

Helminthology – Nematodes Strongyloides

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Classification of Nematodes

Subclass	Order (suborder)	Superfamily	Genus and Species	Probable prevalence in man
Secernentea	Rhabditida	Rhabditoidea	Strongyloides stercoralis	56 million
			Strongyloides myoptami	Occasional
			Strongyloides fuelloborni	Millions
			Strongyloides pyocyanis	Occasional

General Information

- ▶ Primarily a disease of tropical and subtropical areas, highly prevalent in Brazil, Columbia, and SE Asia
- ▶ It is not uncommon in institutional settings in temperate climates (eg mental hospitals, prisons, children's homes)
- ▶ Serious problem in those on immunosuppressive therapy
- ▶ Higher prevalence in areas with a high water table

General Recognition Features

- ▶ Size; parasitic female 2.7 mm, free living female 1.2 mm, free living male 0.9 mm
- ▶ Eggs – 50-58 X 30-34 um
- ▶ The Rhabdiform larvae have a shorter buccal canal vs hookworm
- ▶ Larvae have a double lateral alae, smaller than hookworm
- ▶ *S. fuelloborni* – free living female has a distinct post vulvar constriction

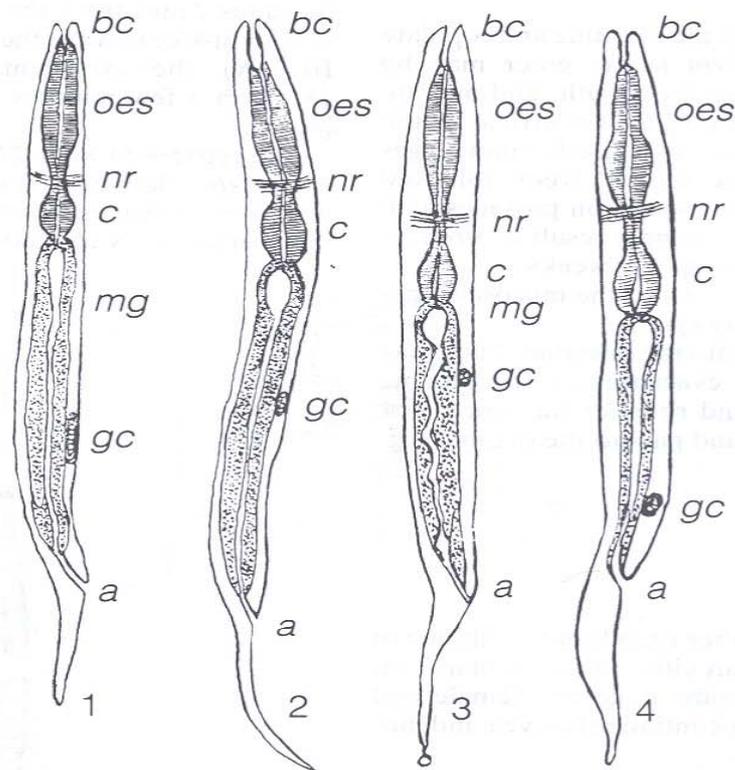


Figure III.73 Distinguishing features of nematode larvae in the faeces. 1, *Strongyloides stercoralis*. 2, *Ancylostoma duodenale*. 3, *Trichostrongylus colubriformis*. 4, *Rhabditis hominis*.

a anus
 mg midgut
 bc buccal cavity
 nr nerve ring
 c cardiac oesophageal bulb
 oes oesophagus
 cg genital cells

