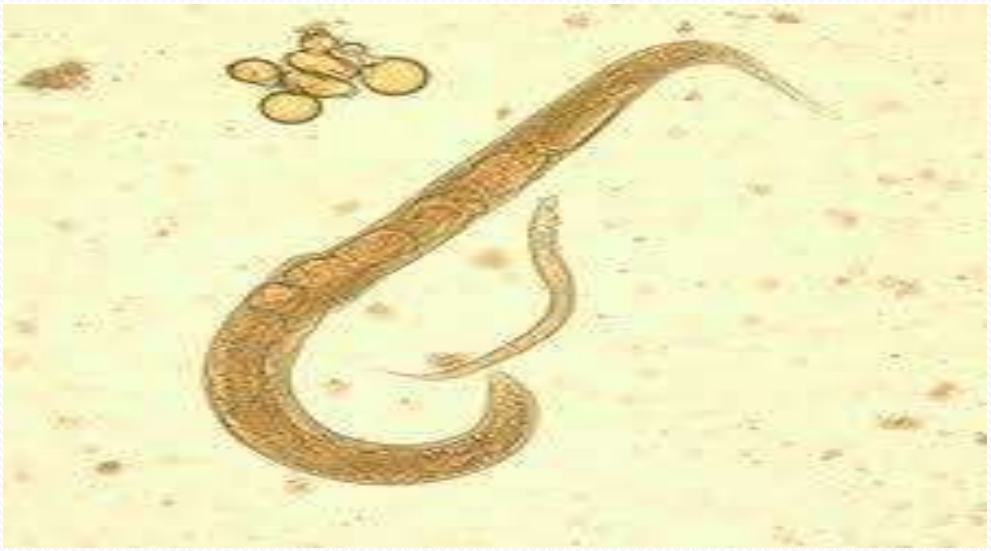
# *Strongyloides stercoralis*



**Presented By: Dr.Asma**

# Introduction

- Habitat: females live in the superficial tissues of the small intestine (duodenum and jejunum)
- Definitive host: Human, dogs and cats
- Route of infection: Filariform larvae penetrate the skin of human.
- Infective stage: Third stage larvae ( filariform).
- Diagnostic stage: First stage larvae(Rhabditiform) in feces.
- **Geographical distribution: -** cosmopolitan parasite, mainly in moist and warm areas of low hygiene

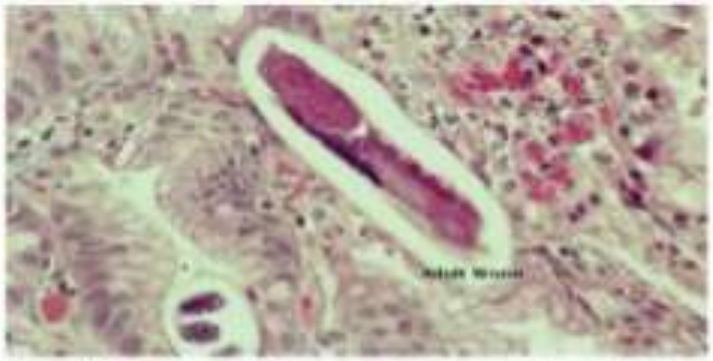


Figure 4: Section of adult worm in gastric biopsy (H and E x 400)

# Introduction

- Human parasitic disease caused by nematode S. Stercoralis.
- Mostly in tropical, subtropical area and temperate climate.
- Affect 30-100 million annually.
- Has two unique life cycle: Free life cycle and Parasitic life cycle.
- Cause by direct contact with contaminated soil and recreational activities.
- Children highly affected to bad sanitation.
- S. stercoralis is a 2 mm long intestinal worm

# Epidemiology

- Relatively uncommon in the US
- BUT, endemic areas in the rural parts of the Southeastern states and the Appalachian mountain area
  - Certain pockets with prevalence 4%
- Usually found in tropical and subtropical countries
  - Prevalence up to 40% in areas of West Africa, the Caribbean, Southeast Asia
- Affects >100 million worldwide
- No sexual or racial disparities. All age groups.

