Parasitology.

Filarial worms - the hair like nematodes.

Characteristics.

All use intermediate hosts - arthropods of some kind. Mites, blackflies, mosquitoes.

Many species have endo-symbionts - *Wolbachia* as essential endosymbionts. The nematodes cannot live without the bacterial endosymbionts.

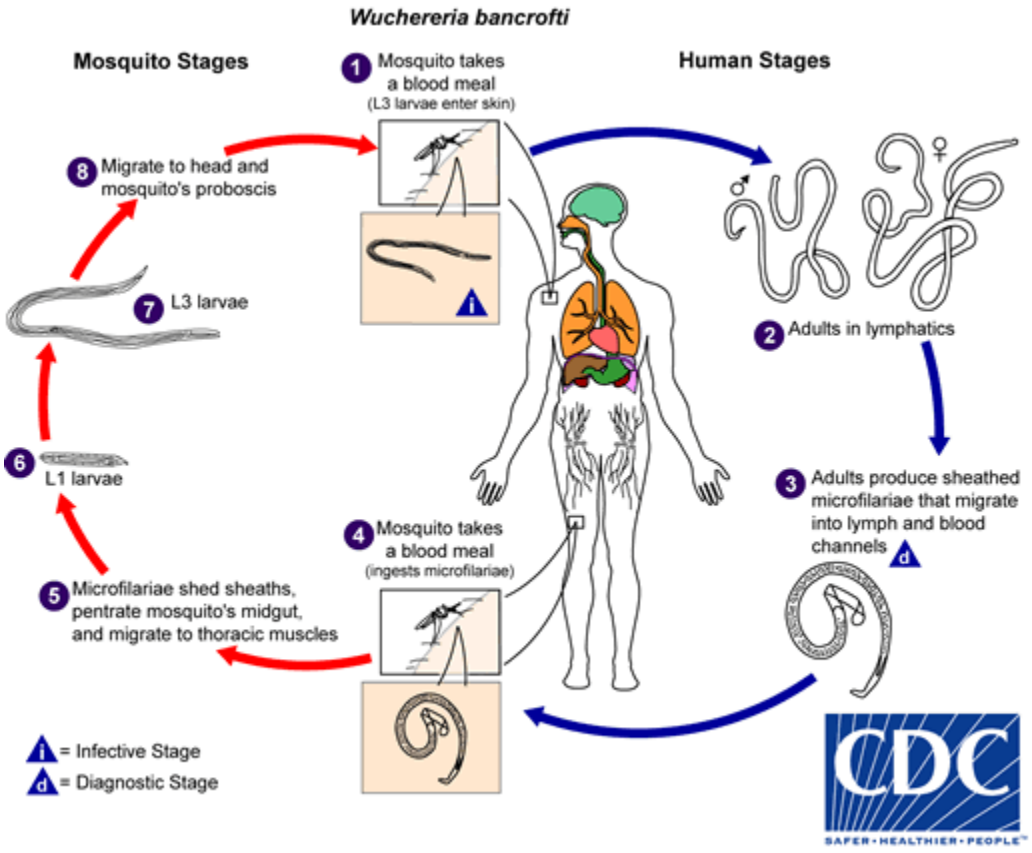
Order Filariata - adults live in tissues of vertebrate host.

F. Onchocercidae

Many genera that occur in vertebrates (no fish yet). -cosmopolitan-

Species of human health importance.

Wuchereria bancrofti, *Loa loa, Brugia malayi, Onchocerca volvulus*



Wuchereria bancrofti

-Bancroftian filariasis - also causes elephantiasis

Distribution: Africa, Asia, Pacific Islands, South America

-originally in Africa, probably disseminated with people from Africa world-wide.

Adults Males 40 mm, females 6 - 10 cm.

See life cycle (usually we call the developing nematans Juveniles instead of Larvae).

Lymphatic system - adults - cause blockages - thus, the lymph system builds up long term causing connective tissue to increase due to permanent edema.

*microfilariae are released into the lymph system by ovoviparous females. Enter blood via lymphatic thoracic duct to blood stream.

*microfilariae cycle deep in blood in daytime, and emerge into periph. circulation during night time. Adapted to mosquitoe host. 3rd stage juveniles are infective and stay in proboscis of mosquito.

*Vectors - *Anopheles*, *Mansonia*, and some others. - see life cycle. See book for control measures. Best way is mosquito control.

*Treatment - Diethyl Carbamazide - laced table salt. Surgery for disfigurment.

(Brugia malayi) - good lab model that is easily maintained in rodents.