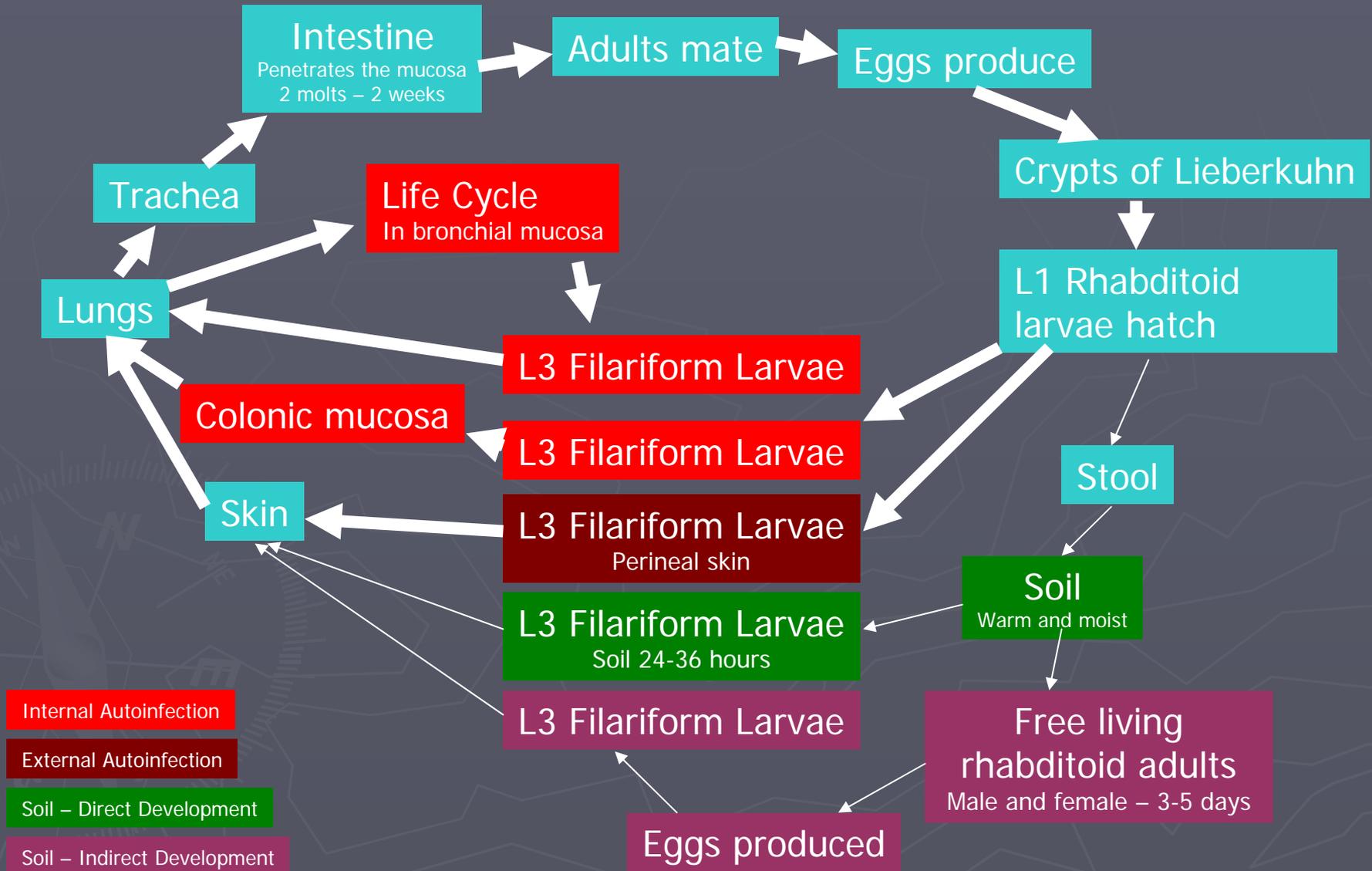
Characters	<i>Strongyloides</i>	<i>Ancylostoma</i>	<i>Trichostrongylus</i>	<i>Rhabditis</i>
Average size	225 × 16 μm	275 × 17 μm	275 × 15 μm	240 × 12 μm
Posterior tip	Blunt	Sharp	Sharp with bead-like swelling	Sharp
Buccal chamber	Shorter than width at tip of head	Longer than width at tip of head	Longer than width at tip of head	Longer than width at tip of head
Genital primordia	Fairly large	Small	Very small	Very small

