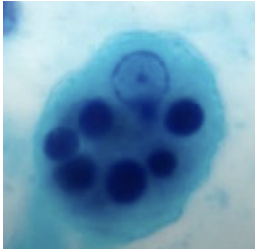
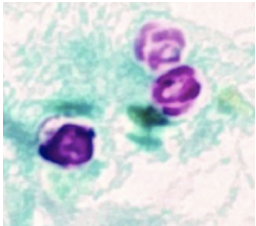


Chp 1- Protozoa of the Intestinal Tract

Bug	Characteristics	Virulence factors	Diseases	Treatments
Giardia lamblia	Fecal oral transmission, by cysts Seen in hikers and campers- who drink water from stream	Trophozoites attach but dont invade intestinal wall -causes inflammation and villous atrophy --> reduce absorptive capacity of gut  Trophozoites	Bloating, diarrhea (foul-smelling/steatorrhea), flatulence -increase mucus production, cant RA fat --> malabsorption Dx: trophozoites in stool (O&P test) -or ag in ELISA Some Trophozoites in the intestines can turn into cysts --> feces --> infect others 	metronidazole
Entamoeba histolytica	Cysts ingested by drinking water, also in anal-oral transmission (MSM)	Cysts mature in trophozoites in GI --> invade--> blood --> liver Invasive O&P- has endocytosed RBCs	Bloody diarrhea Multiple and single abscess- anchovy paste -usually right lobe, singular -RUQ pain Flask-shaped ulcers in colon Dx: cysts or trophozoites in stool (trophozoites endocytosed RBCs), ELISA, serology, colonoscopy Ddx: echinococcus, also makes liver abscesses	Metronidazole Paramycin/iodoquinol- luminal agent to eliminate cysts Dont drain!

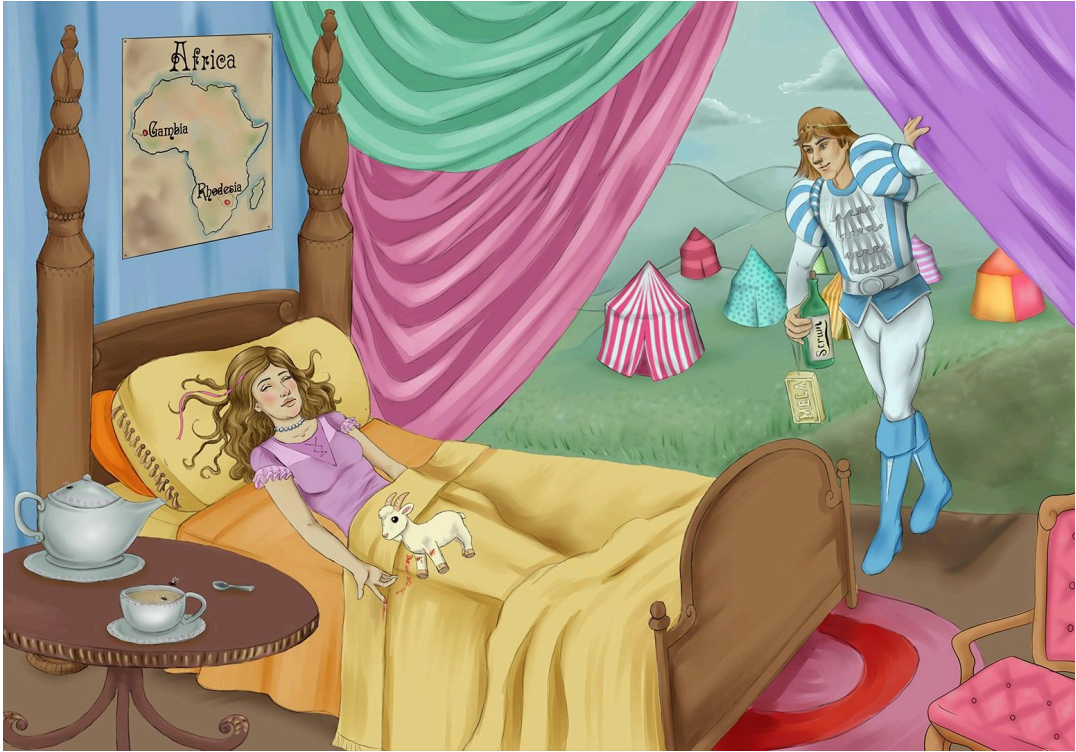
				
Cryptosporidium spp.	Oocytes acid fast Oocytes in feces transmitted to humans	Cysts contain 4 motile sporozoites -sporozoites attach to small intestinal wall (can be large too)  Oocytes acid fast	Severe diarrhea in immunocompromised (AIDS) -MCC diarrhea in HIV pts In swimming pools- kids get it, mild diarrhea -also seen in campers and people who work with animals Resistant to chlorination -filtration can remove oocytes Dx: cysts in stool	Nitazoxanide “knitted socks” Spiramycin (macrolide)



