

# *The Parasite Zoo*

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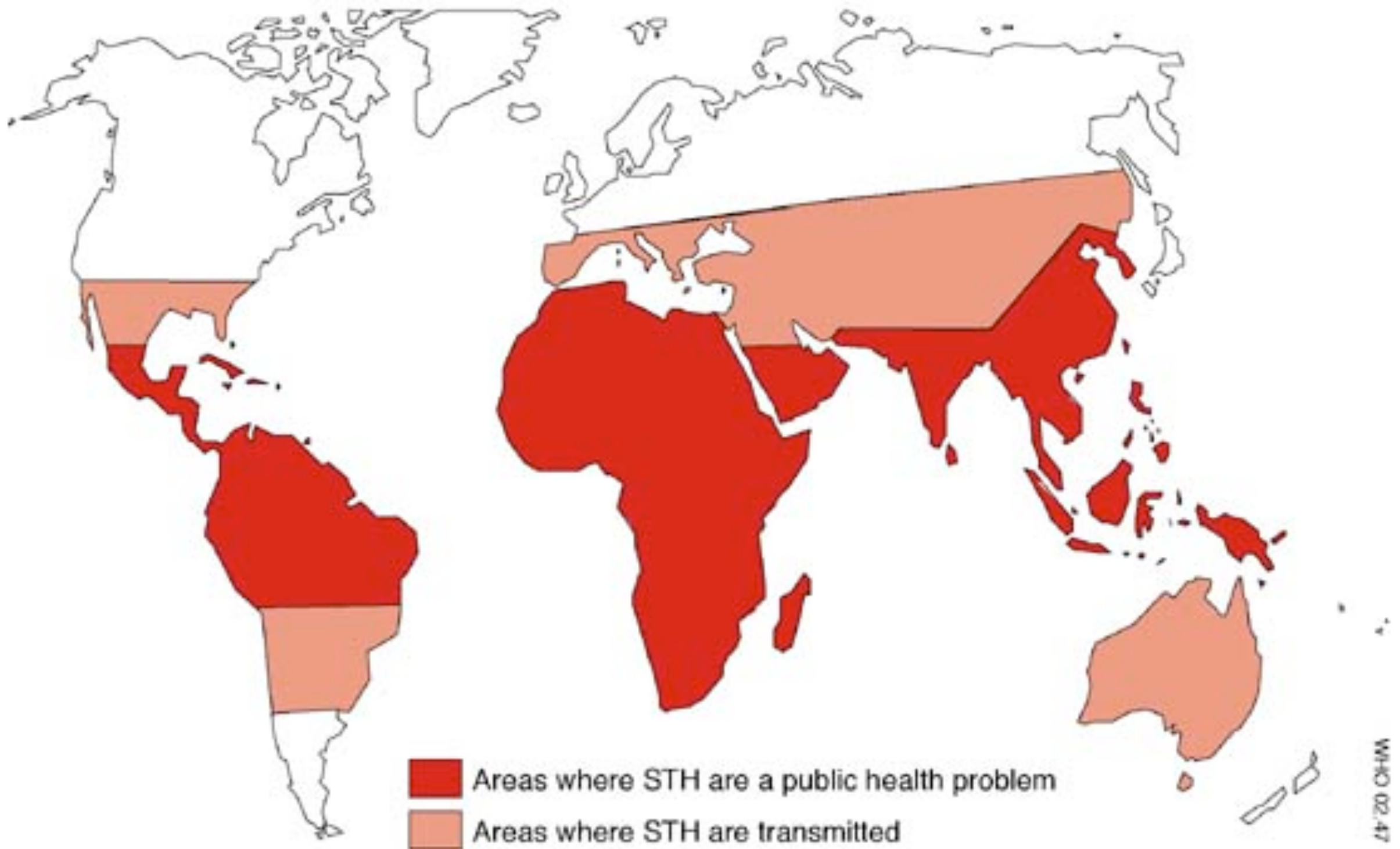
# Parasite

A person permitted to eat at the table of a public official, or at the feast following a sacrifice. (OED)

# Parasite

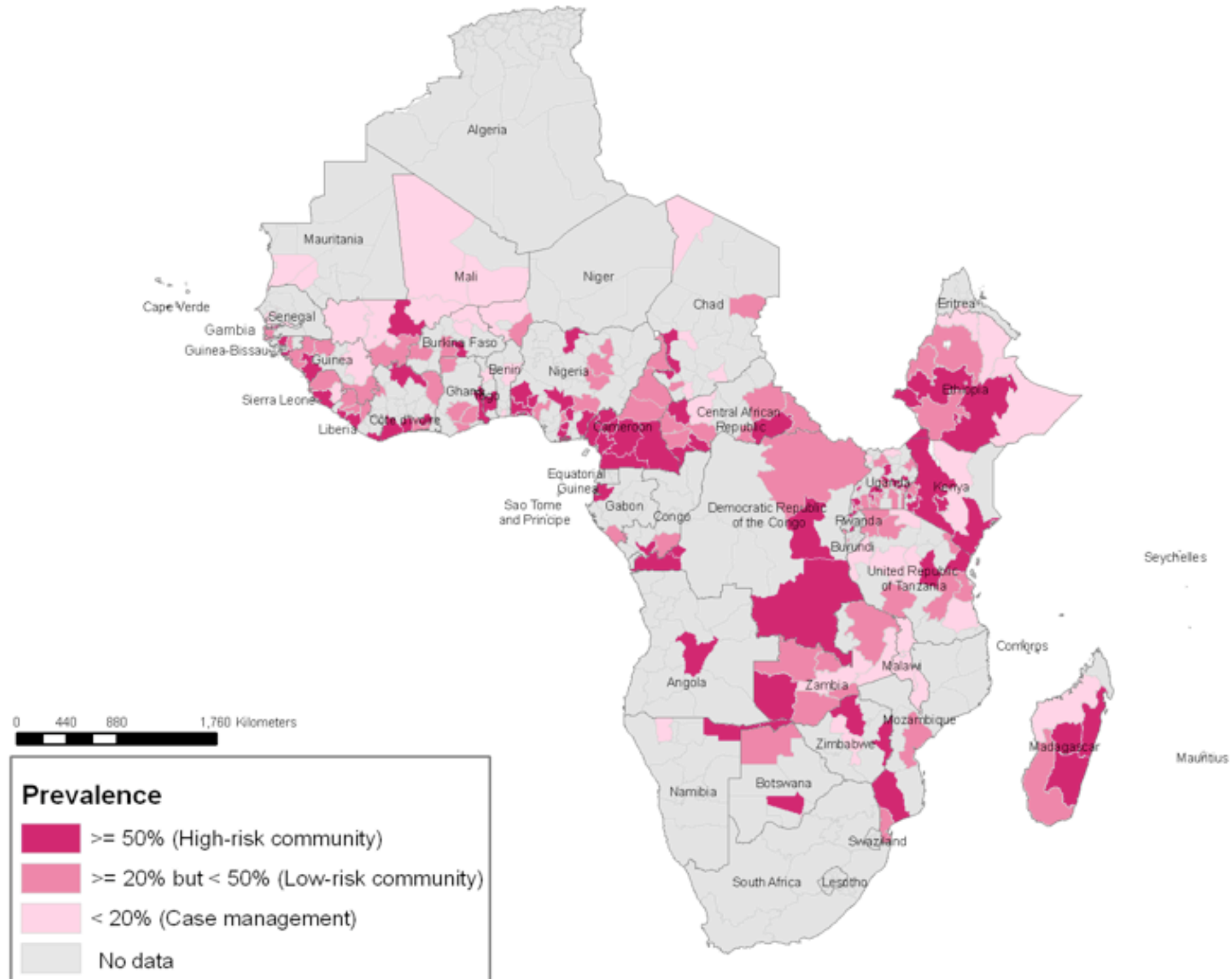
An organism that lives on, in, or with an organism of another species, obtaining food, shelter, or other benefit; (now) *spec.* one that obtains nutrients at the expense of the host organism, which it may directly or indirectly harm. (OED)