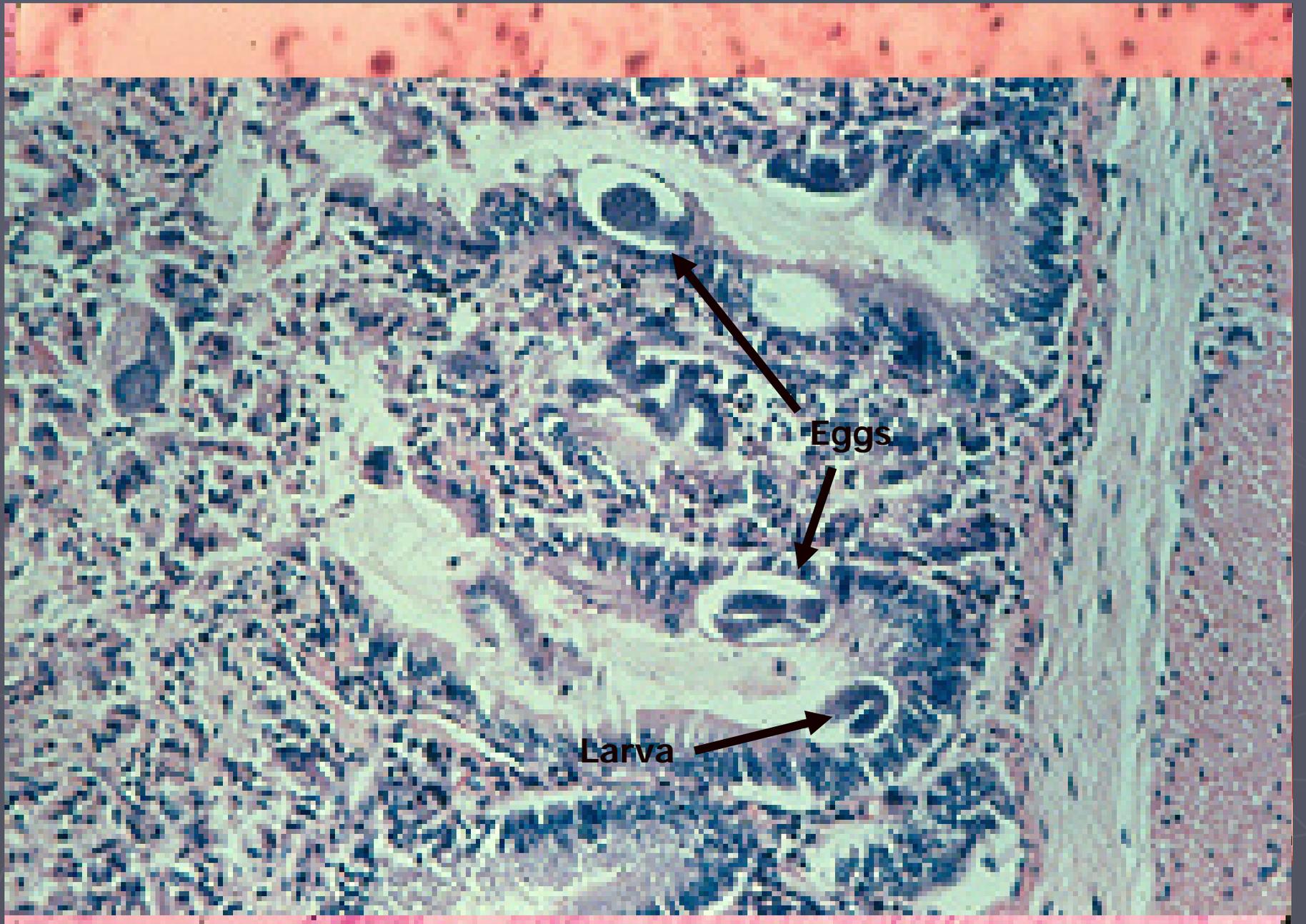


Life Cycle

- ▶ Definitive host
 - *S stercoralis* - man, dogs, primates
 - *S myoptami* – nutrea
 - *S fuelloborni* – man, primates
 - *S pyocyanis* – man, raccoon
- ▶ Stage leaving the body – Rhabdiform larvae
- ▶ Infectious stage for the definitive host – L3 filariform larvae