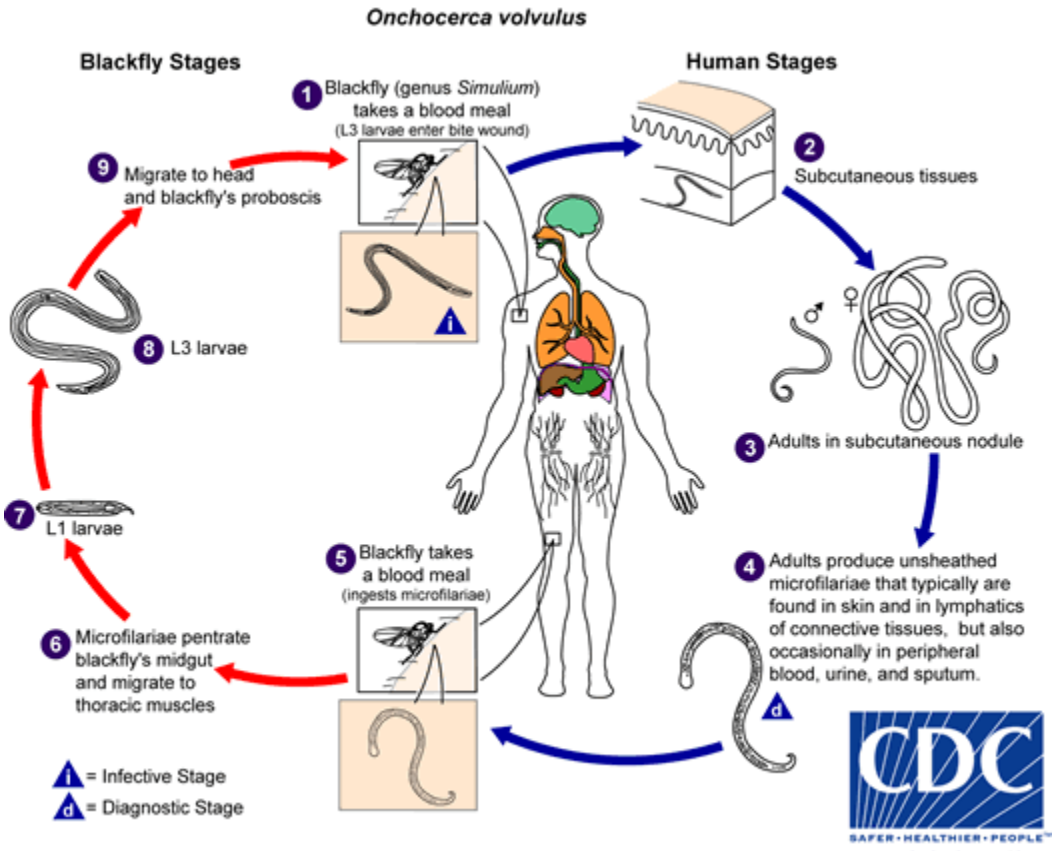
Onchocerca volvulus

Human parasite - no known reserviors. *Intermediate host necessary - Blackflies of the genus *Simulium* (F. Simuliidae) - the larvae of simluiids live in fast flowing streams, they are shredders, and eat organic material and attach to the substrate with silken threads. DDT kills them, and so does Malathion - thus these intense chemicals are used to try to rid the areas of Africa of these nematans - in addition to using ivermectin in the people that kills microfilaria in the blood. Recall the story of Bill Campbell - a good friend of the Manter Laboratory.

*Riverblindness - Africa and central and south America. Originally in Africa, transferred to the Americas by people.

*responds to ivermectin - Wolbachia is necessary for the juveniles and adults to live.

