LAB11

Kingdom:Animalia

Phylum : Nematoda

A:Class: Secernentea

1-Order:Strongylata

1-Family: Ancylostomatidae (hook worm)

Genus: Ancylostoma duodenale Old World hookworm

: Necator americanes New World hookworm

2-Family: Rhabditida

Genus: Strongyloides stercoralis

2-Order :Ascaridata

Genus: Ascaris lumbricoides

:Enterobius vermicularis

3-Order: Spirurata

Family: Spirurida

Genus: Wuchereria bancrofti

:Onchocerca volvulus

B- Class: Adenophorea (Aphasmidia)

Genus: Trichuris trichiura

Hook worm speices

Site of infection: small intestine

Definitive host: human

No intermediate host

Infective stage: Filariform larvae

Diagnostic stage:egg

Ancylostoma duodenale

Disease name:Ancylostomiasis (Tunnel disease)

Infective stage: filariform larva

Diagnostic stage egg

Morphology:

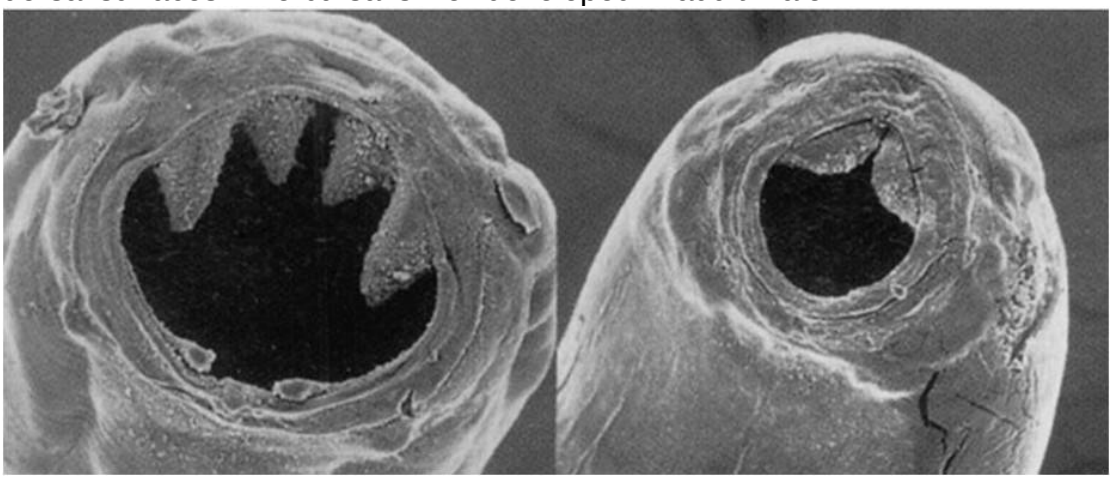
The females are longer than males *Ancylostoma duodenale* buccal cavity bears two hook like teeth on the top and two triangular cutting plates on the bottom

Necator americanes

Disease name:Necatoriasis

Morphology

The buccal cavity has four cutting plates, two on the ventral and two on the dorsal surfaces. The bursa is well developed in adult male.



Symptoms:anemia,malnutrition from protien loss

Laboratory diagnosis:

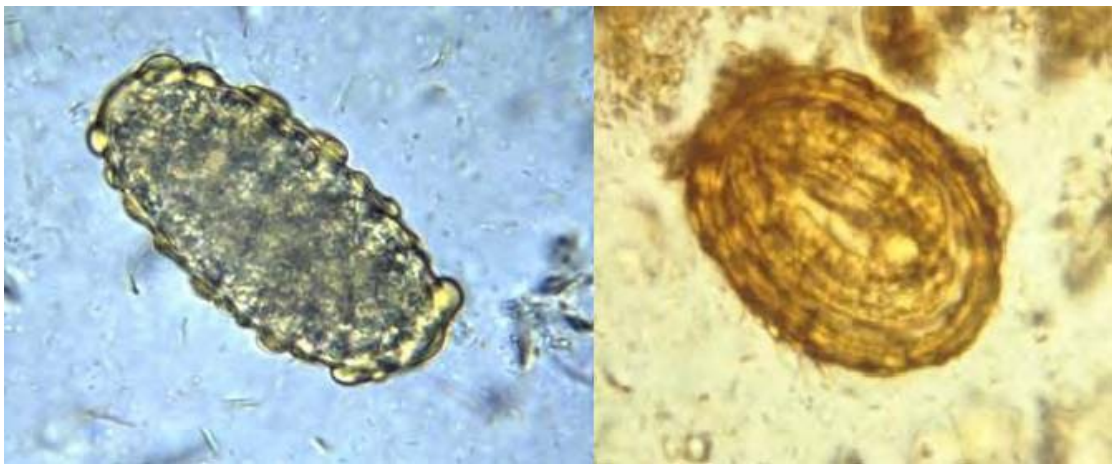
The microscopic examination of stool deposits after an iodine stained, formol-ether concentration method concentration reveals the characteristic ova. The ova are oval and transparent with a smooth thin shell and measure 56-75µm by 36-40µm. The ova of both species of Hookworm are similar.