# Human Nematode Infection

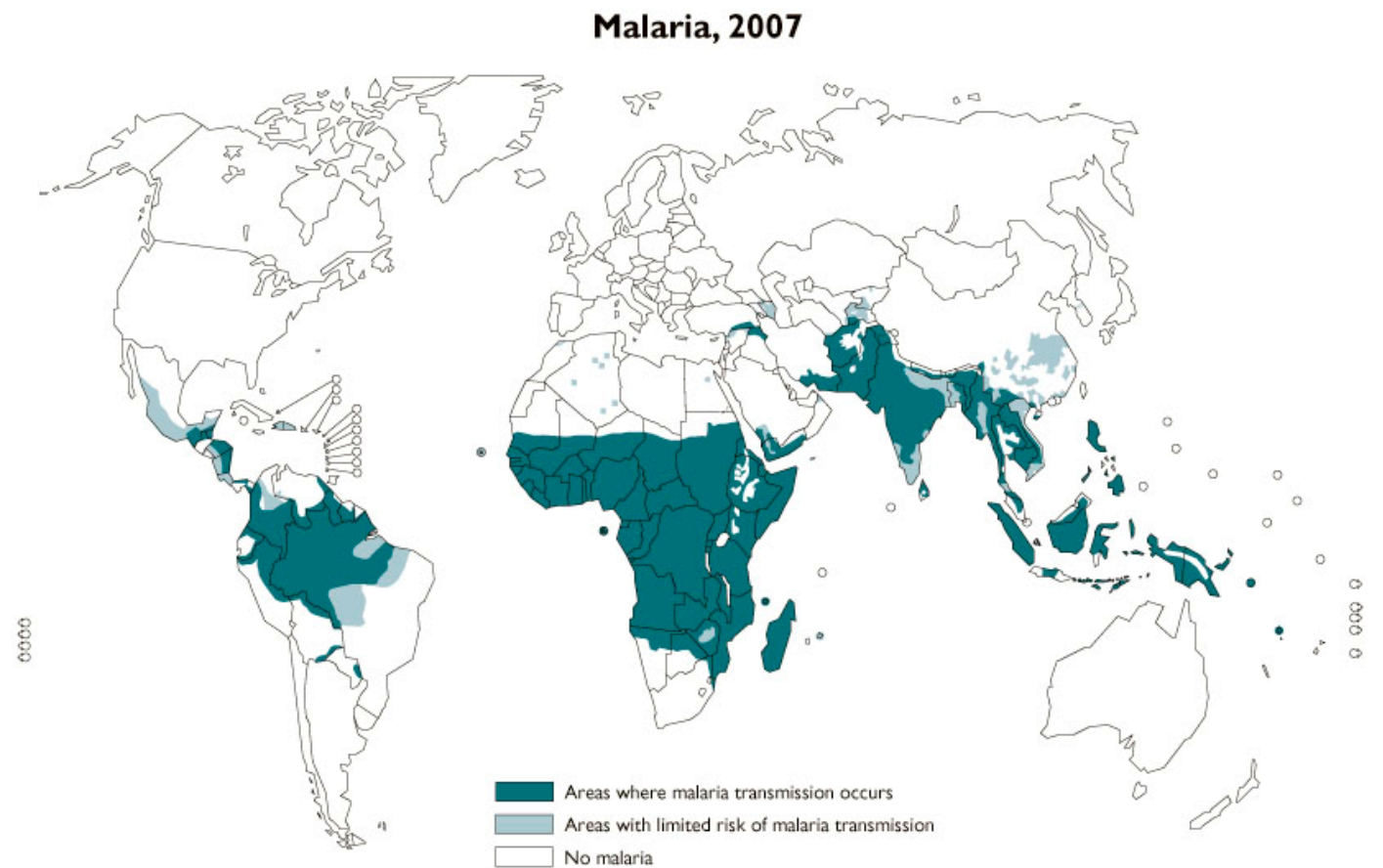
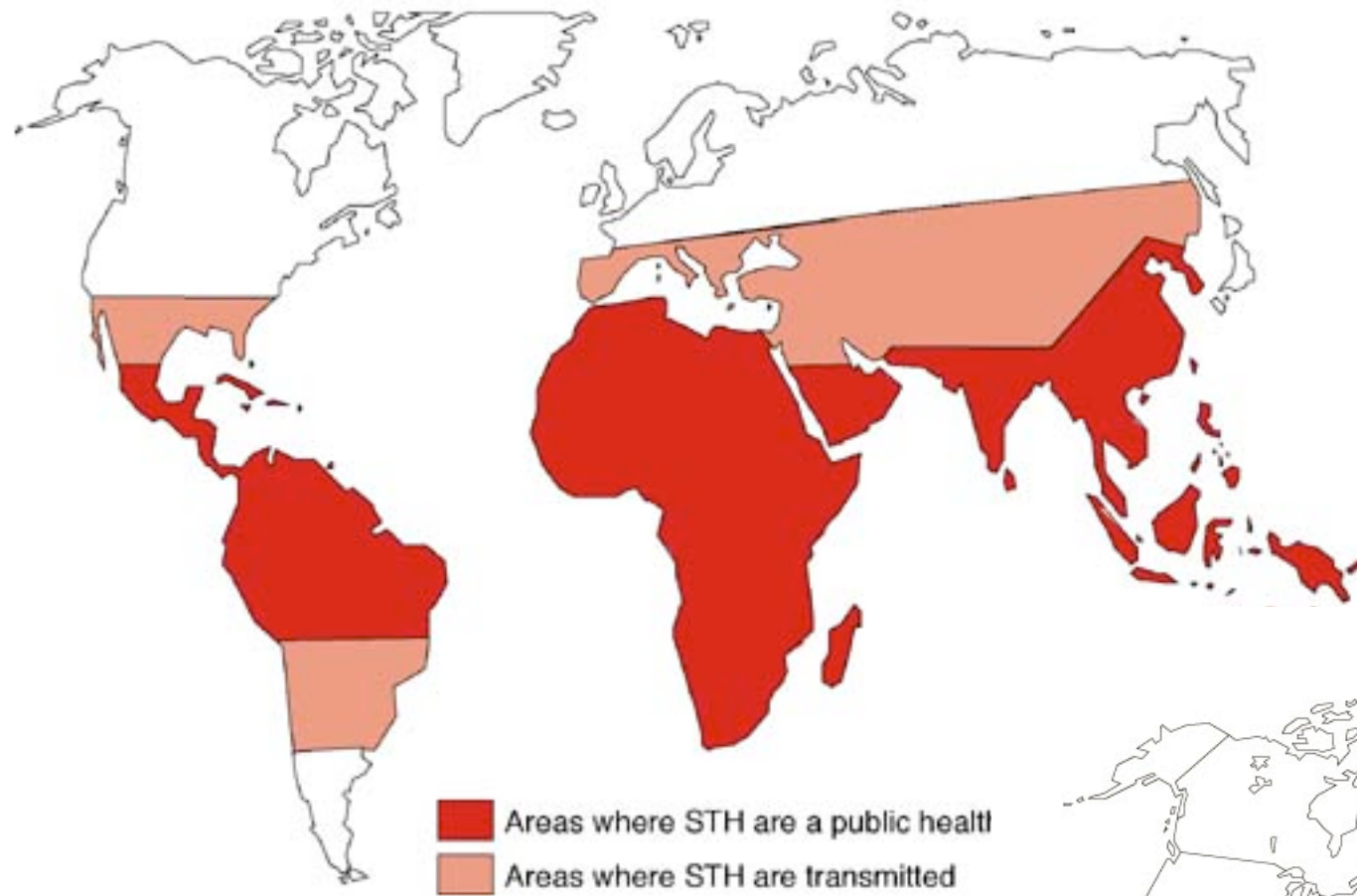




# Human Nematode Infection



# Nematode + Malaria Infection





# Carpinteria salt marsh, CA, USA





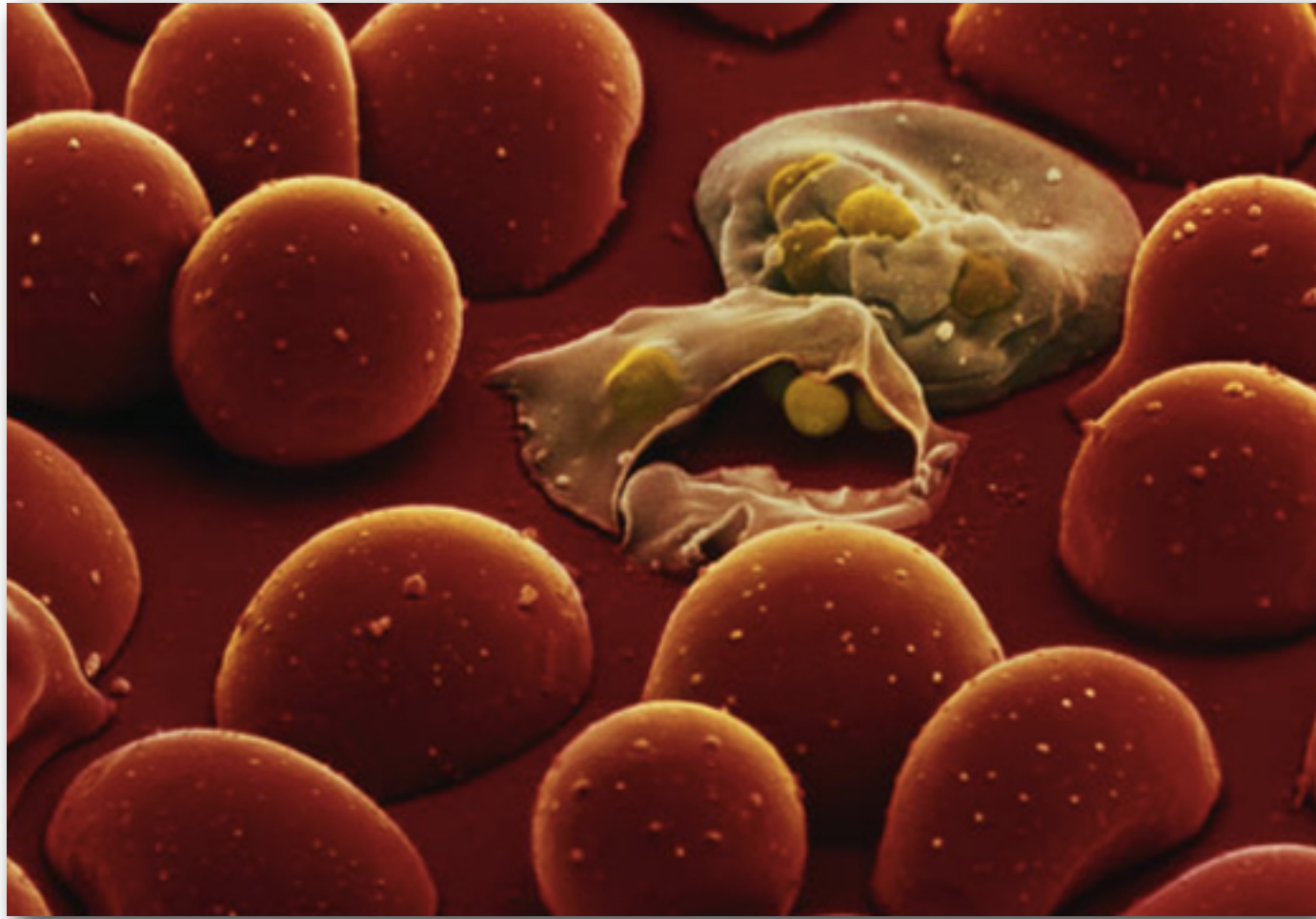
Parasite biomass ~7-10 elephants  
Reproductive rate ~1-2 elephants / day  
for 200 days



