



# *ASCARIS LUMBRICOIDES* & *ENTEROBIUS VERMICULARIS*

Presented by:

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# *ENTEROBIUS VERMICULARIS*



# INTRODUCTION:

- *Enterobius vermicularis* is a nematode (roundworm) and a common intestinal parasite in humans.
- It has round body with cylindrical ends and a complete digestive system including mouth and anus.
- It has separate sexes, the female is usually larger than male.
- It has a worldwide distribution.



# GEOGRAPHICAL DISTRIBUTION

1

worldwide in distribution(cosmopolitan).

2

World's most common parasite effects children.

## HABITAT

Adult worms are found in the caecum, appendix and adjacent portion of ascending colon.

# MORPHOLOGY

- The body is covered with a highly resistant coating called cuticle.
- The male worm is inconspicuous and has a length of 2 to 5 mm.
- The female is dominant and has length of 8 to 13 mm.

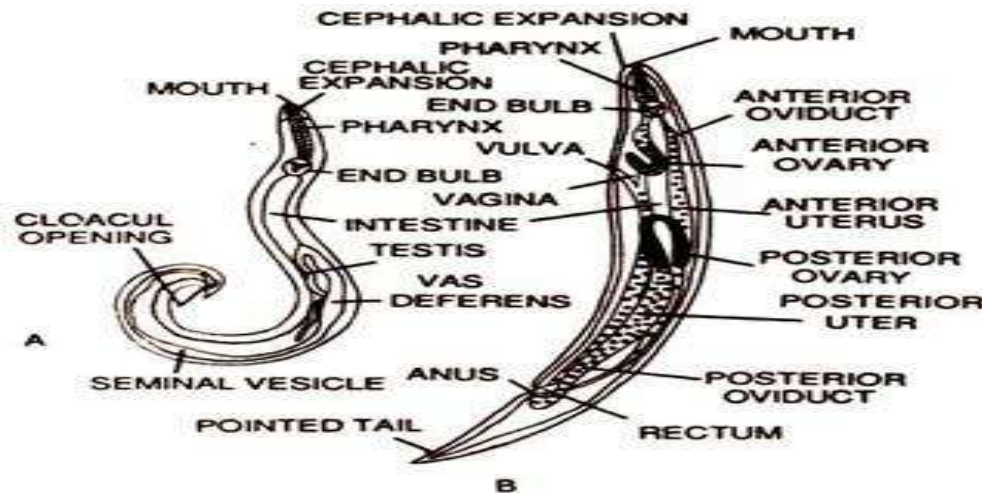


Fig. 11.1 *Enterobius*  
A. male B. Female

## EGGS

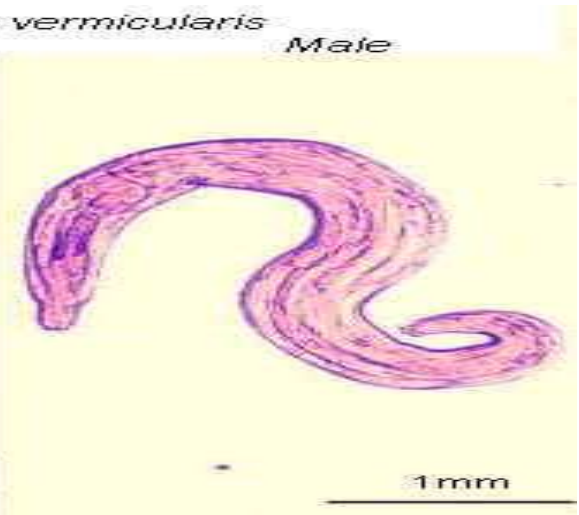
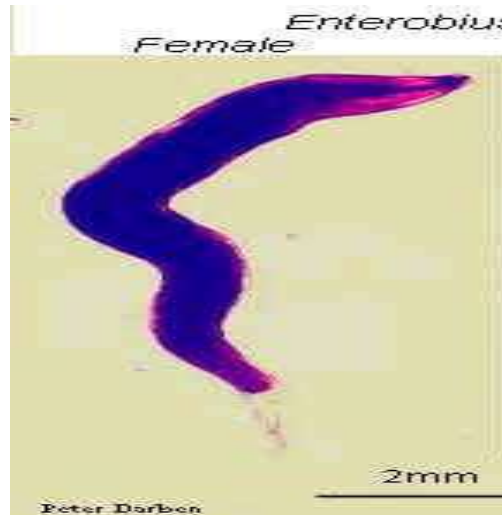
- Flattened on one side
- Plano-convex
- Colourless
- Double counter shell
- Fully formed embryo inside