# Morphology

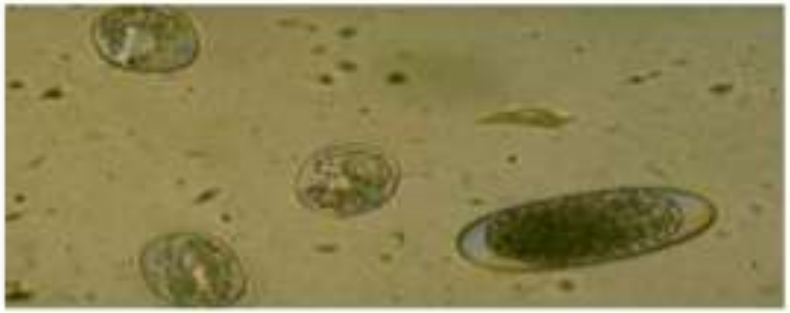
## Egg:

**Size** : 55 x 30 um.

**Shape:** oval . Clear, thin shelled Similar to hookworm but are smaller.

Eggs are laid in the mucosa, hatch into rhabditiform larvae that penetrate the glandular epithelium and pass into the lumen of the intestine and out the feces

(Eggs are seldom seen in stools).



# Morphology

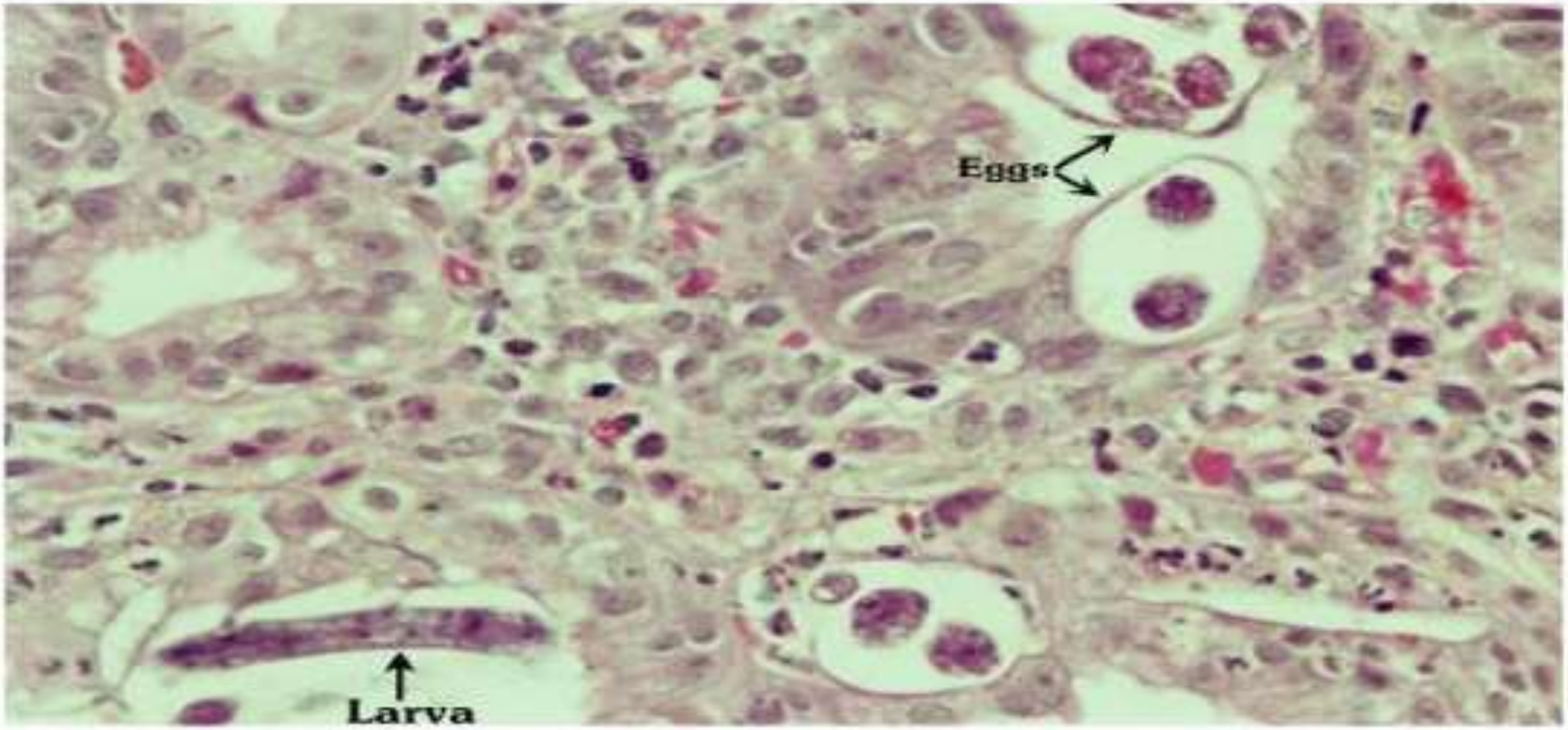



Figure 3: High power view showing details of intramucosal eggs and larvae (H and E x 400)