Ascaris lumbricoides

Disease name :Ascariasis
Site of infection:small intestine

Morphology

Ascaris lumbricoides is the largest intestinal nematodes found in man. The male measures 15cm with a diameter of 3-4µm and has a curled tail with protruding spicules. The female is 20-35cm long with a diameter of 5µm with a straight pointed posterior end. The mouth has one dorsal and two ventral lips. The fertilized ova are easily recognized, oval in shape with a thick wall showing an irregular bumpy surface. They measure 45-75µm by 35-50µm. The outer covering has an albuminoid coat, stained golden brown by bile stain. The unfertilized eggs
are longer and narrower than fertilized eggs.



Symptoms:
Intestinal blockage, vomiting and abdominal pain and malnutrition pneumonitis with cough and low grade fever during the migration of the larvae through the liver and lungs.

Diagnosis:
The microscopic examination of stool deposits after concentration reveals the characteristic bile stained ova.

***.Enterobius vermicularis* - the pinworm**

.Most common helminthes infection in the U.S.A

.Transmission is direct, person-to-person

.Egg is infective immediately or within hours of being shed by the female

.Common worldwide but more prevalent in temperate climates

.Higher prevalence in Caucasians than in Negroes

It is a group infection especially common among children. Very often .associated with low sanitation and hygiene

.Humans are the only known host. Dogs and cats are not infected

Life cycle:

.Eggs are ingested, hatch in intestine, larvae mature to adults
.Gravid females migrate to the perianal area at night to lay eggs
Eggs develop to infective stage within 4-6 hours. Eggs can survive for .extended periods in cool, moist environment
Eggs are found rarely in fecal samples; Release is most often external to .the intestines. Dying worms may release eggs in the bowel

Trichuris trichiura - the whipworm.

Morphology:

Adults - females: 35 to 50 mm long, anterior two-thirds is long and threadlike, expanding into a broader posterior; males: 30 to 45 mm long, .similar to female but exhibiting a strong curvature of tail
Eggs - 50 to 55 x 22 to 25 microns, barrel-shaped, with clear polar plug at .each end

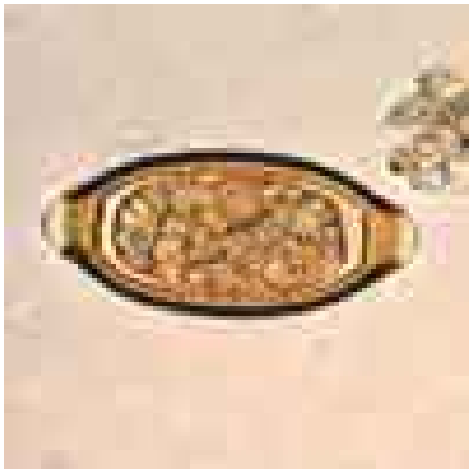
Life cycle:

- Infective, fully embryonated eggs are ingested, larvae hatch in small intestine, penetrate and develop in the intestinal villi, return to lumen and migrate to the area of the cecum.
- Larvae mature and live in the colon. Worms embed their anterior portion (as much as two-thirds of the worm) into the mucosa.