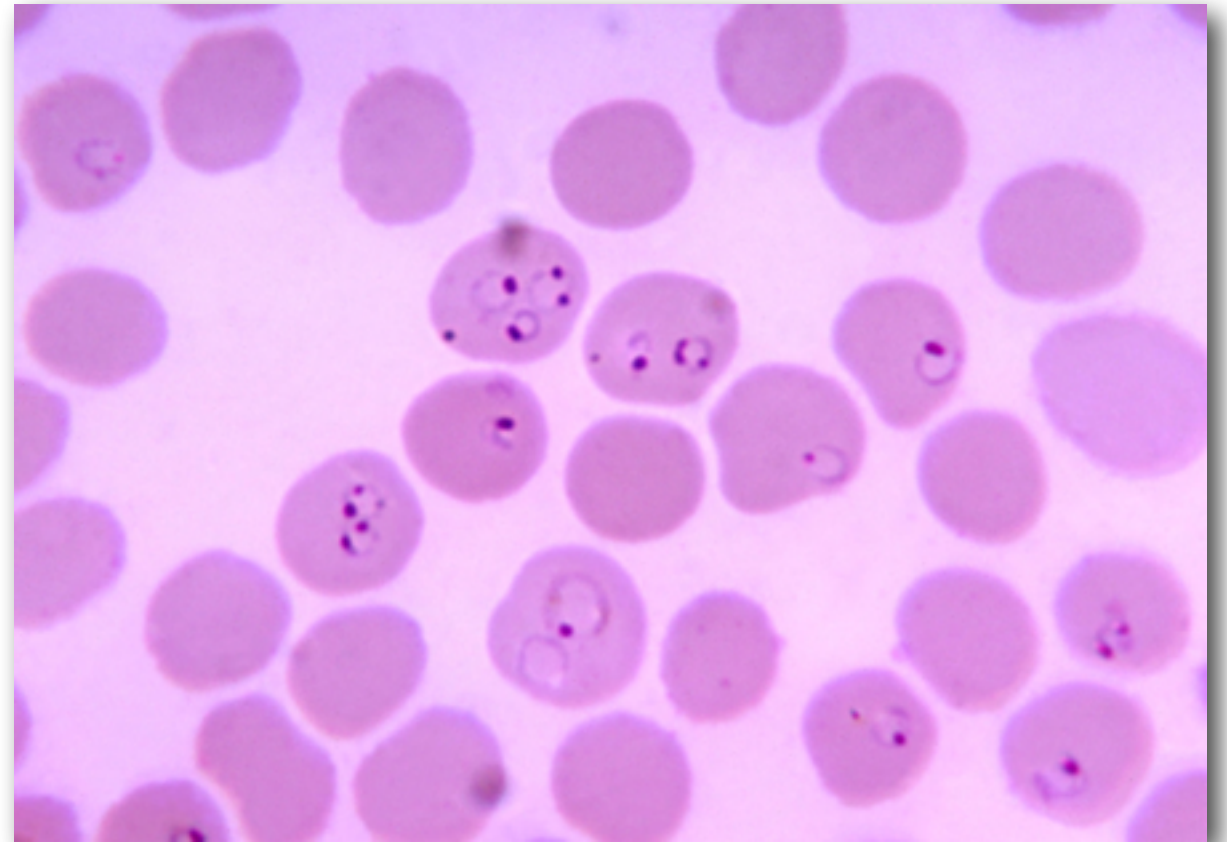
# Parasite

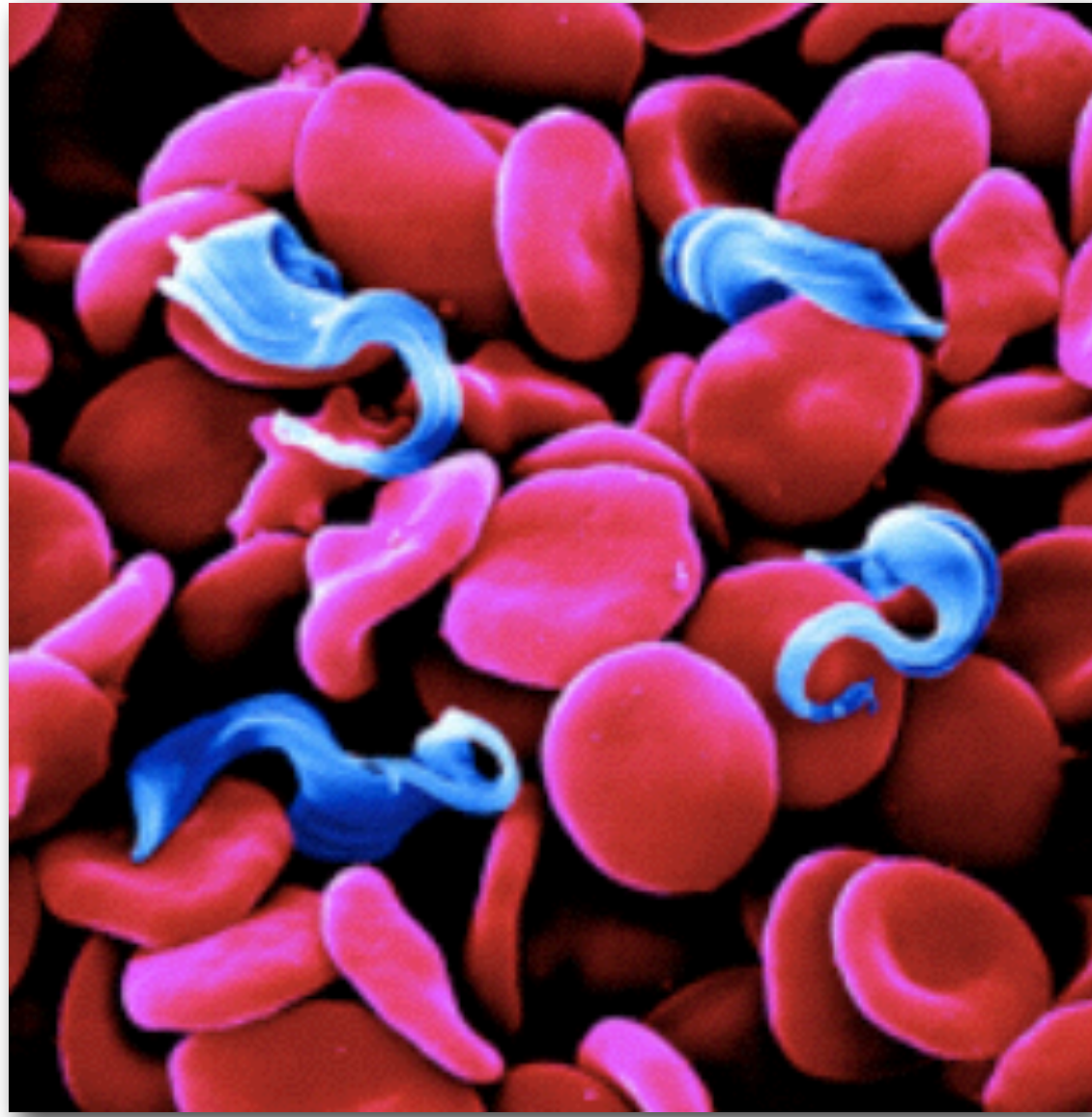
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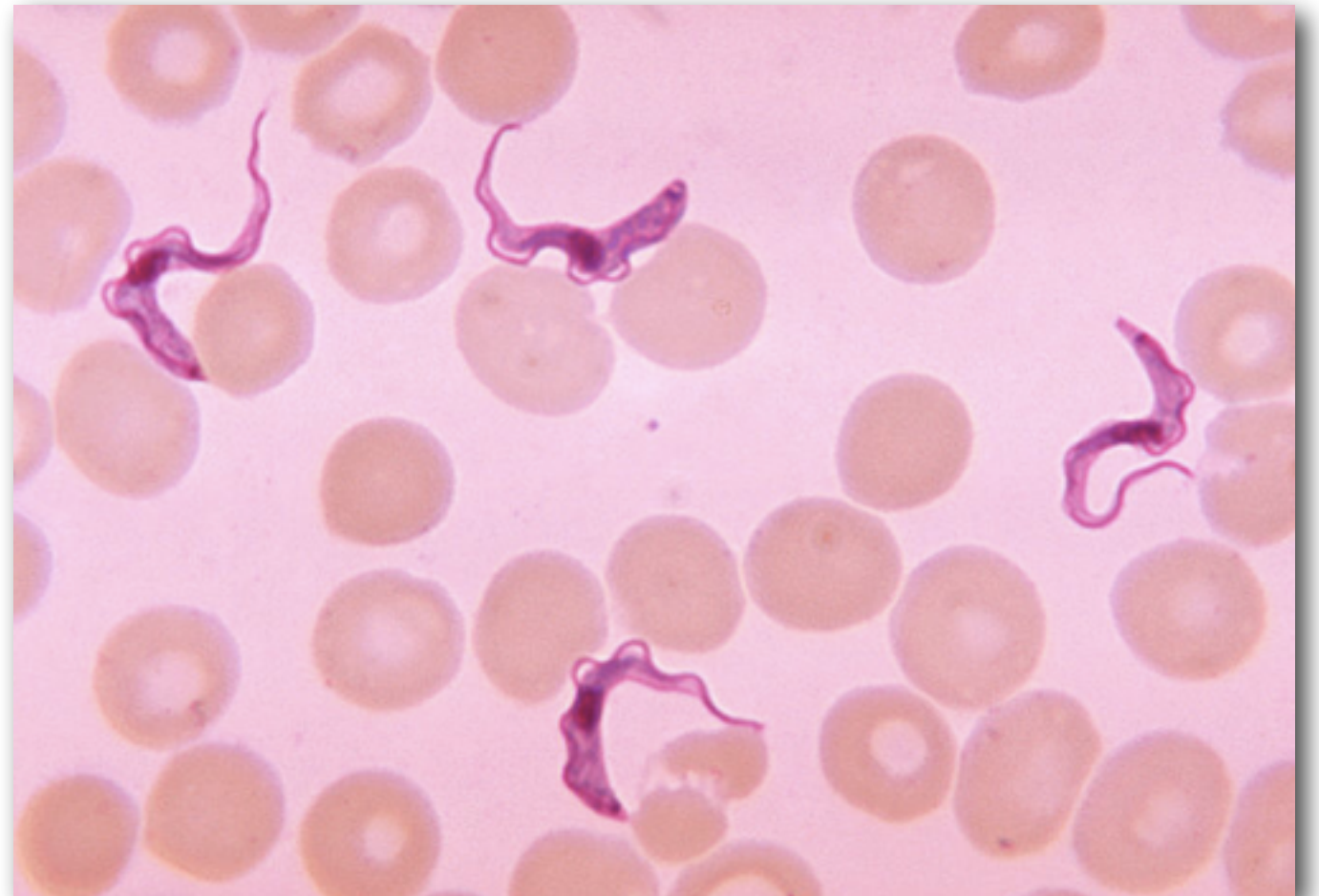