## ADULT FEMALE

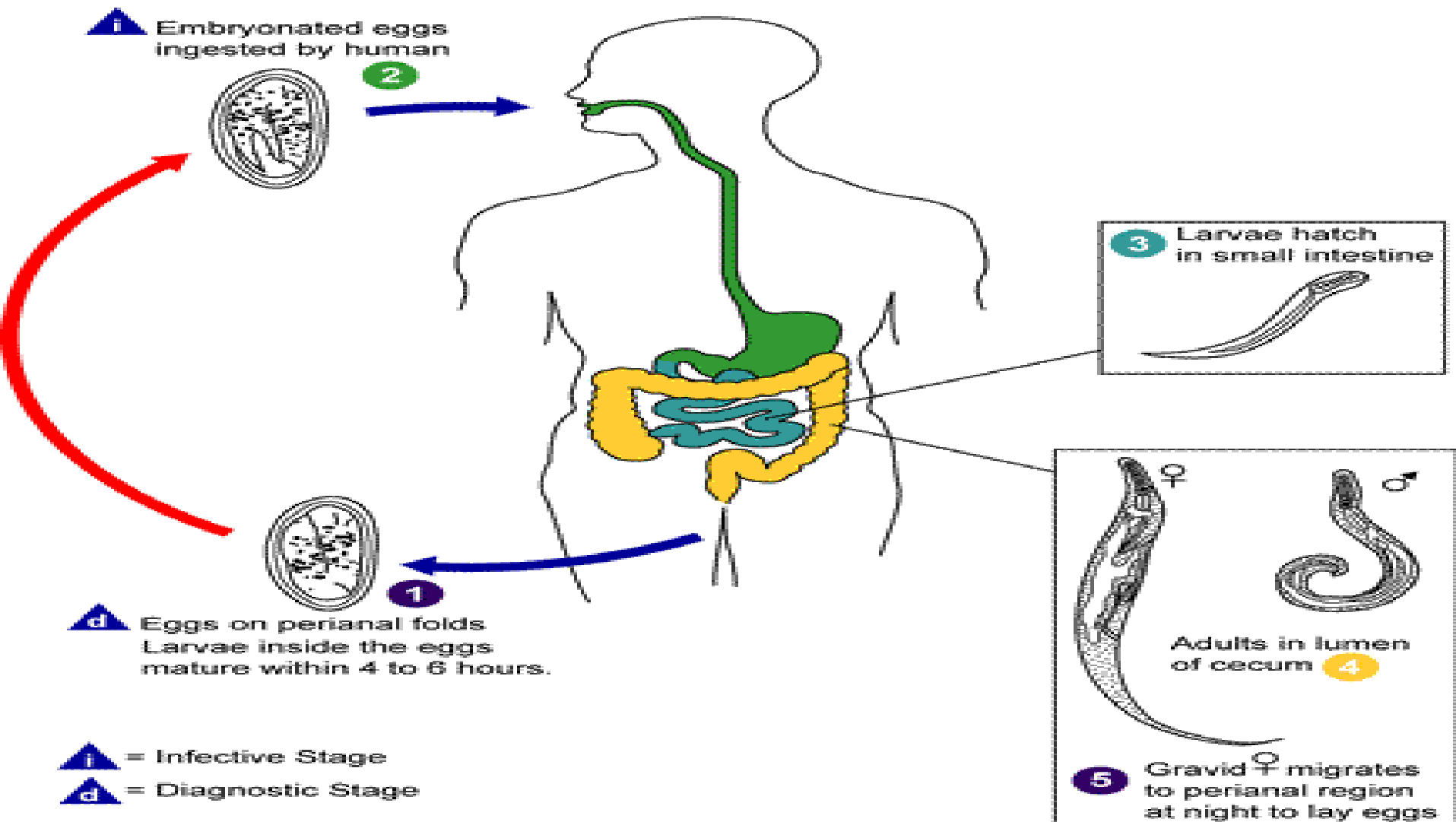
- Long pointed tail
- Slit like vulva in anterior of the body