# Morphology

**Adult:**

**Male (parasitic or free-living):**

- 0.7 mm in length
- Rhabditiform oesophagus
- Posterior end curved ventrally with Spicules

# Morphology

**Parasitic female:**

- 2.2 mm in length
- Cylindrical oesophagus (1/3 body length)
- Posterior end straight

**Free living female:**

- 1 mm in length
- rhabditiform oesophagus
- posterior end straight

# Life Cycle

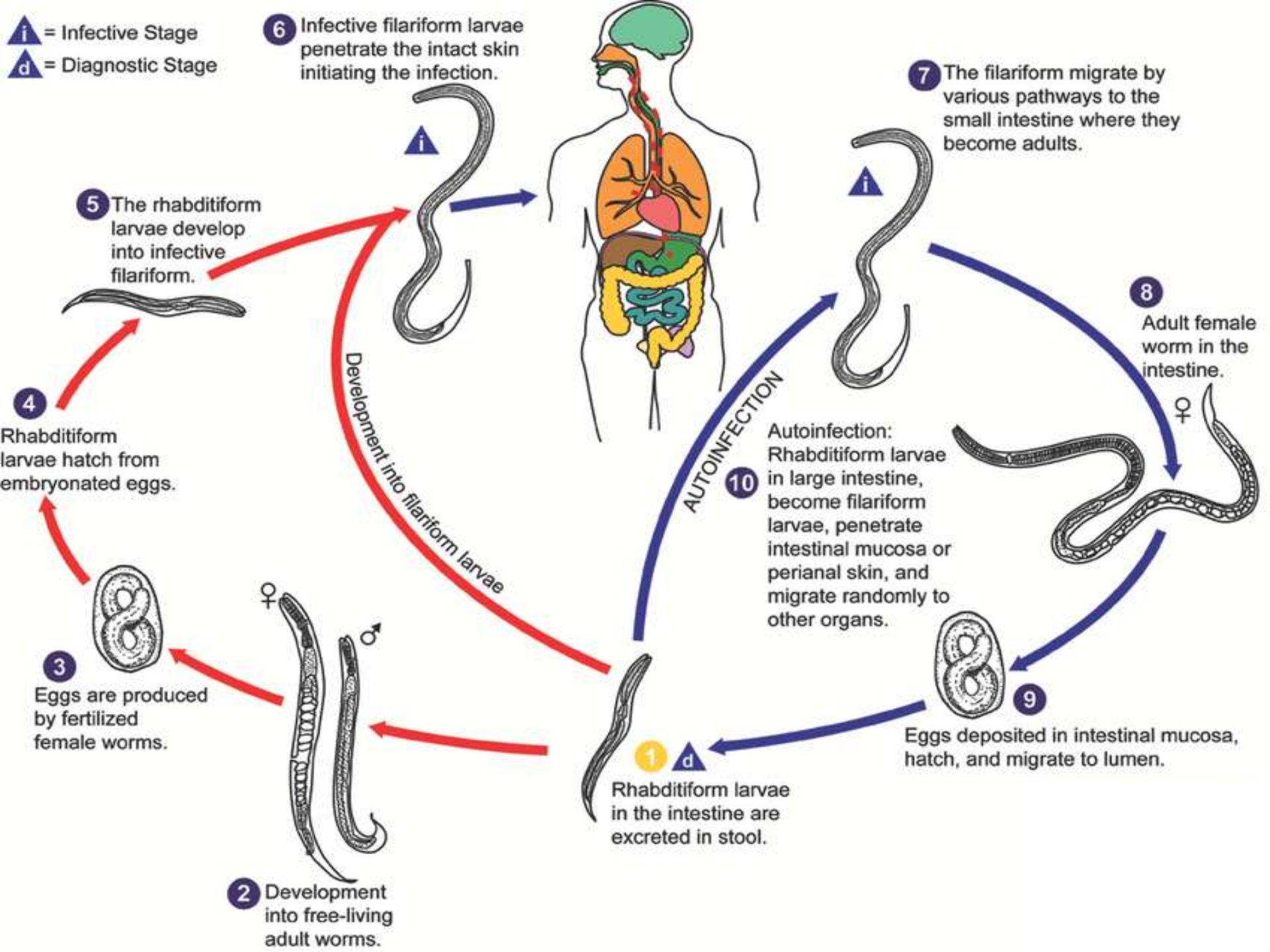
**Free-living cycle**

**Parasitic cycle:** In the parasitic stage, no male form of this organism has been reliably identified, and the female reproduce in a parthinogenitic manner.