# *Plasmodium* Malaria





# *Trypanosoma* Sleeping Sickness







**Planaria**





# *Diplozoon paradoxum*





# *Diplozoon paradoxum* on fish gills

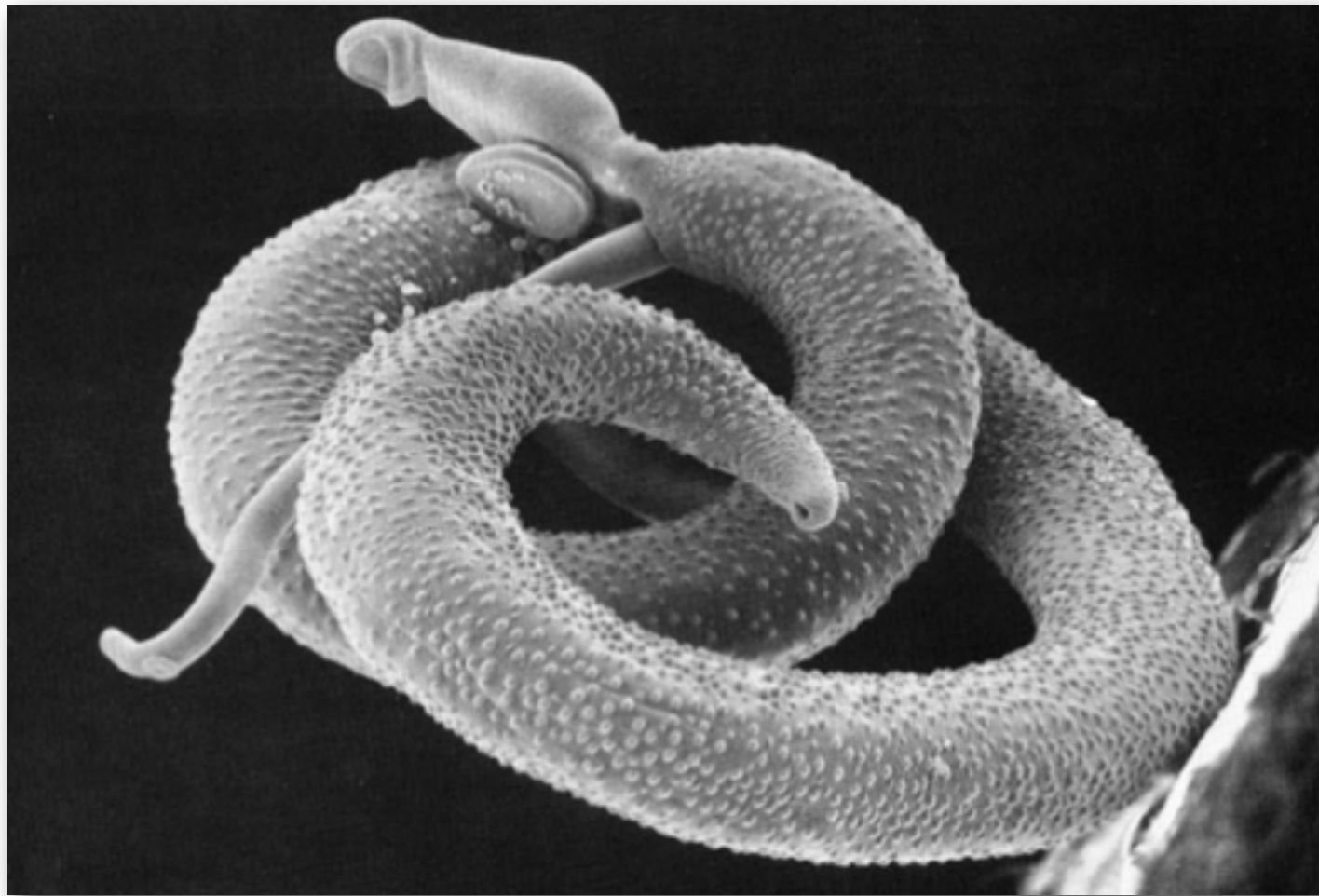




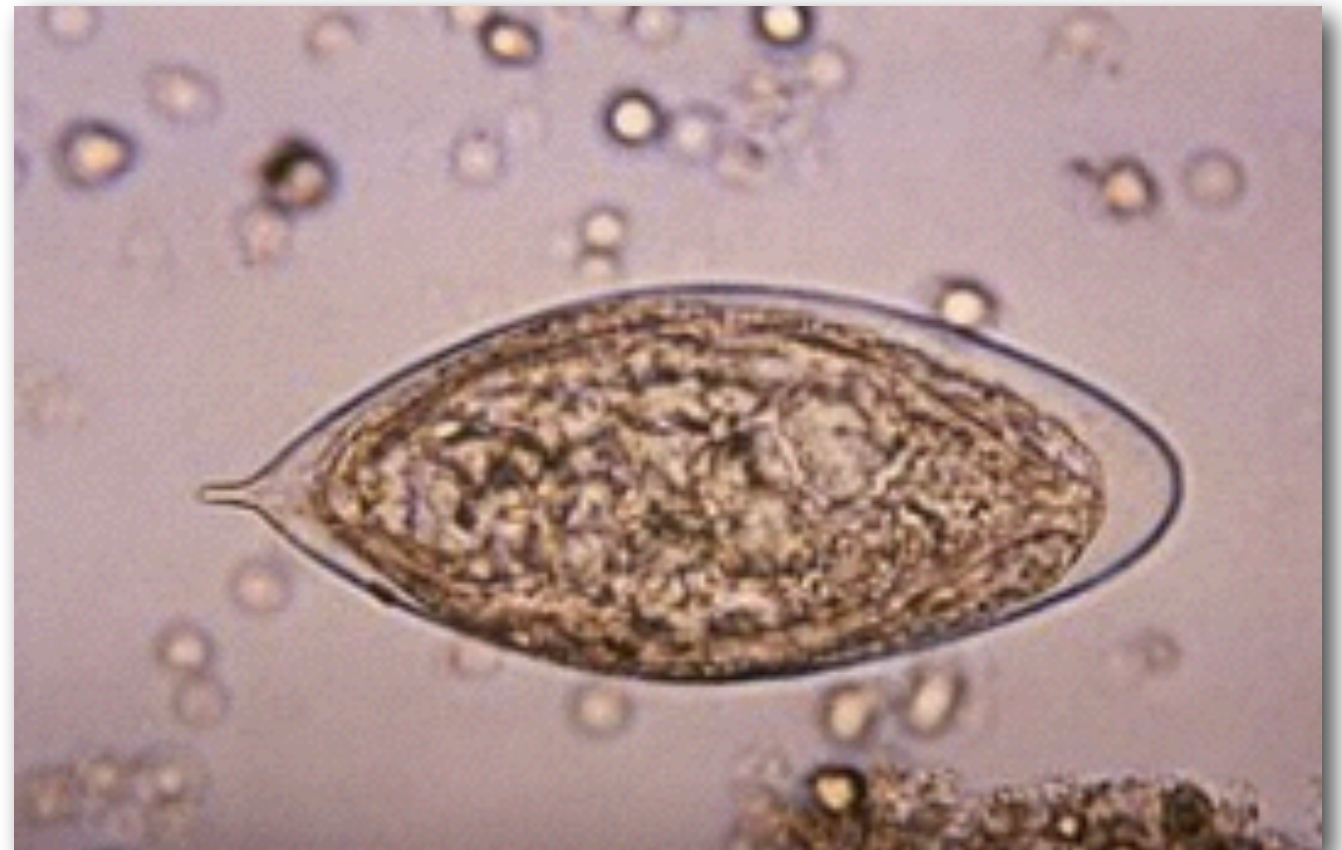
*Schistosoma*  
Bilharzia



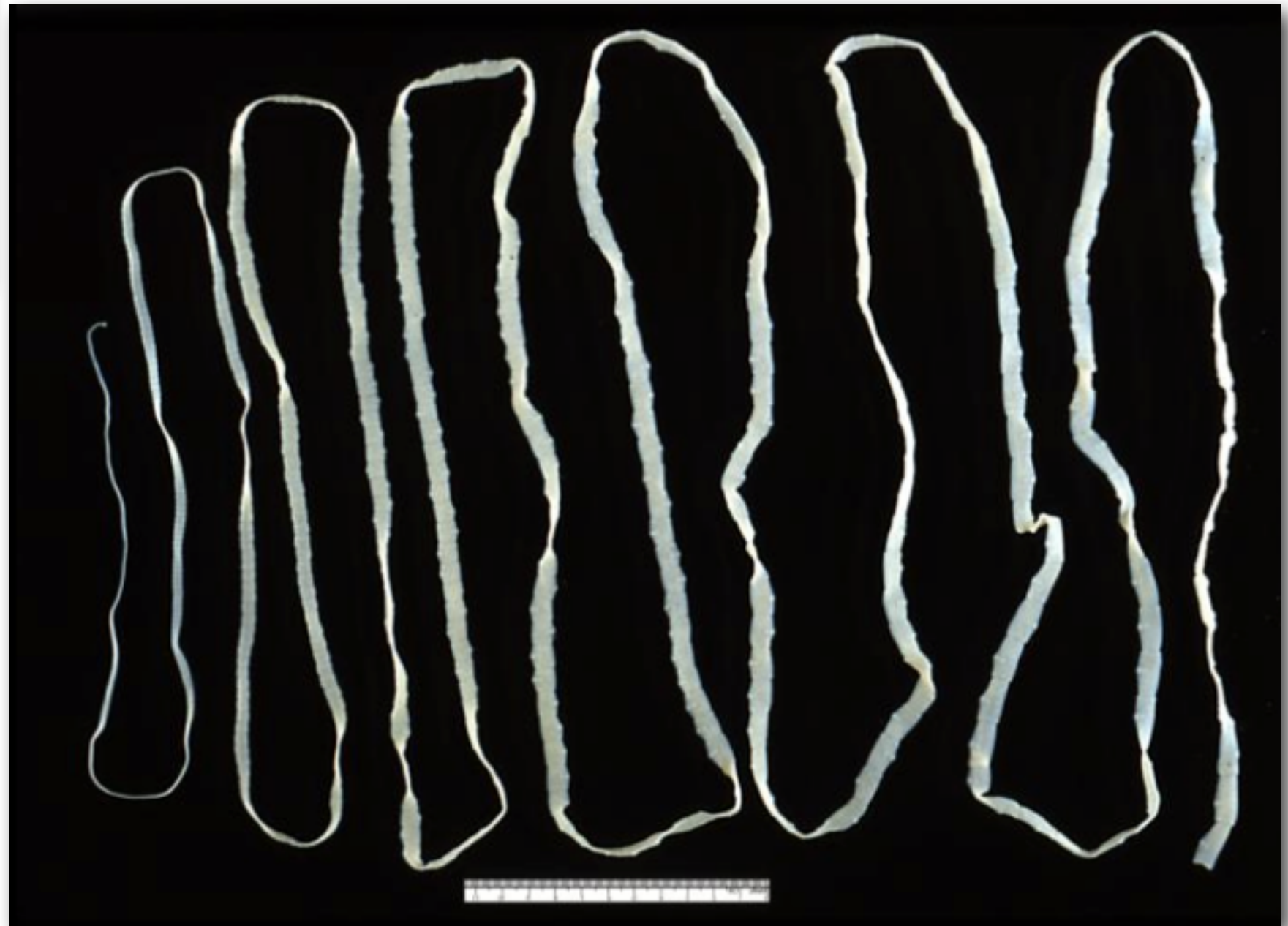




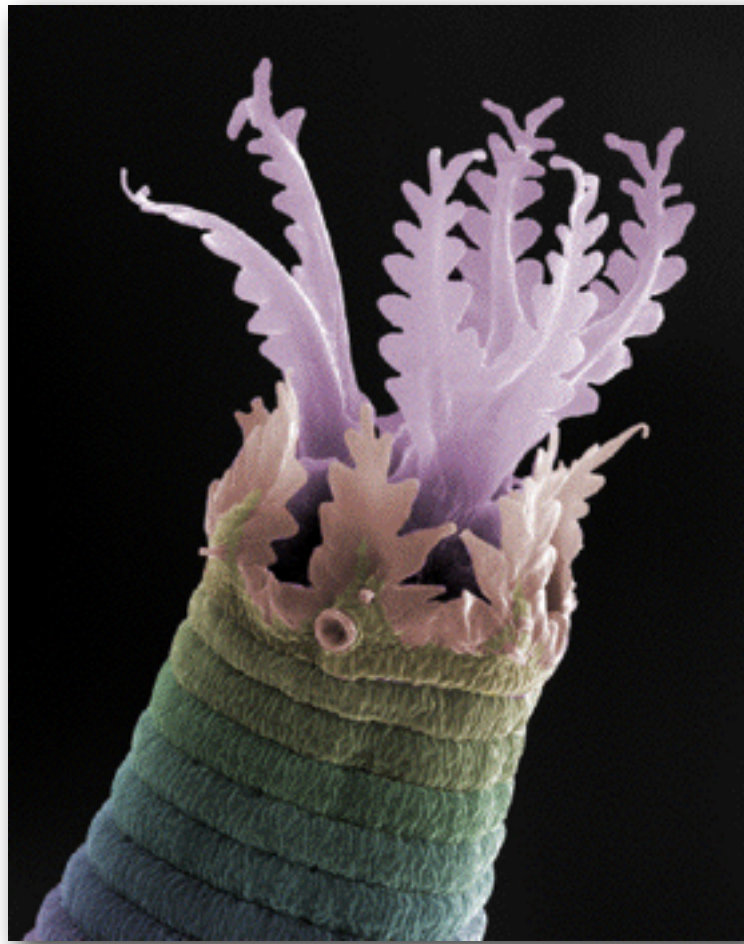
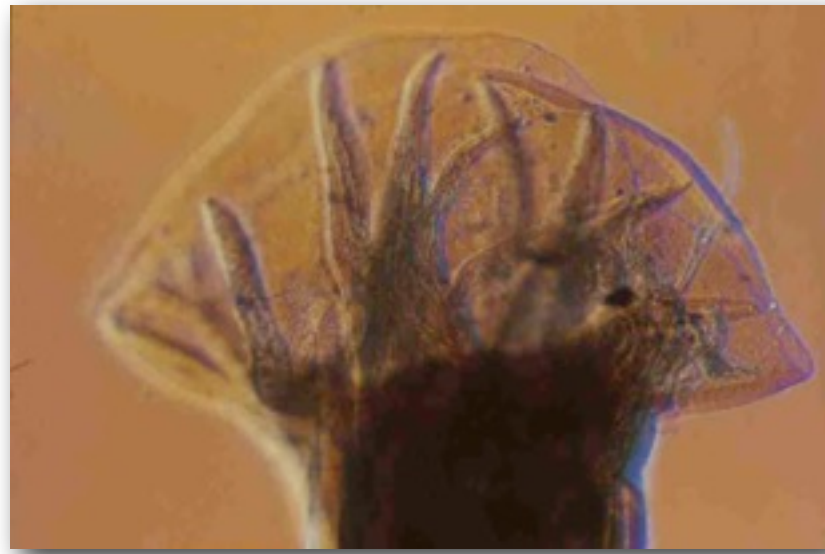
*Schistosoma*  
Bilharzia



# Cestodes Tapeworms







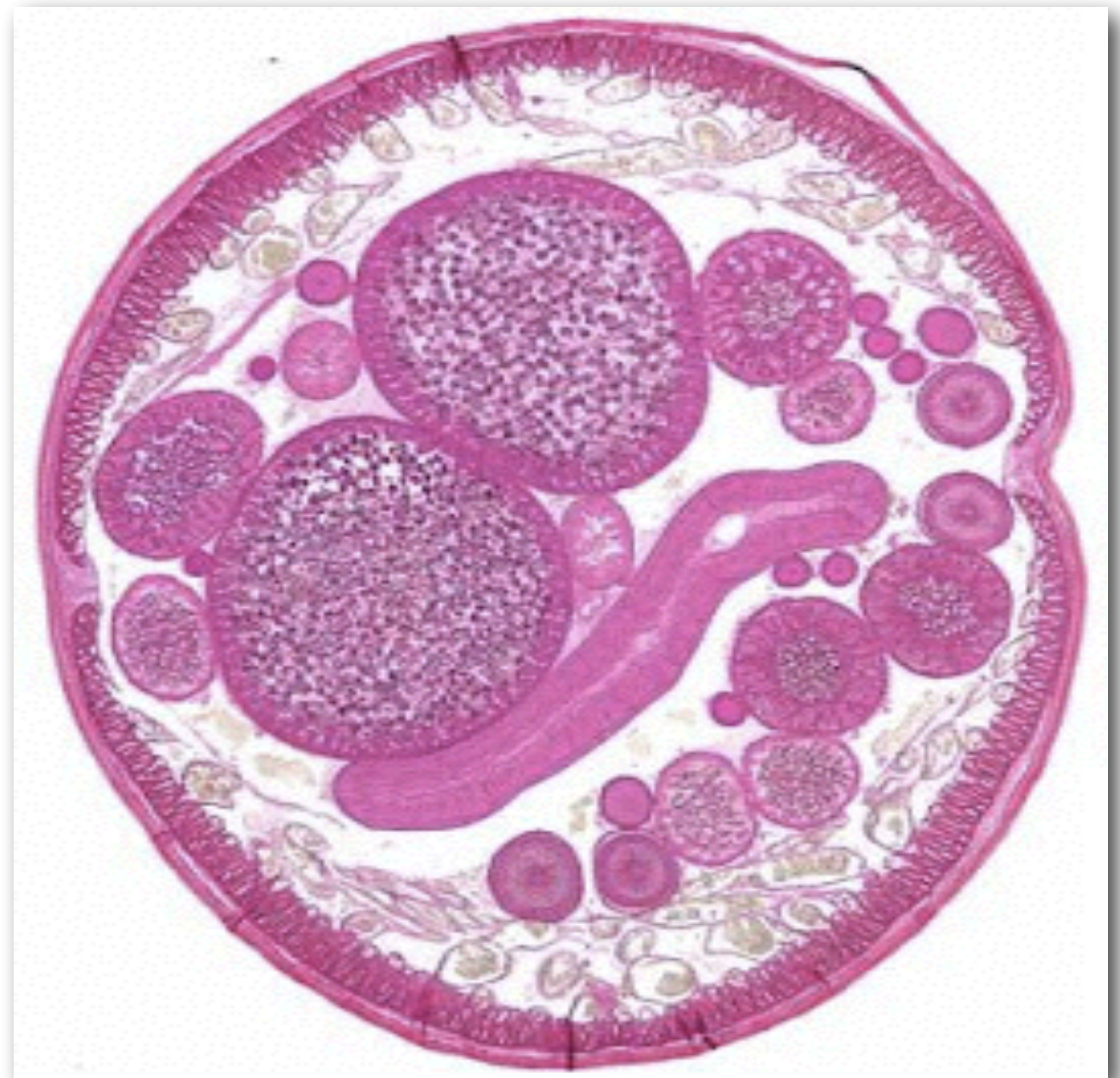
*"In short, if all the matter in the universe except the nematodes were swept away, our world would still be dimly recognizable ... we should find its mountains, hills, vales, rivers, lakes, and oceans represented by a film of nematodes. The location of towns would be decipherable, since for ... human beings there would be corresponding massing of certain nematodes. Trees would still stand in ghostly rows representing our streets and highways. The location of various plants and animals would still be decipherable..."*