.Barrel-shaped eggs are released into the stool

Eggs must undergo development in the soil for approximately 10 days to .3 weeks before they become infective

The worm's life span is estimated to be 4 - 8 years



.Diagnosis - recovery and identification of eggs in the feces
:Major pathology and symptoms
.Slight infections - usually asymptomatic
Heavy infections - surface of colon is matted with worms which causes .bloody or mucous diarrhea
weight loss and weakness - infections with 200 or more worms in children may cause a chronic dysentery, profound anemia and growth retardation
Major pathology and symptoms: (continued)
.Abdominal pain and tenderness
.increased peristalsis and rectal prolapse, especially in children

Strongyloides stercoralis - The Threadworm

Life cycle: (very complex)

Infective stage: third stage filariform larvae penetrate skin, enter the .lymphatics or bloodstream

.Larvae migrate to the lungs, break out of lung capillaries into alveoli
After maturation, larvae travel to the pharynx, are swallowed, and
.return to the intestine
.Larvae mature to adults and attach to the mucosa of the small intestine
Life cycle: (Continued)
Parthogenetic Females only - no parasitic males. Females are capable of
.unisexual reproduction, no fertilization required. Produce viable eggs
.Eggs hatch in mucosa
Larvae: Are passed in feces, live in the soil, mature into a free-living adult males and females, which produce eggs; Rhabditiform larvae feed in soil and develop into infective stage larvae which penetrate the skin; First stage larvae develop into infective stage larvae in the intestine
.(autoinfection)
:Morphology
Rhabditiform larvae - short buccal cavity; large, prominent genital
.primordium

Filariform larvae - tail has a notch in it, in contrast with the filariform
.larva of hookworms
.Must be able to differentiate these from hookworm larvae
Eggs hatch in the intestine (not usually passed in stool specimens). Eggs resemble hookworm eggs, but are embryonated
:Diagnosis
.Recovery and identification of larvae in the feces
Recovery and identification of eggs in duodenal drainage
:Major pathology and symptoms
Skin – allergic reactions; raised, itchy, red blotches at the site of larval
.penetration
.Lungs – pneumonia
Intestinal - abdominal pain, diarrhea, vomiting, weight loss, anemia, eosinophilia. Light infections usually asymptomatic; Heavy infection -
.bowel becomes edematous and congested
Death occurs in immunosuppressed patients due to heavy autoinfection
Strongyloides stercoralis - The Threadworm (Continued)
.Distribution - worldwide, similar to hookworm

While hookworm infection dies out over a period of years after the patient has moved from an endemic area, strongyloidiasis may persist for .years, due to autoinfection (internal infection)

In cases with severe diarrhea, Strongyloides eggs may be present in stool specimens. These must be differentiated from hookworm eggs. Strongyloides eggs contain well-developed larvae. Hookworm eggs do not have well developed larvae until passed from the body and mature for one to two weeks in the soil. The Filarial Worms

:Wuchereria bancrofti

Bancroft's Filariasis." A blood & lymphatic dweller. The infection" .often results in elephantiasis

.Vectors - Culex, Aedes, & Anopheles mosquitoes

Diagnosis - Detection and identification of microfilaria in stained blood smears. Exhibits a marked circadian migration, best seen at night after 10 .P.M

Morphology - Microfilariae are sheathed, and the nuclear column does .not extend to tip of tail

The Filarial Worms

:Wuchereria bancrofti

– Major pathology and symptoms

Swelling, due to allergic reaction occurring around adult worms, produces obstruction & elephantiasis. Each individual reacts differently. .Very few develop elephantiasis, but in some this is extensive

The Filarial Worms

:Onchocerca volvulus

The "blinding filaria." Infections involve the dermis and .subcutaneous tissues, where adults gather within nodules

.Vector - Simulium flies (blackfly, or buffalo gnat)

.Diagnosis - microfilariae are found in skin scrapings from around nodules

Morphology - Microfilariae not sheathed; found only in skin, not in the blood stream

The Filarial Worms

:Onchocerca volvulus

- Major pathology and symptoms

Characterized by fibrotic nodules which encapsulate adults, usually on the trunk in Africa, and on the head in central America. A progressive, allergic skin rash develops. Blindness occurs due to the presence of microfilariae in ocular structures. This parasite is a major cause of blindness in Africa. Control is difficult because Simulium flies breed in running water.