# Life Cycle

## 1. Free-living Phase

- Free living *S. stercoralis* dwell in moist soil in warm climates
- Copulation occurs in soil; sperm penetration merely activates the oocyte to develop parthenogenetically with no contribution to the genetic material of the developing embryo
- Following oviposition, eggs hatch in the soil and give rise to 1st stage rhabditiform larvae
- These feed on organic debris, go through several molts and become sexually mature adults
- This free-living heterogonic life cycle may continue indefinitely
- However, if the environment becomes inhospitable, the rhabditform larvae molts to become a nonfeeding filariform larva - the form infective to humans


i = Infective Stage
d = Diagnostic Stage
6 Infective filariform larvae penetrate the intact skin initiating the infection.
7 The filariform migrate by various pathways to the small intestine where they become adults.
5 The rhabditiform larvae develop into infective filariform.
8 Adult female worm in the intestine.
4 Rhabditiform larvae hatch from embryonated eggs.
Development into filariform larvae
AUTOINFECTION
10 Autoinfection: Rhabditiform larvae in large intestine, become filariform larvae, penetrate intestinal mucosa or perianal skin, and migrate randomly to other organs.
3 Eggs are produced by fertilized female worms.
9 Eggs deposited in intestinal mucosa, hatch, and migrate to lumen.
1 d Rhabditiform larvae in the intestine are excreted in stool.
2 Development into free-living adult worms.

# Life Cycle

## 2. Parasitic Phase

- When filariform larvae encounter a human or another suitable host (e.g. cats and dogs), they penetrate the skin and are carried by cutaneous veins to the vena cava

- They enter the right side of the heart and are carried to the lungs via the pulmonary artery

- In the lungs, following a 3rd molt, the larvae rupture from the pulmonary capillaries and enter the alveoli
- From the alveoli, the larvae move up the respiratory tree to the epiglottis
- Abetted by coughing and subsequent swallowing by the host, they migrate over the epiglottis to the esophagus and down into the small intestine, where they undergo a final molt and become sexually mature females

# Pathology

- Invasive : Skin Penetration.
- Pulmonary:  During Cycle or Immigration.
- Intestinal: Tissue  Destruction

# Clinical Presentation/ Aspects

- Acute infection:
  - Lower extremity itching (mild erythematous maculopapular rash at the site of skin penetration)
  - Cough, dyspnea, wheezing
  - Low-grade fevers
  - Epigastric discomfort, nausea, vomiting, diarrhea (n/v/d)

# Laboratory Diagnosis

- Direct stool smears (larvae)
- Cultivation of stool. (Damp charcoal or Harada-Mori mediums).
- Eosinophilia, is present in uncomplicated strongyloidiasis, but is lost in hyper infection
- Histological examination of duodenal or jejunal biopsy specimens obtained by endoscopy can demonstrate adult worms embedded in the mucosa.
- For population screening in endemic areas, an ELISA for IgG *anfi-Strongyloides antibodies is effective.*