Life Cycle





Eggs

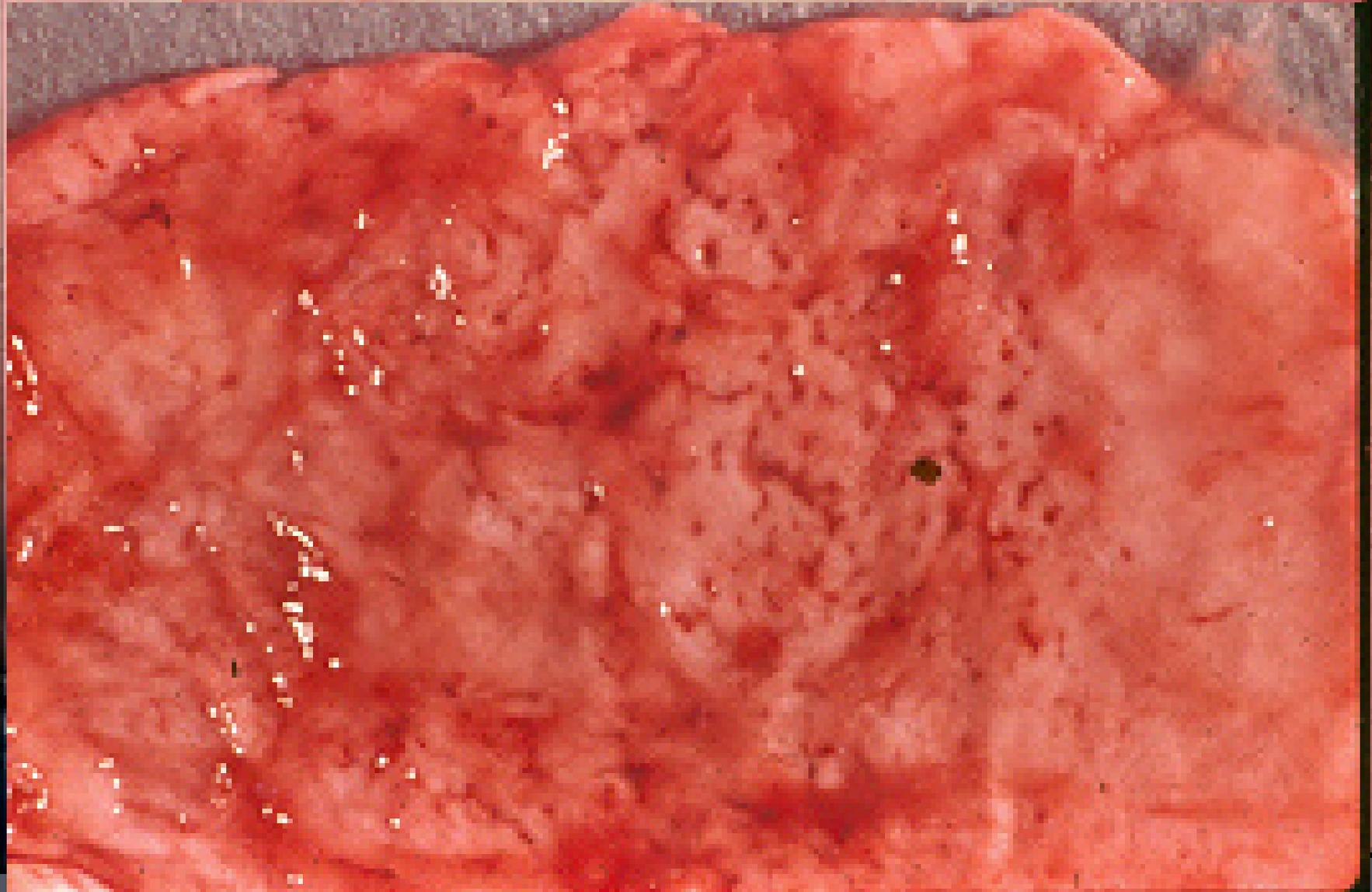
Larva

Life Cycle

- ▶ All filariform larvae can swim
- ▶ Generally strongyloides has a lower prevalence than hookworm
- ▶ Strongyloides L3 filariform larvae are not infectious by the oral route except for *S fuellobourni*
- ▶ Adults are more commonly affected than children
- ▶ The infection usually occurs through exposure to infected soil
- ▶ Transmission by breast milk has been demonstrated in animals and is likely in man
- ▶ Prepatent period – 4 weeks
- ▶ Patent period - 30 + years