Nathan Cobb, 1914

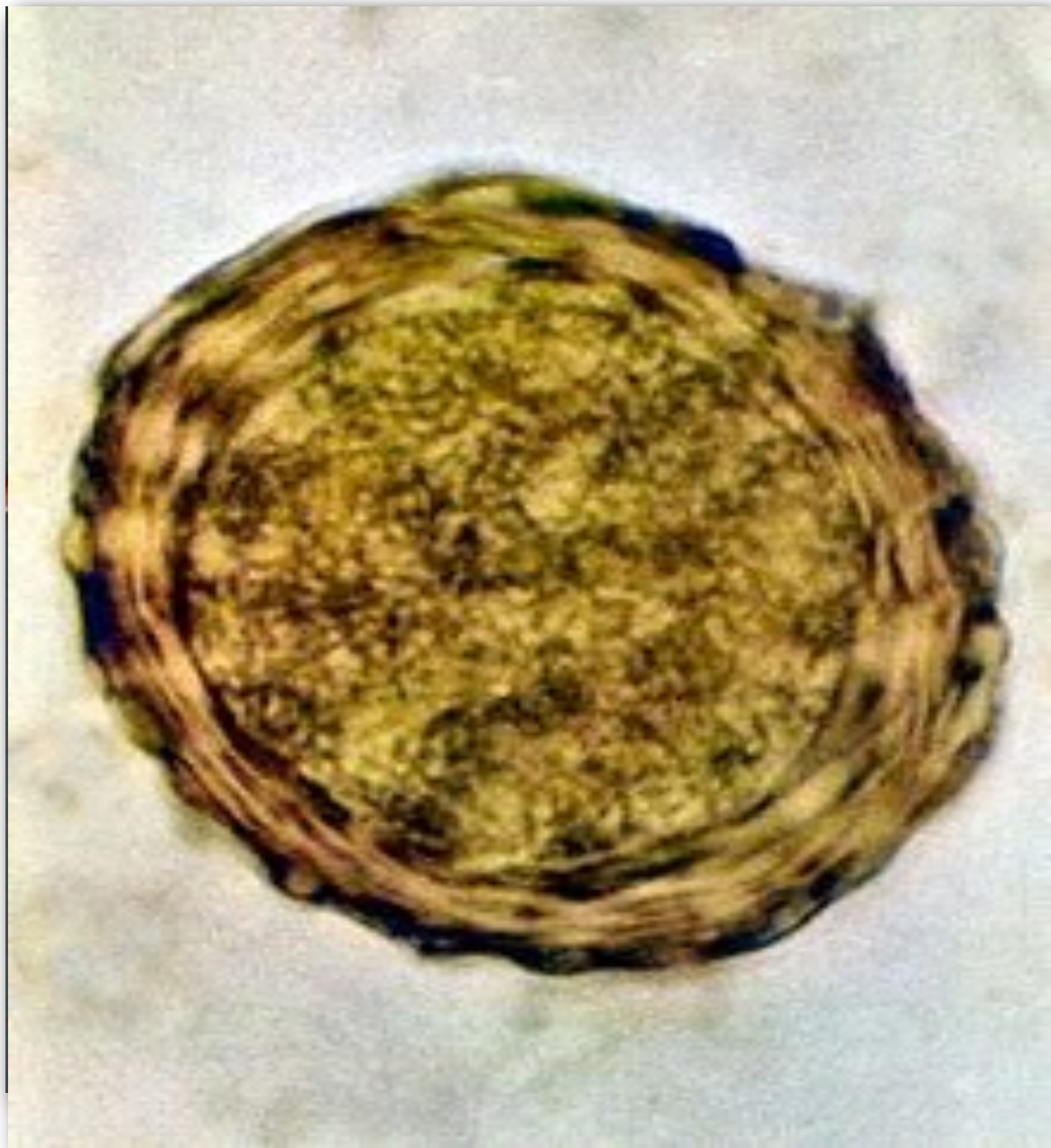




# *Ascaris* Nematode



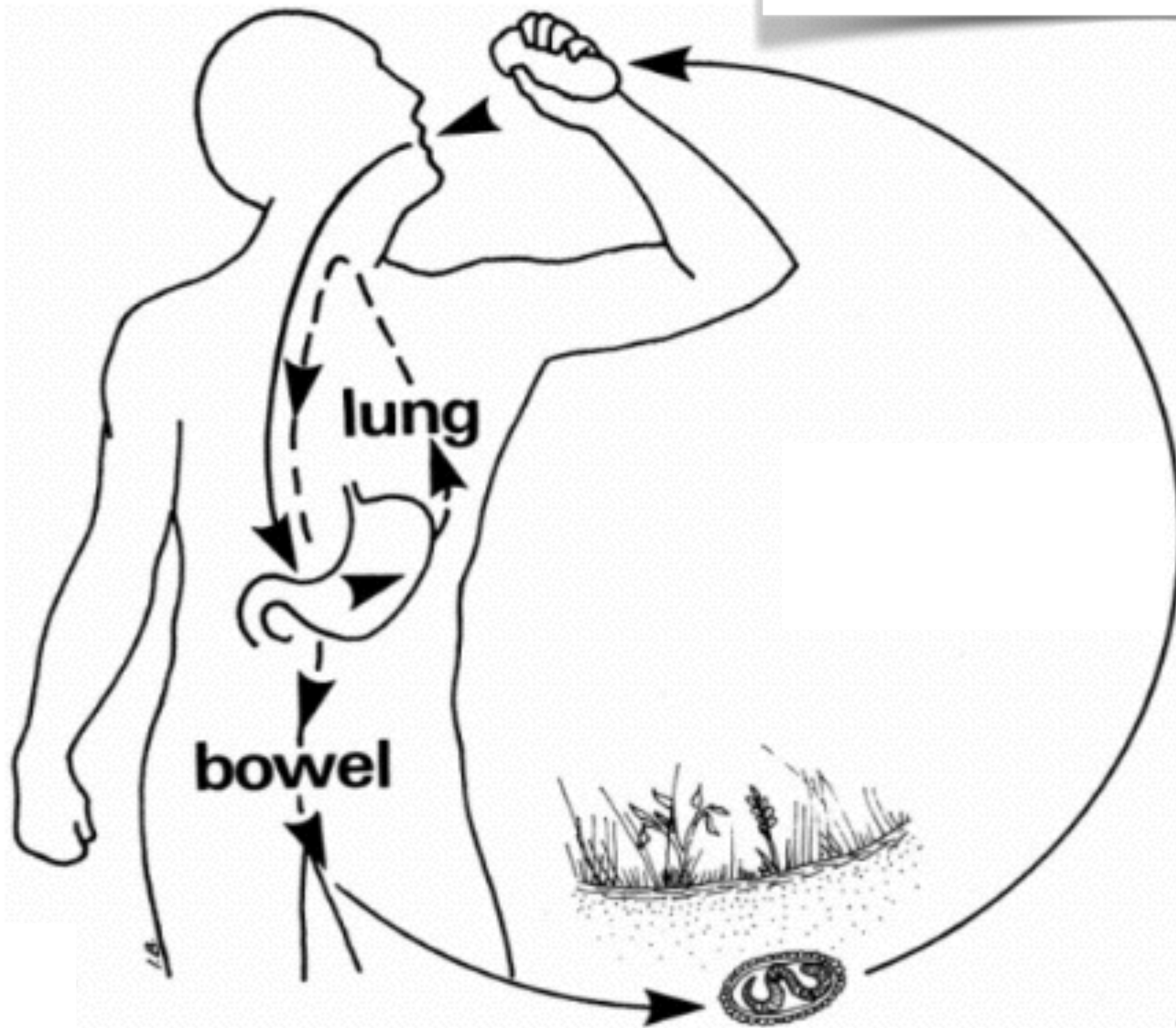




*Ascaris*  
Nematode



# *Ascaris* life-cycle





*Enterobius*  
Pinworm



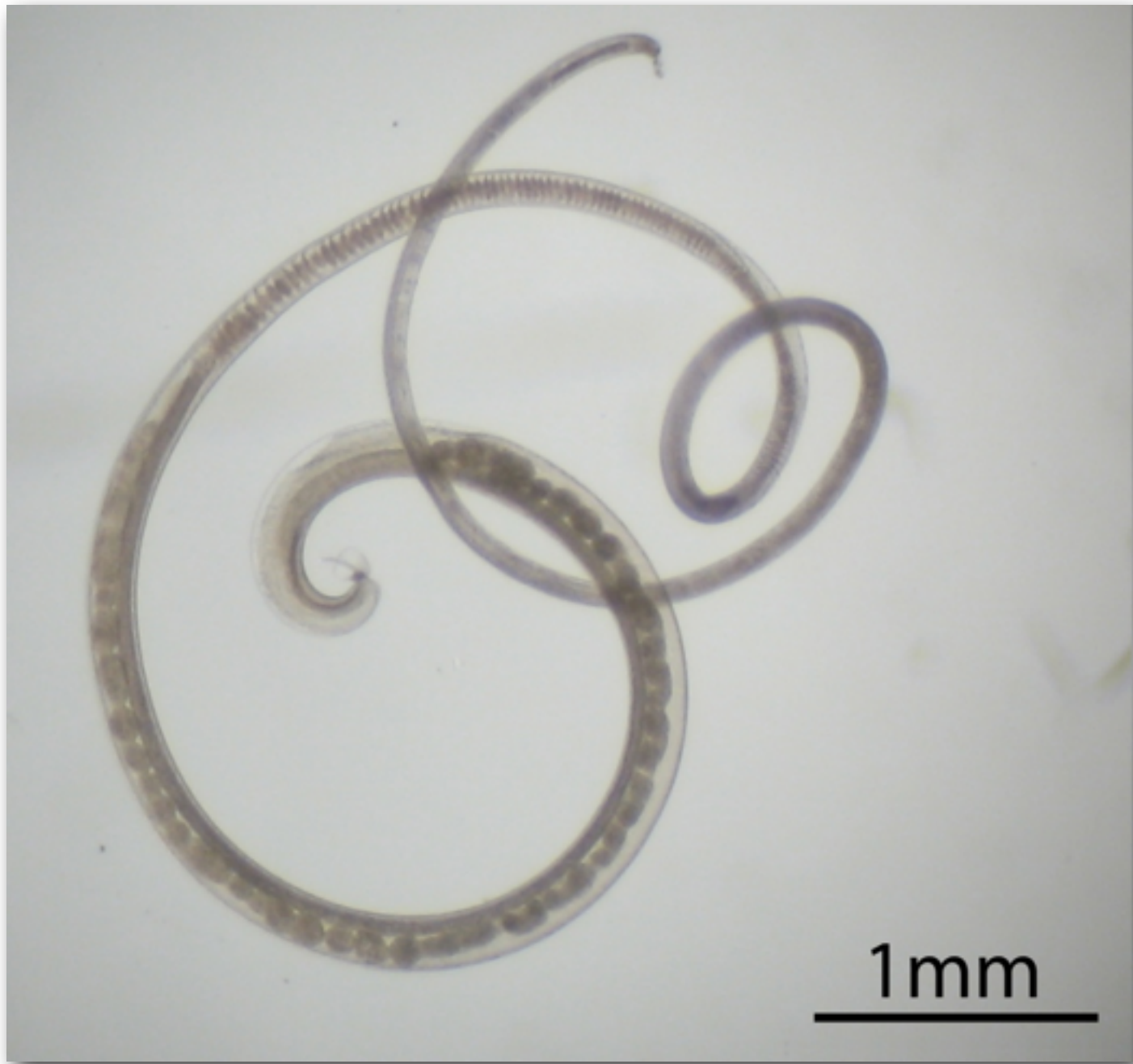












*Trichuris*  
**Whipworm**

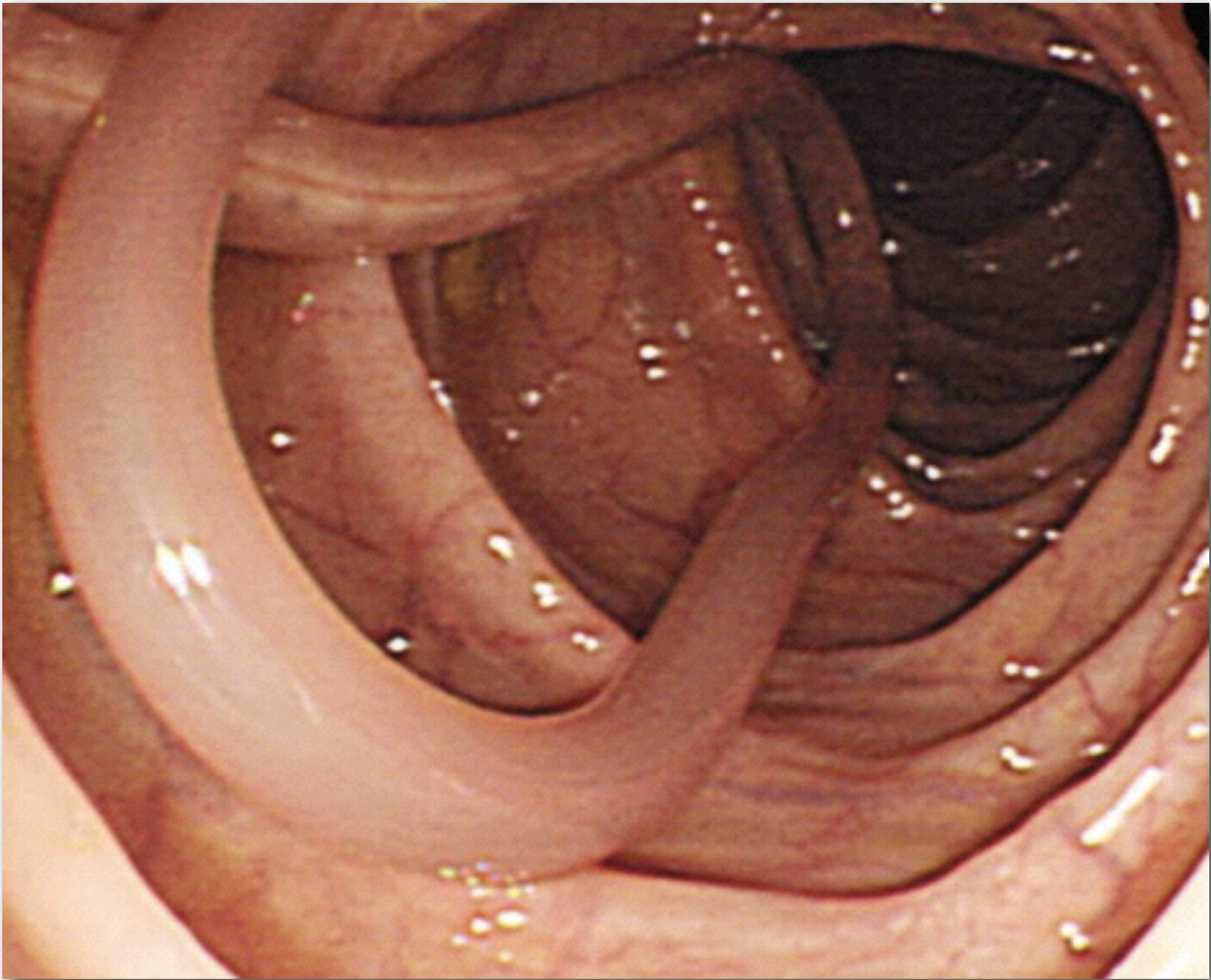