# *Trichuris trichuria*

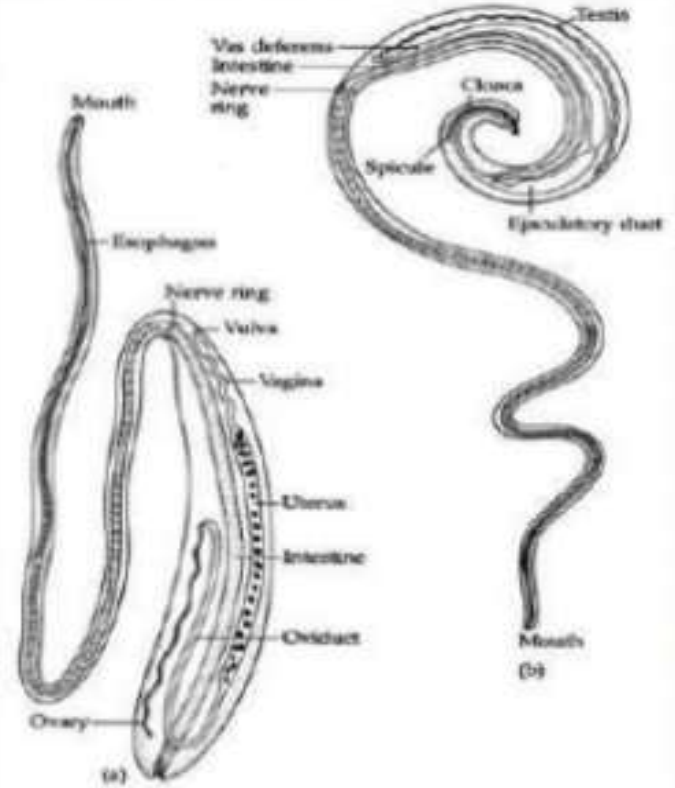
## Introduction

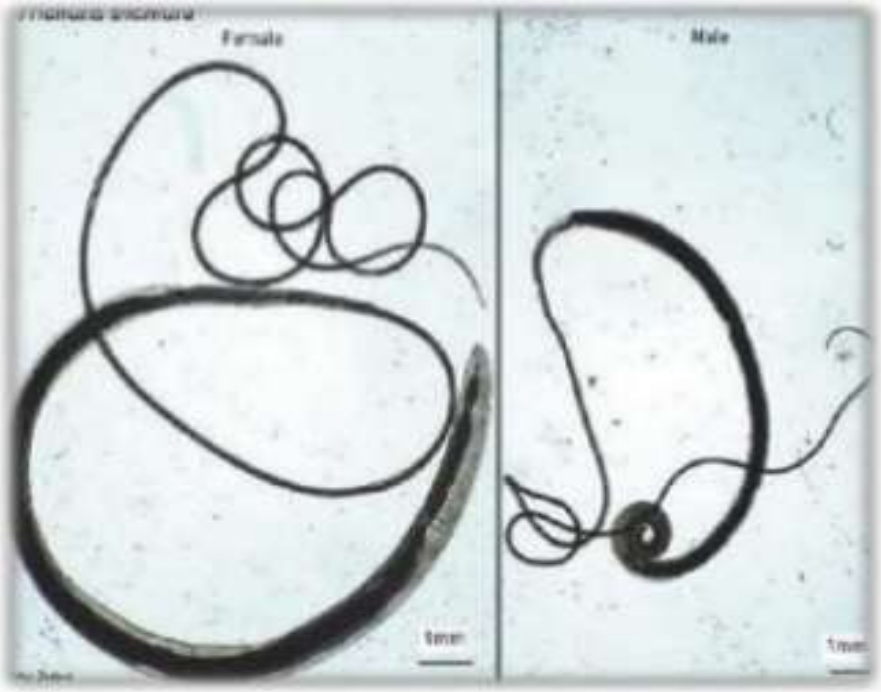
- *Trichuris trichuria* is a parasitic roundworm that cuases disease is also known as trichuriasis.

- It infects a human large intestine .
- It is commonly known as whipworm.
- It occurs in world wide .
- The adult worms live in the large intestine

of man especially the caecum and vermiform appendix

# MORPHOLOGY:



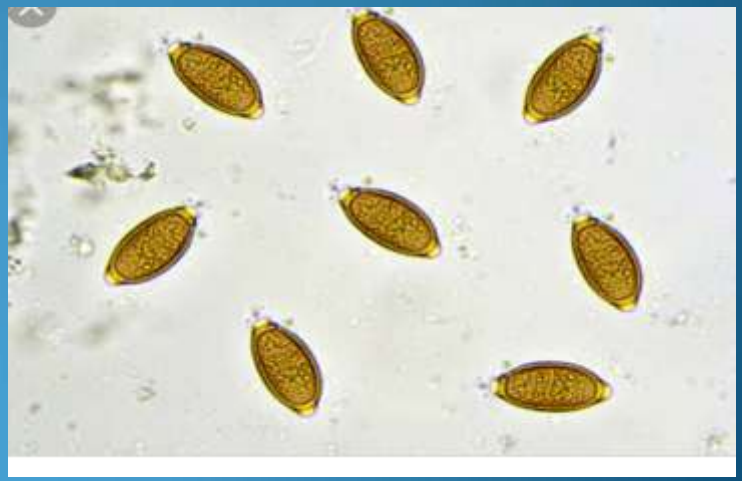

male, 30-45 mm; female, 35-50 mm

# Life cycle

- The life cycle is completed in one host only, but a change of host is necessary to continue the new life cycle.