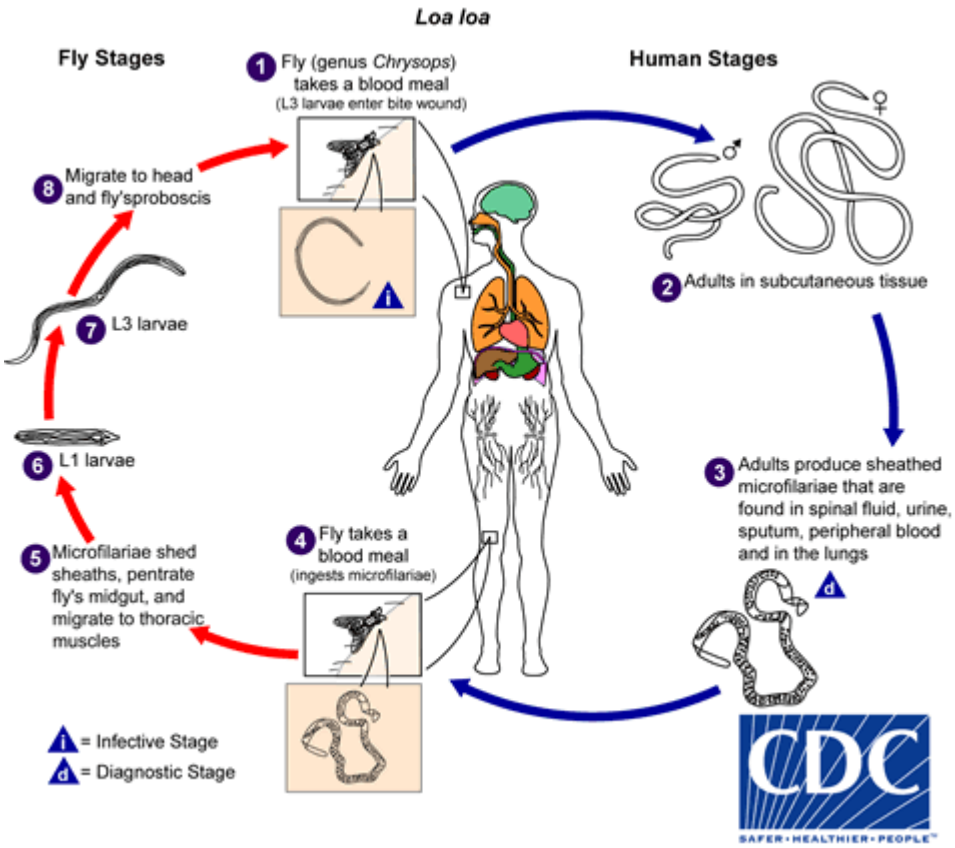
*One dose every 6 months keeps the microfilaria out of the bloodstream and repeated doses kills adults.



Loa loa

Eyeworm of Africa. Calabar Swellings -

Transmitted by biting tabanidae. *Chrysops* is the genus of this dastardly species that transmits this nematan.



- Padgett JJ, Jacobsen KH. Loiasis: African eye worm. *Transactions of the Royal Society of Tropical Medicine and Hygiene* 2008; 102: 983–89.
- Boussinesq M. Loiasis. *Annals of Tropical Medicine and Parasitology* 2006; 100: 715–31.
- Lipner EM, Law MA, Barnett E, Keystone JS, von Sonnenburg F, Loutan L, Prevots DR, Klion AD, Nutman TB.

Other Filarioid parasites of Mammals.

Litomosa - occurs in bats in Africa.
Litomosoides - occurs in bats and rodents and marsupials in the Neotropics and Nearctic.
Ackertia - occurs in rodents in the Nearctic.
Most of these nematodes possess endocymbiotic bacteria (Wolbachia).

See the following for some additional reading:

1. Jiménez-Ruiz, F.A.; **Gardner**, **S.L.**, Cervantes, F.A.; Lorenzo, C. 2004. A new species of *Pelecitus* (Filarioidea: Onchocercidae) from the endangered tehuantepec jackrabbit *Lepus flavigularis*. *Journal of Parasitology* 90: 803-807.
2. Brant, S.V.; **Gardner**, **S.L**. 2000. Phylogeny of species of the genus *Litomosoides* (Nemata: Onchocercidae), evidence of rampant host-switching. *Journal of Parasitology* 83: 545-554.
3. Brant, S.V.**; Gardner**, **S.L**. 1997. Two new species of *Litomosoides* (Nemata: Onchocercidae) from *Ctenomys opimus* (Rodentia: Ctenomyidae) from the Altiplano of Bolivia. *Journal of Parasitology* 83: 700-705.
4. **Gardner**, **S.L.**; Schmidt, G.D. 1986. Two new species of *Litomosoides* (Nematoda: Onchocercidae) from pocket gophers (Rodentia: Geomyidae) in Colorado. *Systematic Parasitology* 8: 235-242.
5. Pitts, R.M.; **Gardner**, **S.L.**; Smolen, M.J.; Craig, T.M. 1990. First reported occurrence of the filarioid nematode, *Litomosoides westi* in *Geomys personatus. Texas Journal of Science* 42: 416.
6. Guererro, R.; Martin, C.; **Gardner**, **S.L.**; Bain, O. 2002. New and known species of *Litomosoides* (Nematoda: Filaroidea): important adult and larval characters and taxonomic changes. *Comparative Parasitology* 69: 177-195.
7. Casiraghi, M.; Bain, O.; Guerrero, R.; Martin, C.; Pocacqua, V.; **Gardner, S.L.**; Francheschi, A.; Bandi, C. 2004. Mapping the presence of *Wolbachia pipientis* on the phylogeny of filarial nematodes: evidence for symbiont loss during evolution. *International Journal for Parasitology* 34: 191-203.