## ADULT MALE

- Posteriorly curved
- Blunt caudal extremity



# LIFE CYCLE :



# LIFE CYCLE :

- ❑ Humans are the host.
- ❑ Infection occur by ingesting eggs.
- ❑ The larvae hatch from the eggs in the small intestine.
- ❑ The larvae develops into male and female worms.
- ❑ Fertilization occurs in the colon, after that males die.
- ❑ Gravid female migrates nocturnally to the anus and lay eggs, after that female die.
- ❑ The eggs become infectious within 6 hrs.
- ❑ The movement of female worm and the eggs cause itching.
- ❑ Scratching the area may result in retro infection .
- ❑ The time period from ingestion of infected eggs to the ovideposition is approximately one month.



# EPIDEMIOLOGY :

- Found worldwide, most commonly in USA.
- Thumb sucking in and nail biting contributes to the ingestion of eggs.
- Children younger than 12 years of age are most commonly affected group.



# PATHOGENESIS AND CLINICAL FINDINGS.:

- ❑ Perianal pruritus is the most common symptoms.
- ❑ It is thought to be an allergic reaction to the presence of either the adult female or the eggs.
- ❑ Itching of the perianal and vaginal area is commonly notable, especially during night.
- ❑ Weight loss is also observed in severe infections.
- ❑ Scratching predisposes to secondary bacterial infection.

# PATHOGENESIS AND CLINICAL FINDINGS

Infection in man known as enterobiasis:

## **MODE OF INFECTION:**

- Auto-infection
- Retrofection

## **Auto-infection:**

Autoinfection occurs by scratching the perianal area and transferring infective eggs to the mouth with contaminated hands by patients itself. Following ingestion, eggs hatch and release larvae in the small intestine.

## **Retrofection**

Egg laid on the perianal skin immediately hatch in to the infective stage larvae and migrate through the anus to develop into adolescent forms in the colon.

# TREATMENT:

- Mebandazole and albendazole can be used.
- These drugs are given in 1 dose at first, the second dose is repeated after 2 weeks.
- Topical insecticide containing malathion can be applied on skin.



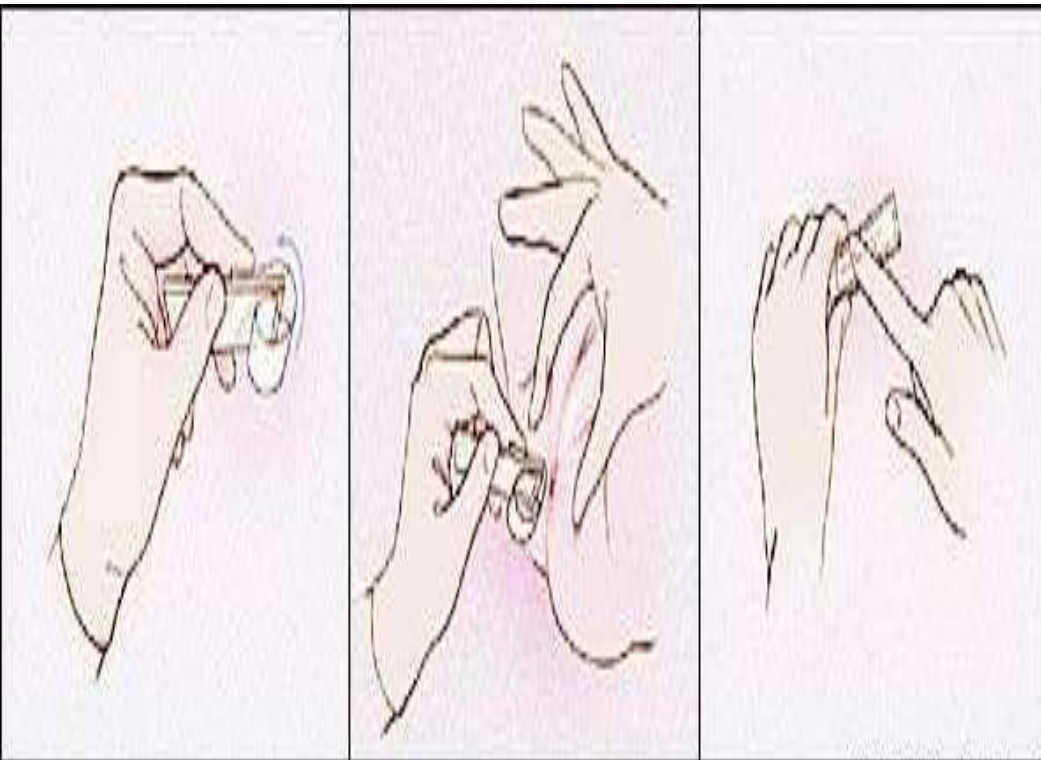
# PREVENTION AND CONTROL:

- Wash the anal area in the morning.
- Change underwear and linen daily.
- Launder the bed sheet in hot water.
- Don't scratch and avoid nail biting .
- Clean toilet seats daily.
- Wash your hand with soap and water.



# LABORATORY DIAGNOSIS

The eggs are recovered from perianal skin by using the scotch tape technique for microscopic examination.



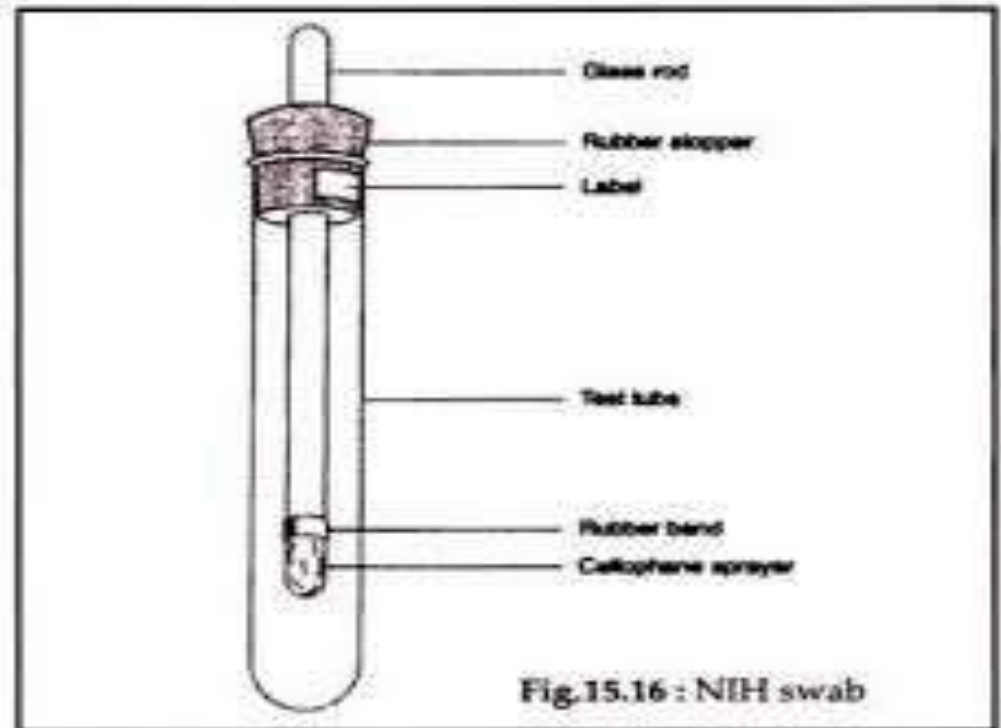
*Enterobius vermicularis* eggs  
as seen in a Scotch Tape Prep  
under high dry magnification



# LABORATORY DIAGNOSIS

Eggs are not found in the stool.

Eggs are generally demonstrated in the scrappings from the perianal skin by a NIH swab.