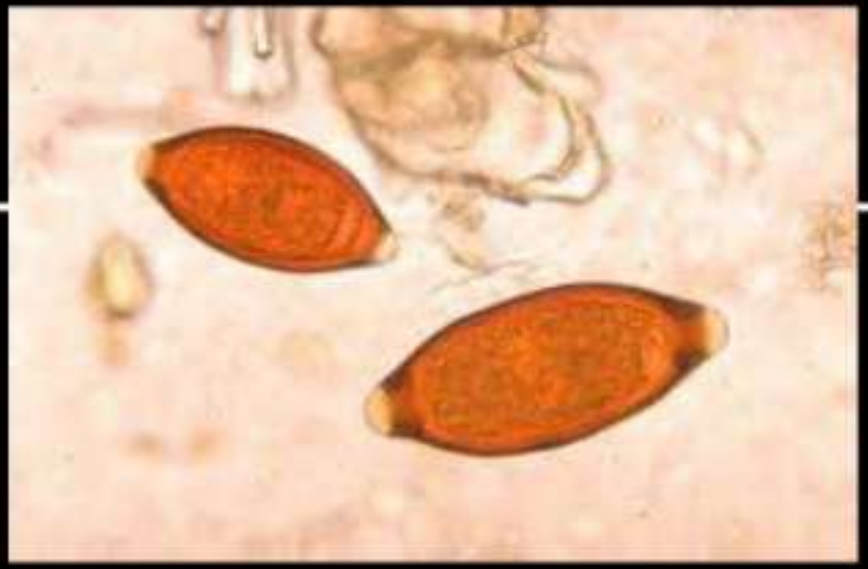
- Eggs when freshly passed are not infective to human beings.

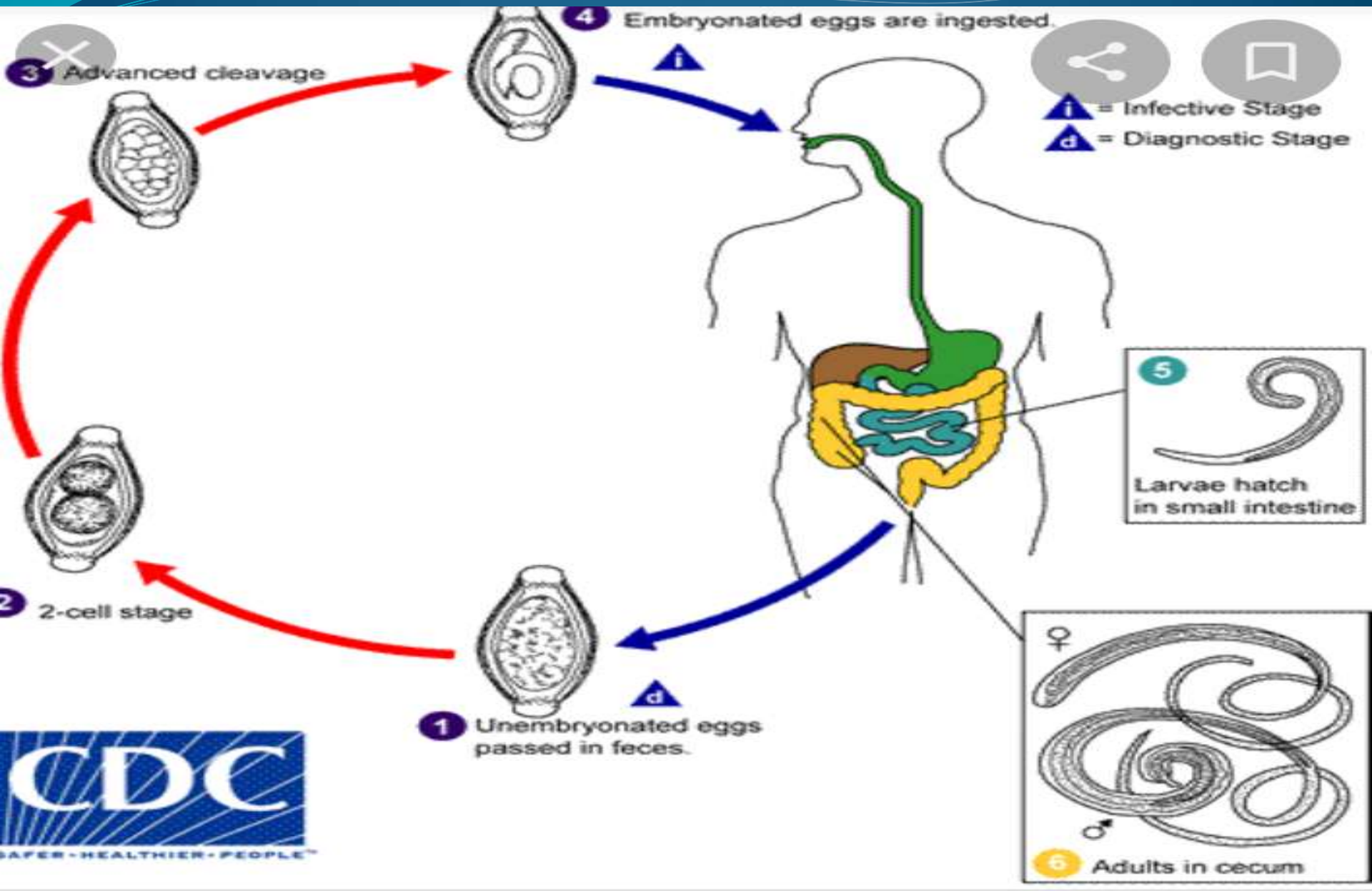
- Eggs start appearing in faeces usually about three months after infection.