Chp 2- Protozoa of the CNS

Bug	Characteristics	Diseases	Treatments
Toxoplasma gondii	Found in cats Pregnant women and cat owners, immunocomp (HIV) are at risk Also transmitted through raw meat, oocytes in feces, transplacental transfer (don't change litter boxes while preg) Dx: intramuscular cysts Large population has been	No sym in immunocompetent Ring enhancing lesions on CT or MRI -usually multiple lesions Encephalitis -need to biopsy to diff from CNS lymphoma Congenital -intracranial Ca²⁺ -hydrocephalus- seizures -choreoretinitis -hearing loss	Sulfadiazine Pyrimethamine Prophylaxis when CD4 <100 when + IgG --TMP-SMX

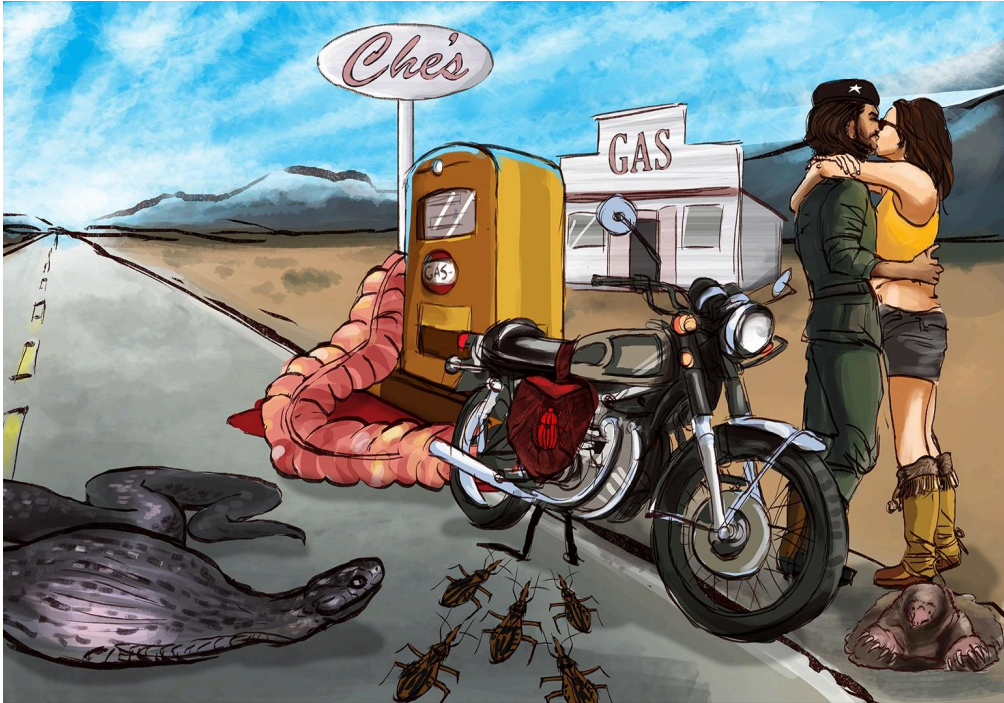
	infected by this (30%)		
Trypanosoma brucei	Vector: tsetse fly Two types of Trypanosoma --Gambiense and rhodesiense --found in Africa Blood smear- trypomastigotes Antigen variation - chronic infx, recurrent fevers Motile with single flagella	Sleeping sickness -coma -cervical and axillary lymphadenopathy -recurrent fevers (undulating, like brucella)	Melarsoprol for CNS infx Suramin for peripheral blood infx

			
Naegleria fowleri	Fresh water (like leptospirosis) -water skiing, backpacking, water sports, nasal washes Trophozoites enter CNS via cribriform plate Dx by LP	Meningoencephalitis (inflam with brain and meniges) -rapidly fatal (~5 days) -fever, nuchal rigidity, AMS	Amphotericin