# *Caenorhabditis elegans*





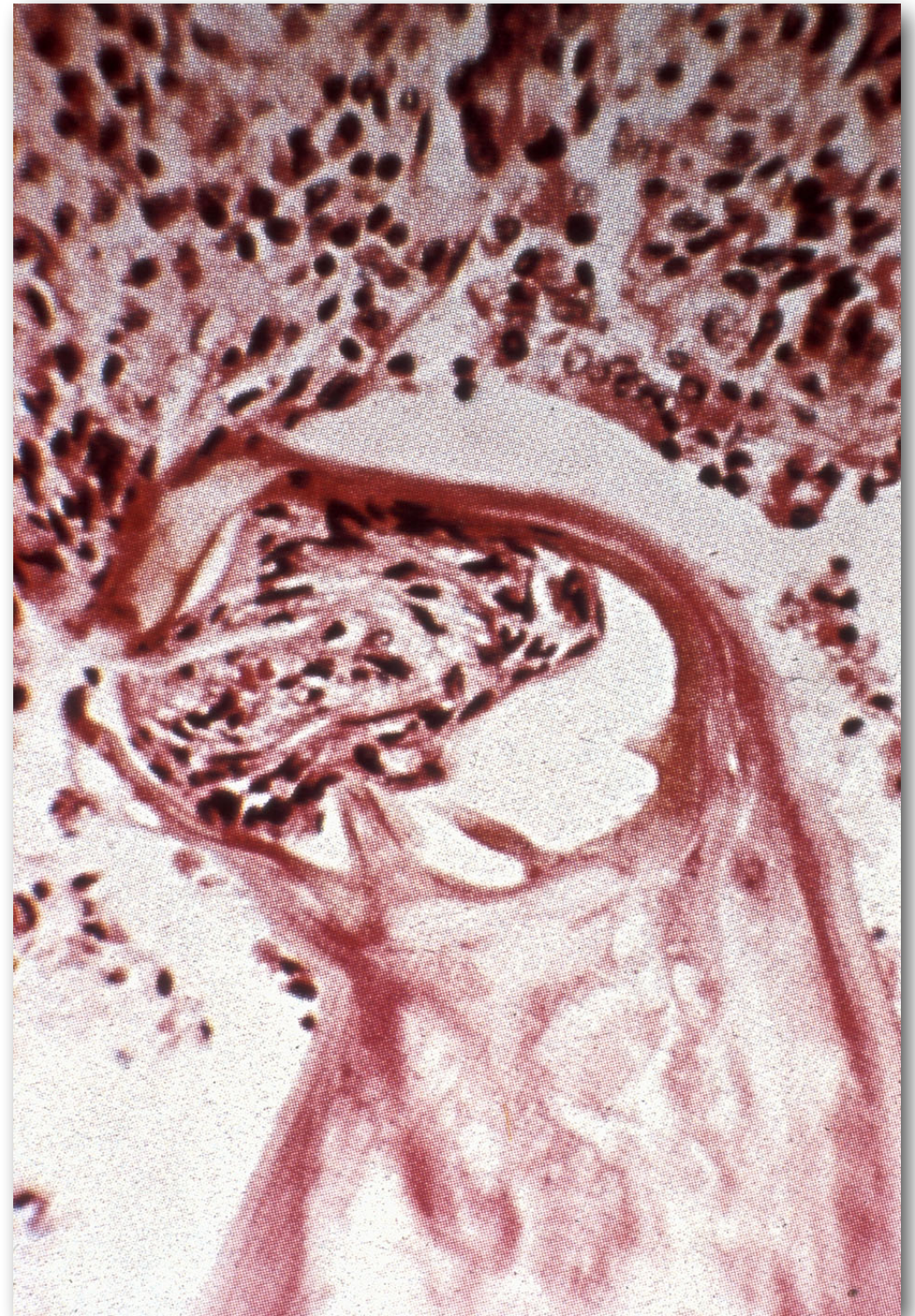








# Hookworm





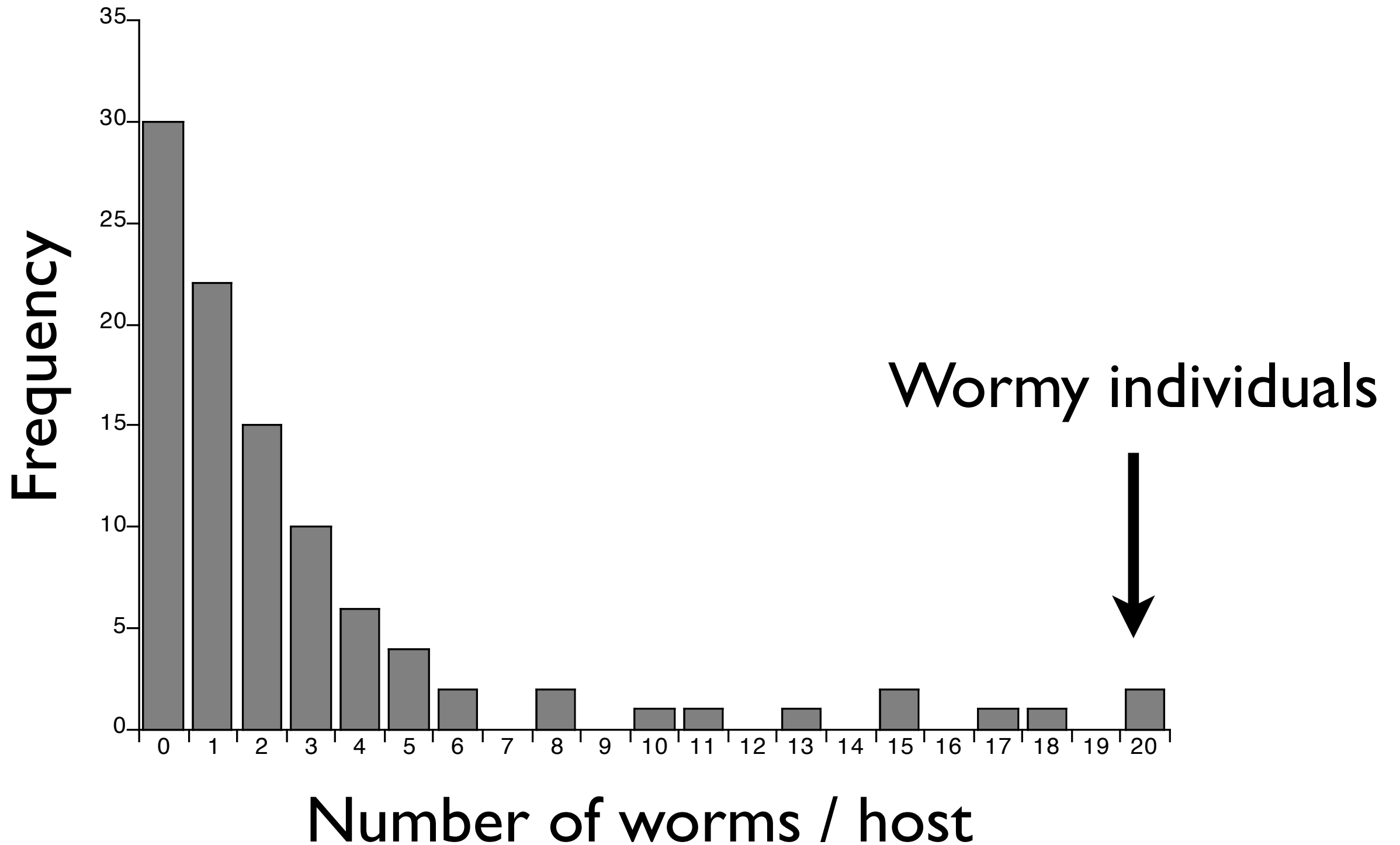




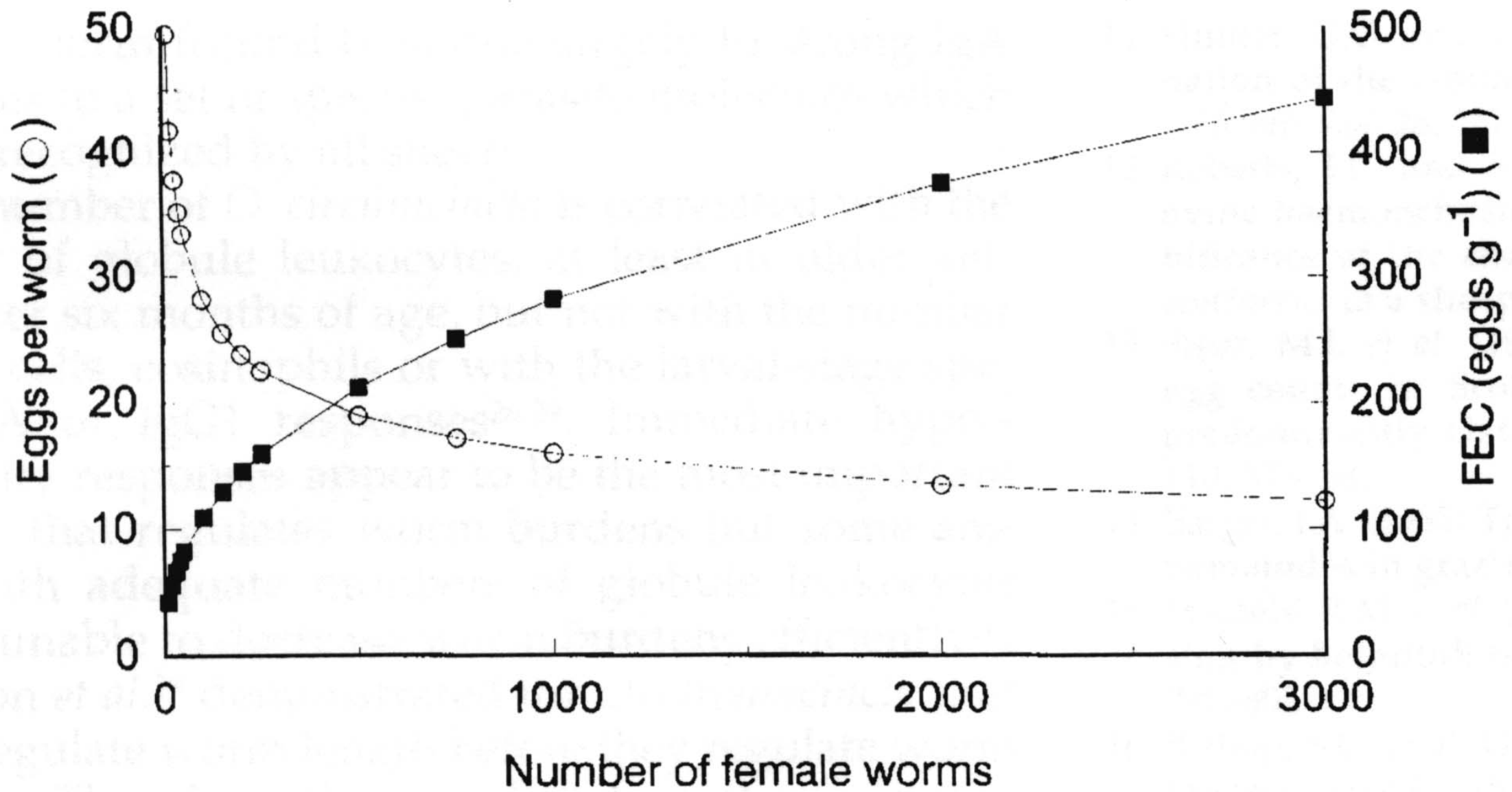
*Strongyloides*



# Over-dispersed (clumped) parasites



# Density-dependent effects



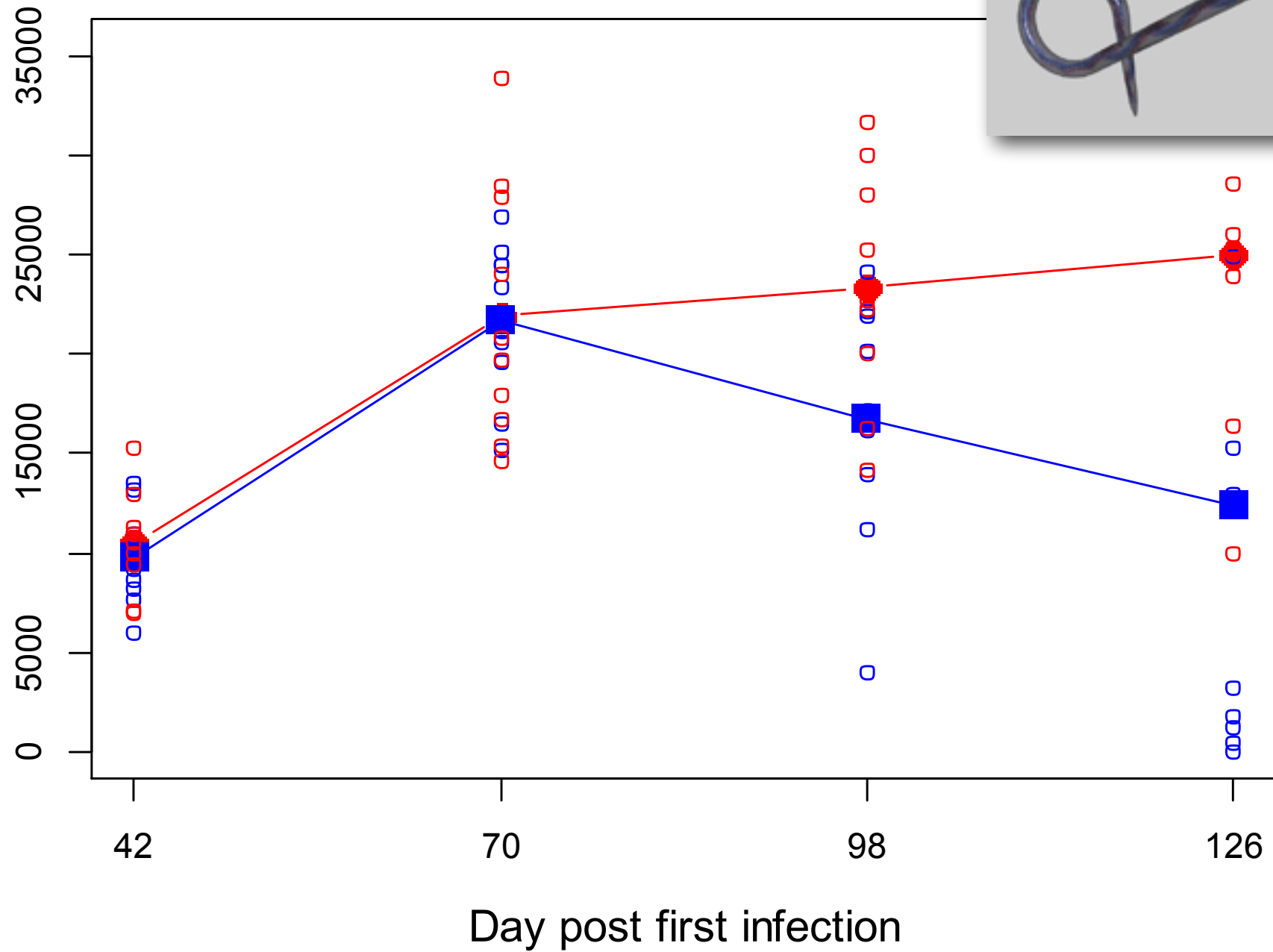