## EGGS

- The female fertilized worm produces:
- BARREL-SHAPED EGS WITH THICK, SMOOTH, BROWN EGG SHELLS AND TWO TRANSPARENT PLUGS PROTRUDING FROM BOTH POLES OF THE EGGS




4 Embryonated eggs are ingested.
i
3 Advanced cleavage
i = Infective Stage
d = Diagnostic Stage
5
Larvae hatch
in small intestine
2 2-cell stage
d
1 Unembryonated eggs
passed in feces.
♀
♂
6 Adults in cecum
CDC
SAFER·HEALTHIER·PEOPLE™

# Epidemiology

- There is a worldwide distribution of *Trichuris trichuria,* with an estimated 1 billion human infections.

- It is chiefly tropical, especially in Asia, Africa and South America.

# Symptoms

- Bloody diarrhea
- Painful or frequent defecation
- Abdominal pain
- Nausea
- Vomiting
- Headaches
- Weight loss

# Treatment

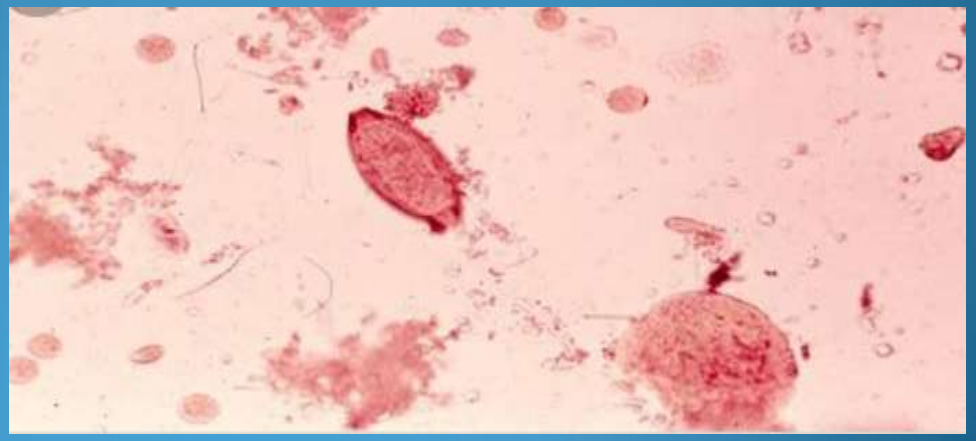
- The single dose of albendazole can be effective in mild to moderate infections but heavier infections require 3 days courses of mebendazole, albendazole.

# Laboratory Diagnosis

## Stool Examination

Following can be observed in stool examination

a) Abundant Charcoat Leyden crystals
b) Ocassionally an adult worm may appear
c) Typical barrel shaped eggs which are easily identifiable in the direct smear of stool.




Thank
You