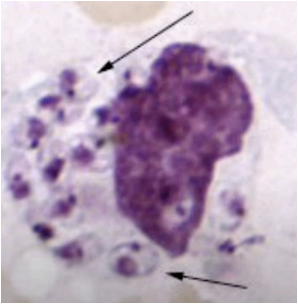


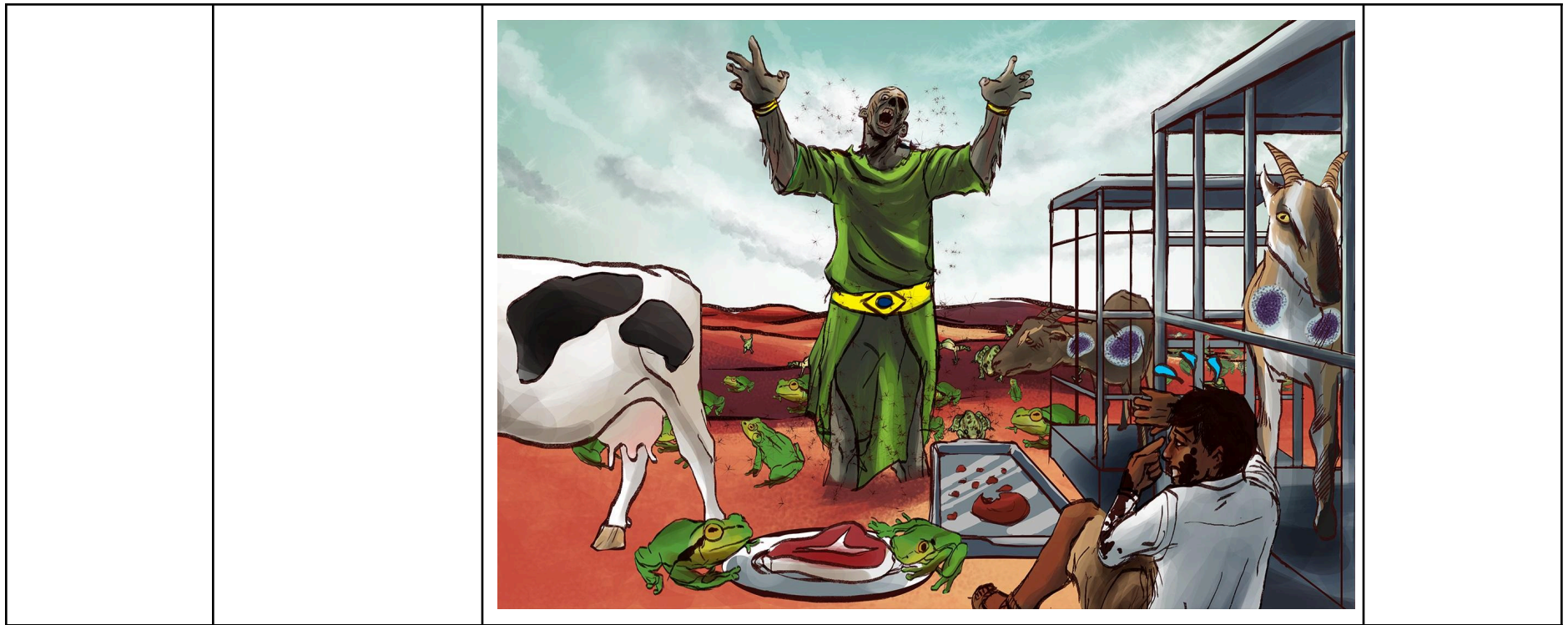
Chp 3- Protozoa of blood

Bug	Characteristics	Diseases	Treatments
Trypanosoma cruzi	Kissing bug (Reduviid), bites around mouth (feces) --> scratch --> mouth Can be seen on heart bx	Chagas (10-20 yrs after bite) -lymphatics -megacolon -dilated cardiomyopathy (MCC of death) -megaesophagus -burrows in endocardium	Nifurtimox Not rx for chronic infx

			
Babesia spp.	Ixodes (deer) ticks (also in lyme, can have both infx) -NE U.S. Dx by blood smear -maltese cross (tetrad of trophozoites)	Blood related symptoms -hemolytic anemia -jaundice -fever, -high risk for severe dx in sickle cell disease Healthy people dont get sx and can clear infx	atovaquone , azithromycin (macrolides)