# *ASCARIS LUMBRICOIDES*



# *Ascaris lumbricoides*

**Common names:**



**Large Intestinal Roundworm**

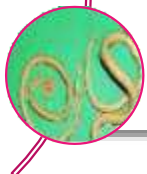


**Roundworm of man**

**Common associated disease and condition names:**



**Ascariasis**



**Roundworm Infection**

# *Ascaris lumbricoides*

- A soil – transmitted helminth.

## **Causes varying degrees of pathology:**



Tissue reaction to the invading larvae



Intestinal irritation to the adult



Other complications due to extraintestinal migration.

- Usual infection of 10-20 worms may not cause symptoms.

# MORPHOLOGY

## □ UNFERTILIZED EGGS

PARAMETER	DESCRIPTION
SIZE	85-95 um by 38-45 um; Size variations possible
SHAPE	Varies
EMBRYO	Unembryonated; Amorphous mass of protoplasm
SHELL	Thin
Other features	Usually corticated

Amorphous mass of protoplasm



Heavy Albuminous Coating  
Thin Shell

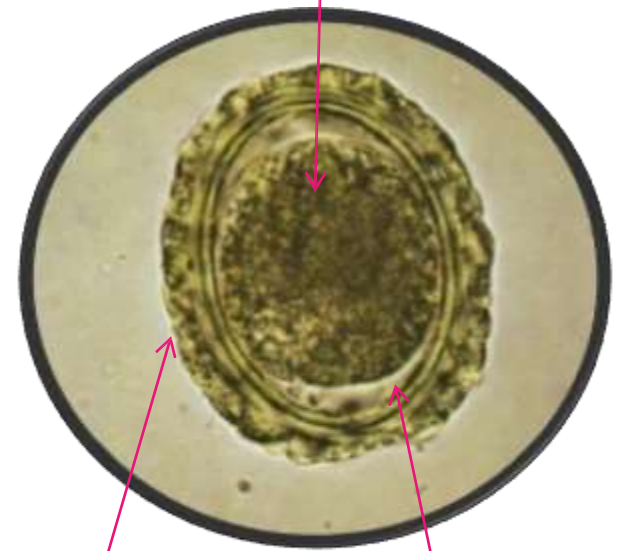
A. *lumbricoides*, unfertilized egg

# MORPHOLOGY

Undeveloped unicellular embryo

## □ FERTILIZED EGGS

PARAMETER	DESCRIPTION
SIZE	40-75 um by 30-50 um
SHAPE	Rounder than non-fertilized version
EMBRYO	Undeveloped unicellular embryo
SHELL	Thick chitin
Other features	May be corticated or decorticated



Coarse Mamilated  
Albuminous Coating  
(Corticated)

Thick chitin shell

*A. lumbricoides*, fertilized egg



**Unfertilized and Fertilized Eggs:**

Females will release unfertilized eggs, which are more elongated (left) than fertilized eggs (right).

Unfertilized eggs may also lack the mammillated layer.

**Fertilized Egg:**

Undeveloped eggs are passed in the stool.  
Stained brown from bile.

**Fertilized Egg:**

Can be Decorticated.

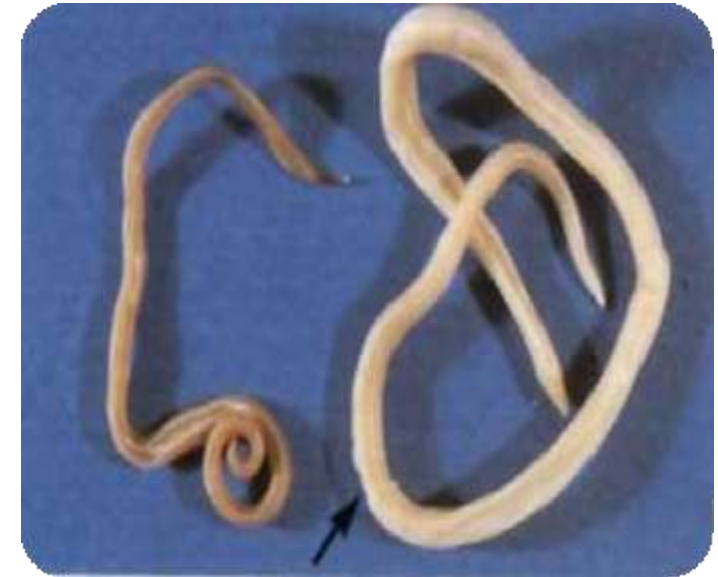
**Developed Egg:**

This egg contains an infective larvae (L2) that could infect a person if ingested.