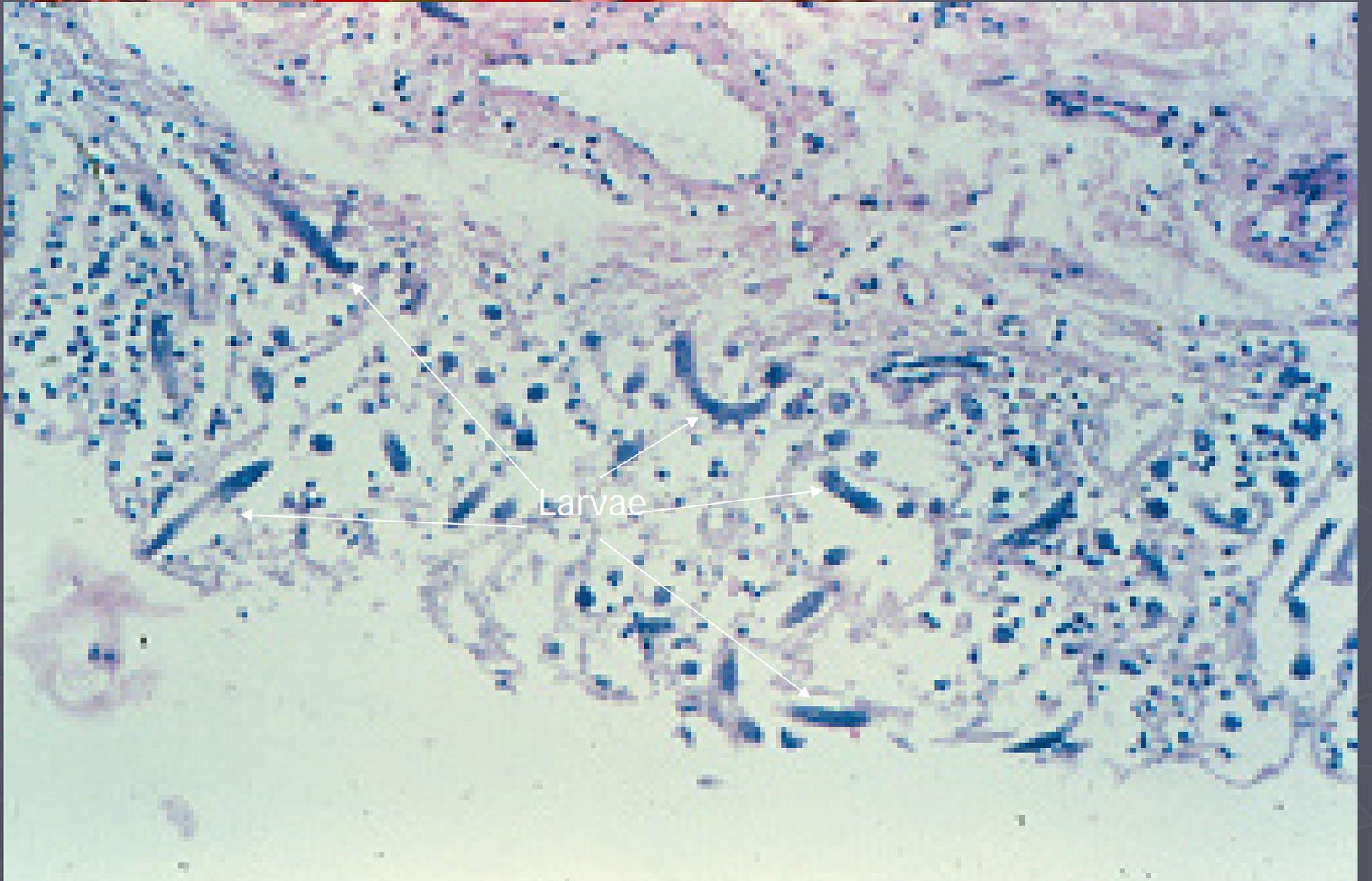
Clinical Presentation

- ▶ Half of the cases are mildly symptomatic or asymptomatic
 - Recurrent rash – Larvae currens – starts from the perianal area and moves rapidly (10 cm / day) to buttocks, thighs and trunk
 - Urticaria
 - Gastrointestinal complaints – mimics peptic ulcer, RUQ pain
 - Chronic pulmonary symptoms
 - Eosinophilia



Clinical Presentation

- ▶ Severe infection – immunocompromised
 - May cause fatal hyperinfection
 - Gastrointestinal – diarrhea, constipation, abdominal pain, nausea and vomiting, malabsorption (fat, B12, protein losing enteropathy)
 - Hypereosinophilia resembling tropical pulmonary eosinophilia (TPE)
 - Leukocytosis



Differential Diagnosis

- ▶ Ascaris
- ▶ Hookworm
- ▶ Schistosomiasis
- ▶ Tropical Pulmonary Eosinophilia
- ▶ Cutaneous Larva Migrans (CLM)
- ▶ Viscera Larva Migrans (VLM)

Diagnosis

- ▶ Stool examination
- ▶ Duodenal fluid
 - Enterotest (HDC Corporation, San Jose, CA)
 - Duodenal aspirate via endoscope
- ▶ Sputum in disseminated infection
- ▶ Serodiagnosis
 - EIA 85% sensitive
 - Cross reaction with filaria infections
- ▶ Eosinophilia - $> 500 / \mu\text{L}$



Treatment

Drug	Adult dosage	Pediatric dosage
Ivermectin (Drug of choice)	200 ug/kg/d X 1-2 days	200 ug/kg/d X 1-2 days