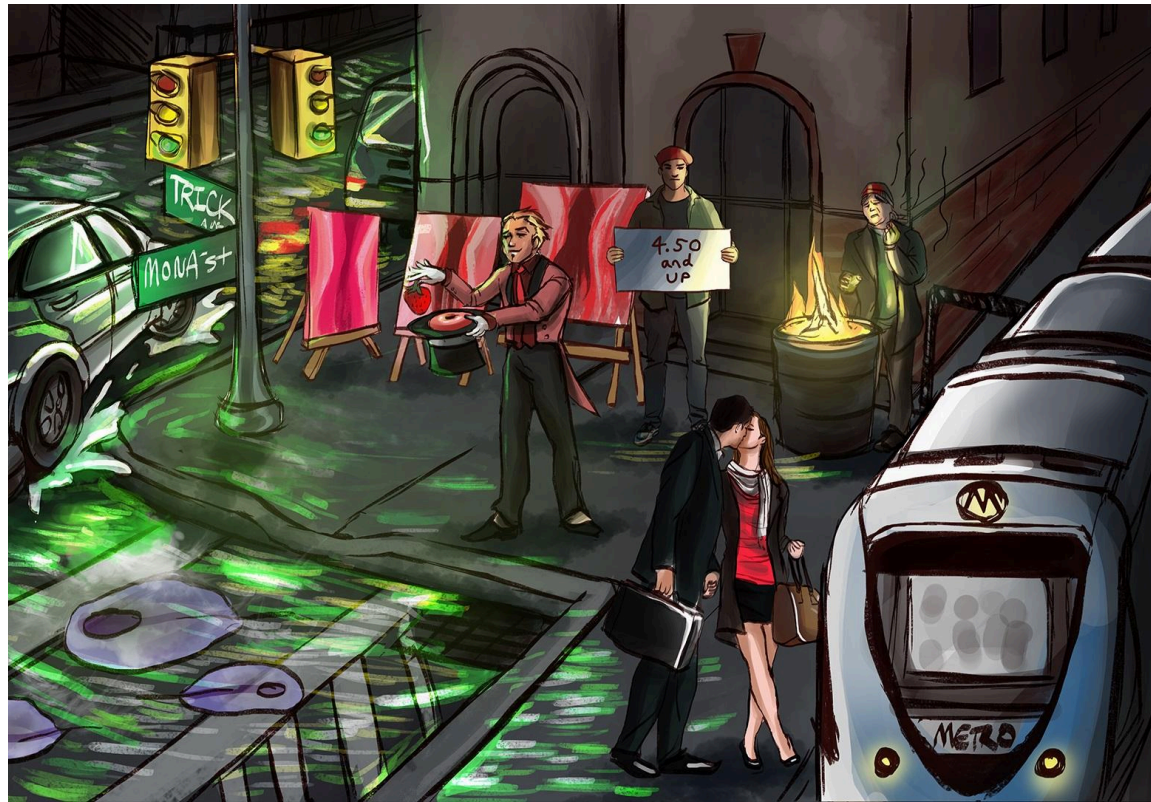
			
Plasmodium malariae, ovale, vivax & falciparum	Giemsa stain Parasites in RBC Anopheles mosquitoes carry sporozoites --> liver --> mature to trophozoites --> schizonts divide into merozoites which burst from liver cells and infect RBCs --> gametocytes	Plasmodium malaria -fever on day 1 and then day 4 (72 hrs later) Ovale and vivax -dormant hypnozoites in liver -fever on day 1 then day 3 (48 hrs later) Falciparum -most severe -fever irregular -neuro sx -RBC occlude kidney and lungs vessels -banana shaped on peripheral blood smear -sickle cell protects against this	-chloroquine -primaquine -mefloquine --strong rx --prophylaxis for chloroquine resistance -atovaquone --strong rx + Proguanil can also be used Artemisin for severe p. Falciparum IV artesunate for severe malar IV -quinidine for

			resistant --HA and tinnititis
<i>Leishmania braziliensis</i> & <i>donovani</i>	Vertebrates are hosts Sandfly vector Infect macrophages -amastigote form --need to bx lymph nodes, spleen, skin lesions... 	Cutaneous leishmaniasis -ulcers Visceral leishmaniasis by <i>donovani</i> -black fever or kala-azar -100% fatal without treatment -bone marrow infx --> pancytopenia -liver and spleen also infected - hepatosplenomegaly	Stibugluconate for cutaneous Amphotericin B for visceral