# MORPHOLOGY

## □ ADULTS

CHARACTERISTIC	FEMALE ADULT	MALE ADULT
SIZE (LENGTH)	22-35 cm	Up to 30 cm
COLOR	Creamy white tint	Creamy pink white pink tint
Other features	Pencil lead thickness;  Paired reproductive organs	Prominent incurved tail with 2 spicules
	200,000 eggs/female/day	



A pair of female and male worms of *A. lumbricoides*. Notice the vulvar waist (arrow) of the female worm and the coiled end of the male worm.

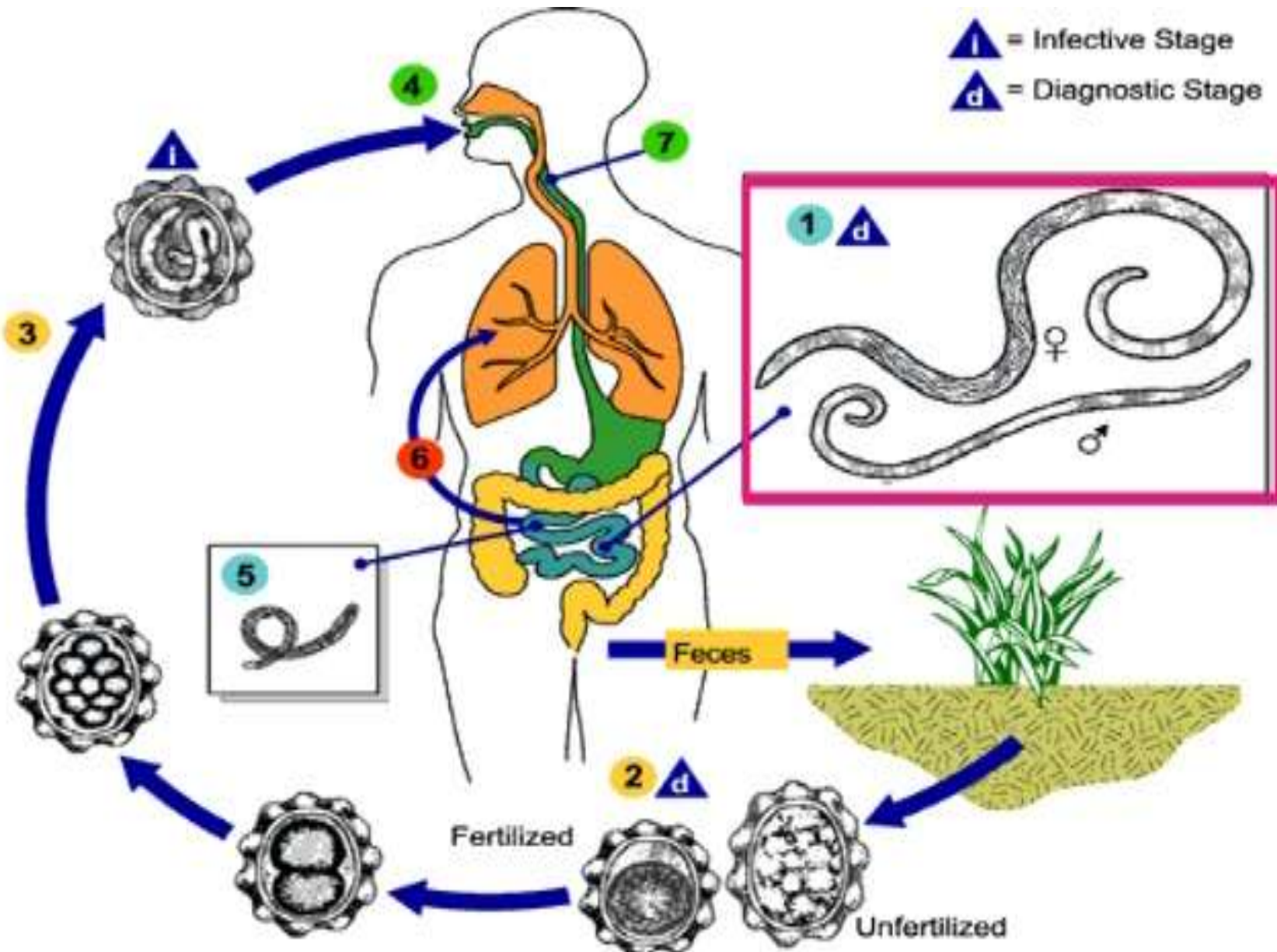
# Life cycle

- ❑ Adult worms live in the lumen of the small intestine.
- ❑ A female may produce up to 240,000 eggs per day, which are passed with the feces.
- ❑ Fertile eggs embryonate and become infective after 18 days to several weeks depending on the environmental conditions.
- ❑ **Infective stage:** fully embryonated ( with 2<sup>nd</sup> stage larvae or Rhabditiform larvae) egg.
- ❑ After infective eggs are swallowed the larvae hatch in the lumen of the small intestine and penetrate the intestinal wall.
- ❑ Larvae enters the venule to go to the liver, to the heart and pulmonary vessels where they break out the capillaries and enter the air sacs, ascend the bronchial tree.
- ❑ In the lungs, larvae undergo molting before migrating to the larynx and oropharynx to be swallowed in the digestive tract.