# Co-infections of two nematodes



# Co-infections of two nematodes

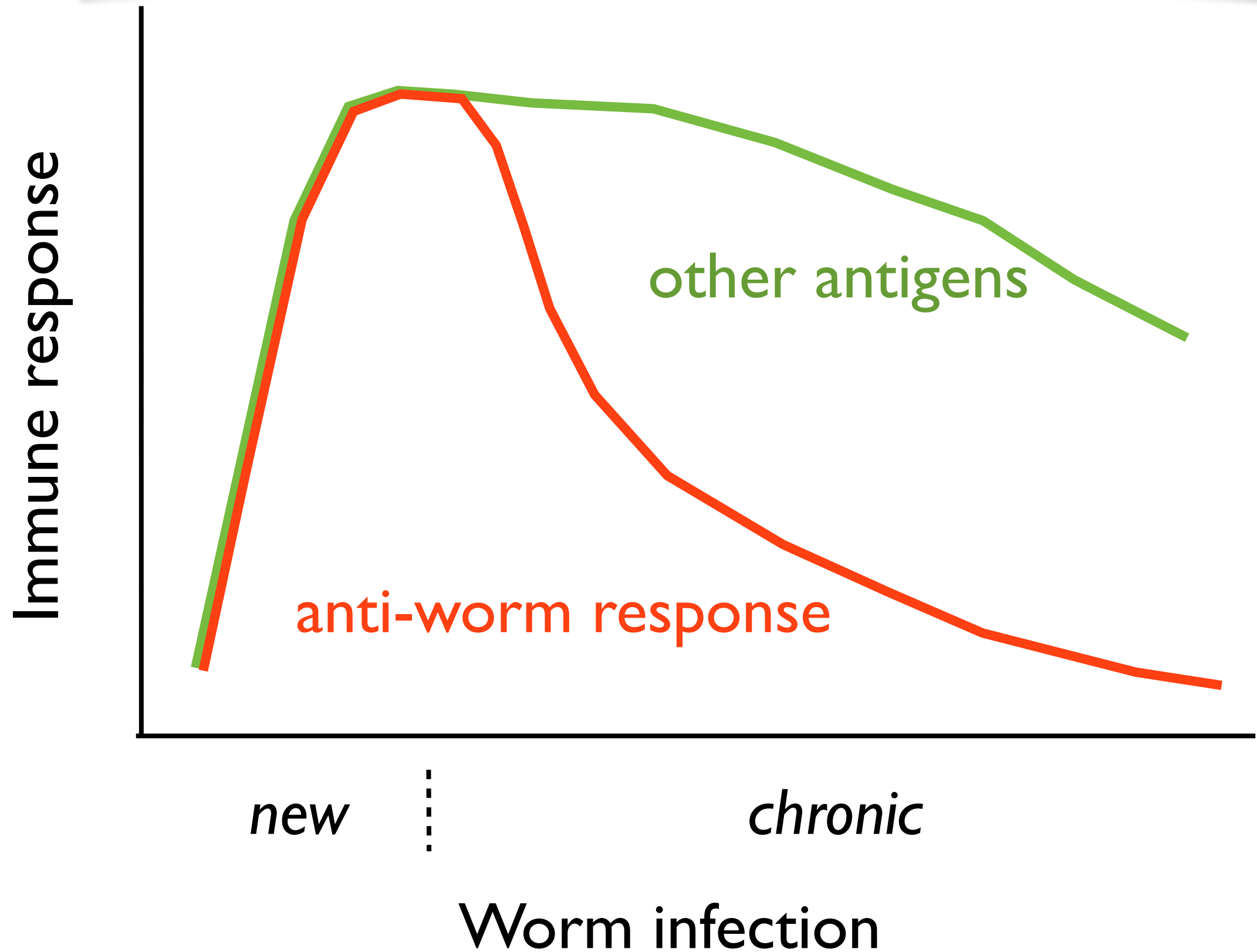
*Trichostrongylus colubriformis* worm count



Single  
Mixed



# Immunomodulation by nematodes



Th1

Th2

Bacteria  
Viruses

Worms  
Allergies



Th1

Th2

Bacteria  
Viruses

Worms  
Allergies

Th1

Th2

# Leading a double life