Chp 4- other tissue

Bug	Characteristics	Diseases	Treatments
Trichomonas vaginalis	Motile trophozoites on wet mount	Cervicitis -strawberry cervix Vaginitis -burning, itching, malodorous -yellow green discharge -pH > 4.5 (like gardnerella, candida is normal) -need to tx sex partners	Metronidazole



Chapter 5 - Helminths - Nematodes

	Characteristics	Diseases	Treatments
robustus vermicularis (pin worm)	Fecal oral Lay eggs at anus	Really itchy -itch then put hands in mouth (kids) -re-infect themselves Dx: scotch tape test -tape put there overnight, eggs will be laid there the next morning	Pyrantel pamoate Albendazole
lostoma duodenale (dude) and tor americanus (American)	Rural southern US	Iron def anemia -hookworms suck a lot of blood in GI	Pyrantel pamoate

)	Hookworm -walk barefoot --> blood --> lungs --> cough --> GI (turn into adults) Wear shoes to prevent	Dx: eggs in stool, eosinophilia	Albendazole
Trichuris lumbricoides (large whipworm)	Eating contaminated food --> eggs --> hatch in SI --> bloodstream --> alveoli --> lungs --> cough --> GI (adults)	Most likely to cause respiratory symptoms Intestinal obstruction -ileocecal valve Dx: eggs in stool, eosinophilia	Albendazole -dont give to preg women Give PAM if preg
Strongyloides stercoralis	Penetrates soles of feet -blood --> lungs --> cough --> GI (turn into adults) Eggs laid into intestinal walls and dont get passed into stool but larvae do	Dx: larvae in stool , eosinophilia	Albendazole Ivermectin
Trichinella spiralis (intestinal nematodes)	Undercooked meat like pork Cysts --> larvae --> blood --> muscle cyst	Larvae like striated muscle --> muscle inflam --> myalgia Fever, vomiting, periorbital edema, eosinophilia	Albendazole

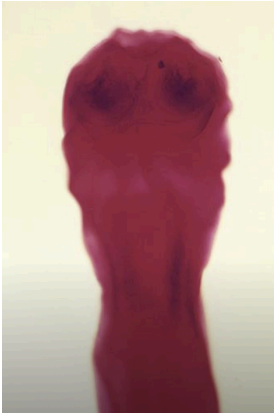
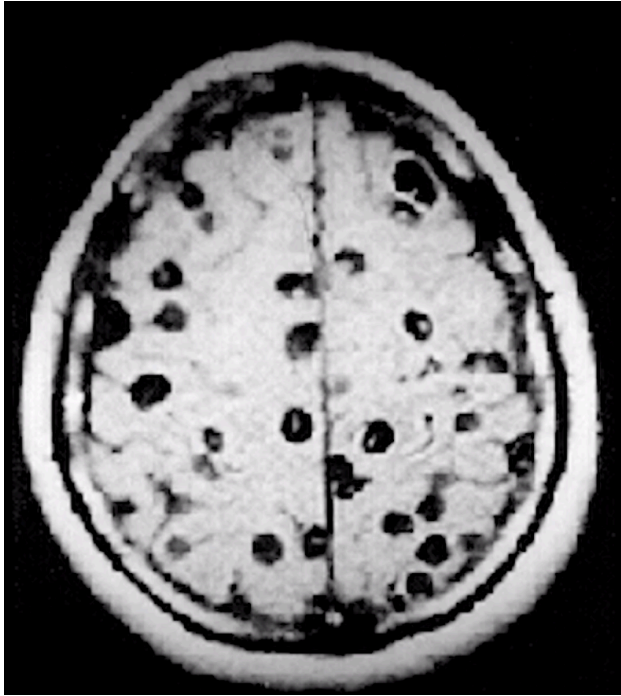