Albendazole (IND drug)	400 mg bid X 7 days	400 mg bid X 7 days
Thiabendazole (Alternate)	50 mg/kg/day divided into q12h doses (maximum 3 gms/day) X 2 days Consider 5 or more days for disseminated disease	50 mg/kg/day divided into q12h doses (maximum 3 gms/day) X 2 days Consider 5 or more days for disseminated disease

Adverse Reactions

Drug	Frequent	Occasional	Rare
Ivermectin		Fever, pruritus, tender lymphnodes, headache, joint and bone pain	hypotension
Albendazole		Diarrhea, abdominal pain	Leukopenia, alopecia, increased serum transaminase levels
Thiabendazole	Nausea, vomiting, vertigo	Leudopenia, crystalluria, rash, hallucinations, olfactory disturbance, erythema multiforme, Steven's Johnson syndrome	Shock, tinnitus, intrahepatic cholestasis, convulsions, angioneurotic edema

Control Measures

- ▶ Sanitary disposal of human waste
- ▶ Education about the risk of infection through bare skin in endemic areas
- ▶ Immunodeficient patient endemic area consider examination of the stool, duodenal fluid and sputum
- ▶ A patient requiring immunosuppressive therapy (eg cancer chemotherapy) from an endemic area consider examination of the stool, duodenal fluid and sputum before treatment with immunosuppressives