- ❑ Upon reaching the small intestine, they develop into adult worms.



# LIFE CYCLE

▲ = Infective Stage  
▲<sub>d</sub> = Diagnostic Stage



# LIFE CYCLE

- During the lung migration, the larvae may cause host sensitization resulting in allergic manifestations such as



Lung infiltration



Asthmatic attacks



Edema of the lips

- Eosinophilia and Loeffler's syndrome may also be present during lung migration.

# EPIDEMIOLOGY



Estimated worldwide prevalence of **25% (0.8-1.22 billion people)**.



Most common intestinal helminth infection in the world.



Children are particularly vulnerable.



Risk infection exists wherever fecal disposal is improper.



# EPIDEMIOLOGY



Remains endemic in Africa, South and Central America.



**The global prevalence in 2010:**

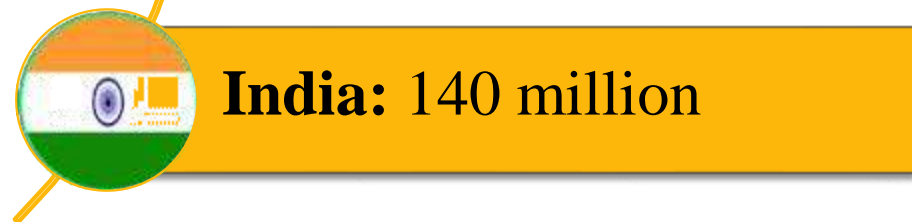
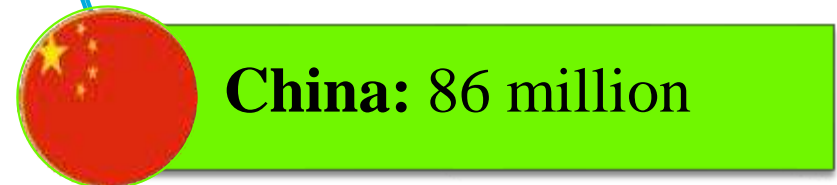
Estimated at 464.6 million people.



In tropical countries, it ranges from **60 to 85%**.



# DISEASE PREVALENCE



# SYMPTOMS

- Pneumonitis during larval migration through the lungs
- Low grade fever
- Dry cough
- Chest discomfort
- Asthmatic wheezing
- Bowel obstruction
- Abdominal distention and tenderness
- Vomiting
- Urticaria