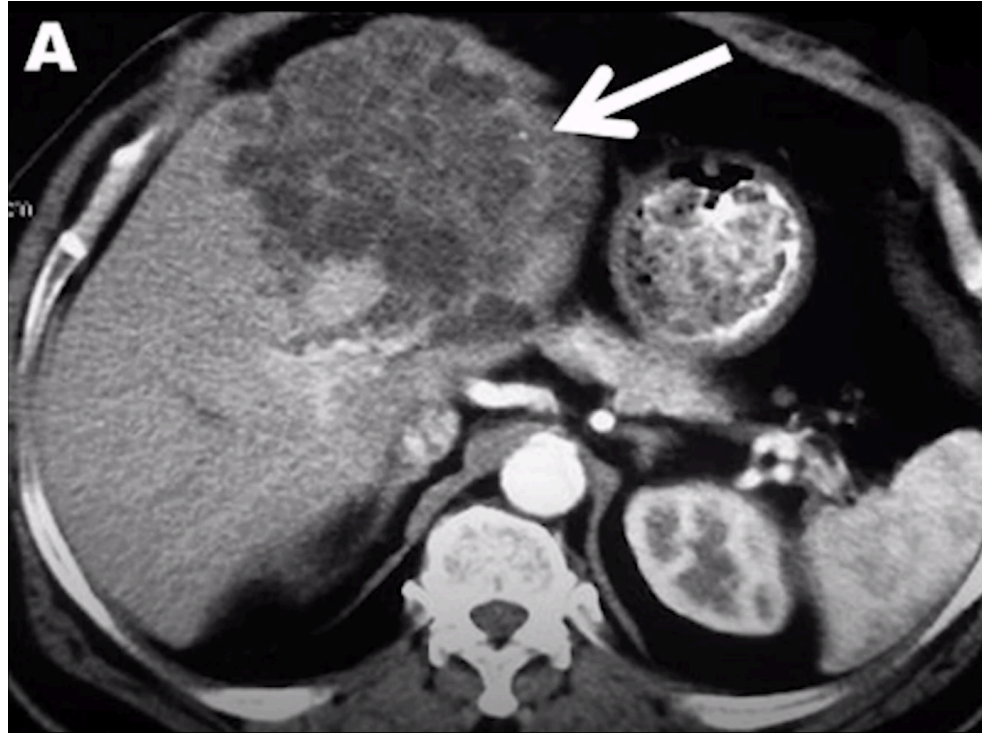
Tissue nematodes

Bug	Characteristics	Diseases	Treatments
Dracunculus medinensis	Contaminated water, larvae with copepods	Painful skin ulcer Take out worm slowly over day Eosinophilia	Metronidazole
Wuchereria bancrofti,	Organism on thick blood smear	Elephantitis Eosinophilia	Diethylcarbamazine

Onchocerca volvulus	Black fly --> skin --> Microfilariae (seen in skin bx)	Papulules -hyper or hypopigmented spots -river blindness bc Microfilariae goes into eye Eosinophilia	Ivermectin
Toxocara canis	Food with dog or cat feces	Can go to eye and cause blindness Eosinophilia	Albendazole
Loa loa	Microfilariae on blood smear Deer flies	Angioedema -local subcut swelling -can go to eye, migrate across conjunctiva -doesnt cause blindness Eosinophilia	Diethylcarbamazine Albendazole



Bug	Characteristics	Diseases	Treatments
Cestodes (tapeworm)	<i>Taenia saginata</i> -cattle <i>Taenia solium</i> -pig -hooks on proglottide heads of <i>T. solium</i> on O & P Both transmitted by water contaminated by animal feces <i>Diphyllobothrium latum</i> (fish tapeworm) 	<i>Taenia</i> -GI issues -ingest cysts or larvae  -can cause brain lesions (neurocystosarcosis) --> seizures -ingest eggs - cysticercosis <i>Diphyllobothrium latum</i> (fish tapeworm) -diarrhea, B12/cobalt def --> megaloblastic anemia -can grow up to 10 m long -Proglottid segments on stool O&P <i>Echinococcus granulosus</i> -dogs are definitive host, sheep are intermediate host -dog feces: transmission -looks like slow growing tumor, but has egg shell Ca2+ in cyst on liver CT -hydatid cysts in liver	Praziquantel Neuro- albendazole Nicosamides for fish tapeworm Echnio- cyst rupture causes anaphylatic rxn and acute abdomen



			
Trematodes -schistosoma mansoni, - schistosoma japonicum, - schistosoma hematobium, - clonorchis sinensis, - paragonimus westermani	Swimmers at risk Blood --> liver (mature to adults) --> go to other parts of body --against portal blood flow Snails are intermediate host clonorchis sinensis -cysts in food	Mansoni-egg has large lateral spine Japonicum- egg small spine, round and smooth Haematobium- egg has large terminal spine --hematuria, bladder cx All 3 --swimmers itch --chronically, portal HTN --> GI hemorrhage, cirrhosis, GI pain clonorchis sinensis (chinese liver fluke) --biliary fibrosis --GB cx --pigmented gallstones --operculated eggs on O&P paragonimus westermani (lung fluke) -chronic cough with blood sputum	praziquantel

-from rare crab
--operculated eggs on O&P