# TREATMENT

## Anti –helminthic drugs



**Albendazole**  
– drug of choice



**Mebendazole**



**Pyrantel pamoate**

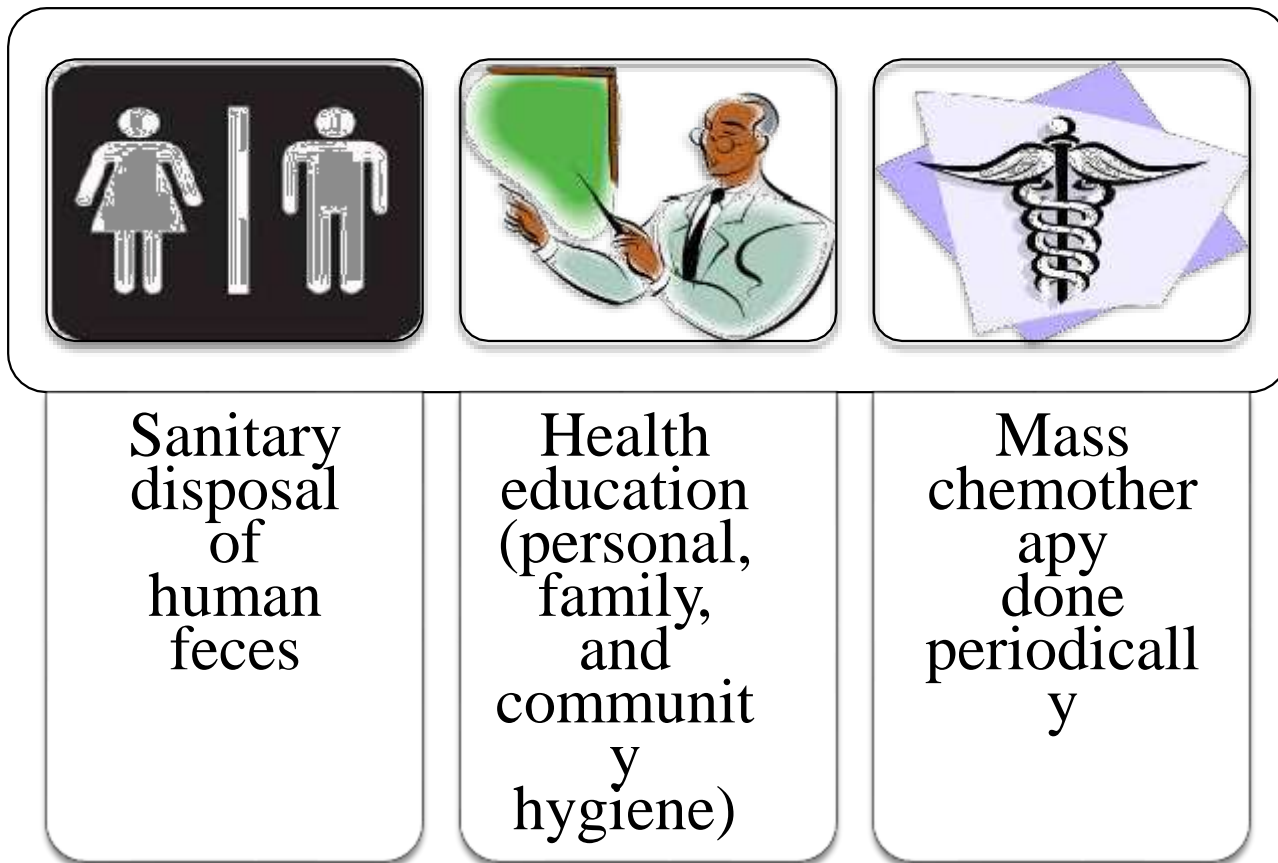


**Piperazine citrate**



# PREVENTION AND CONTROL

Prevention and control measures involve the following:





# LABORATORY DIAGNOSIS

- Specimen of choice for *A. lumbricoides* eggs:  
**Stool**
- Adult worms: may be recovered in several specimen types, depending on the severity of infection. (Intestine, Gallbladder, Liver and Appendix)

# LABORATORY DIAGNOSIS



## Stool Tests

- DFS
- Kato-katz Technique
- Kato technique or cellophane thick methoda
- BEAVER DIRECT SMEAR METHOD (semi-quantitative)
- STOLL'S EGG COUNTING TECHNIQUE



## Blood Tests

- CBC
- ELISA



## Imaging Tests

- X-Ray
- CT Scan
- Ultrasound

THANK YOU! 😊

