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VMP 930
Veterinary Parasitology

(aka Infection & Immunity III)

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Dr. Barbara Qurollo
James Flowers, PhD
(Office hours by appointment)

Studies in Infectious Diseases

- Microbiology
  - Virology
  - Bacteriology
  - Mycology
- Parasitology
  - Medical & Veterinary Protozoology
  - Helminthology
  - Medical & Veterinary Entomology

Parasites in Practice

- In a veterinary practice how much effort & time is spent on Parasite issues?
  - What parasites are often diagnosed in a veterinary practice?
  - What parasites do veterinary practices often try to manage?

Parasitism

- Intimate relationship between two hetero-specific organisms, in which the parasite, usually the smaller symbiont, is metabolically dependent on the host.

- One symbiont (host) is harmed, while the other symbiont (parasite) benefits.

Parasite Impact on the Host

- Pathogenesis
  - Production or Development of Disease
- Forms of Pathogenesis
  - Trauma
  - Nutrient Robbing
  - Toxin Production
  - Interactions with Host immune / inflammatory responses.
- Etiologic Agent – the agent that elicits DZ

Important concepts of Parasitic Infections

- Infection = presence of an agent that has the potential to cause disease
- Disease = the occurrence of dysfunction
- Infectious = capable of causing infection
- Infection ≠ Infectious ≠ Disease

Infection, Disease, and/or Infectious?

A. The dog showed no adverse symptoms to the 2 female *Dirofilaria immitis* in its right ventricle.

Infection

B. 1,000 juvenile *Haemonchus contortus* were causing severe anemia in the lamb.

Infection + Disease

C. Cats suffering from large bowel diarrhea due to *Tritrichomonas blagburni* pass active trophs in their stool.

Infection + Disease + Infectious

D. After using the bathroom, she was horrified to see that she had passed several active proglottids of the beef tapeworm, *Taenia saginata*.

Infection

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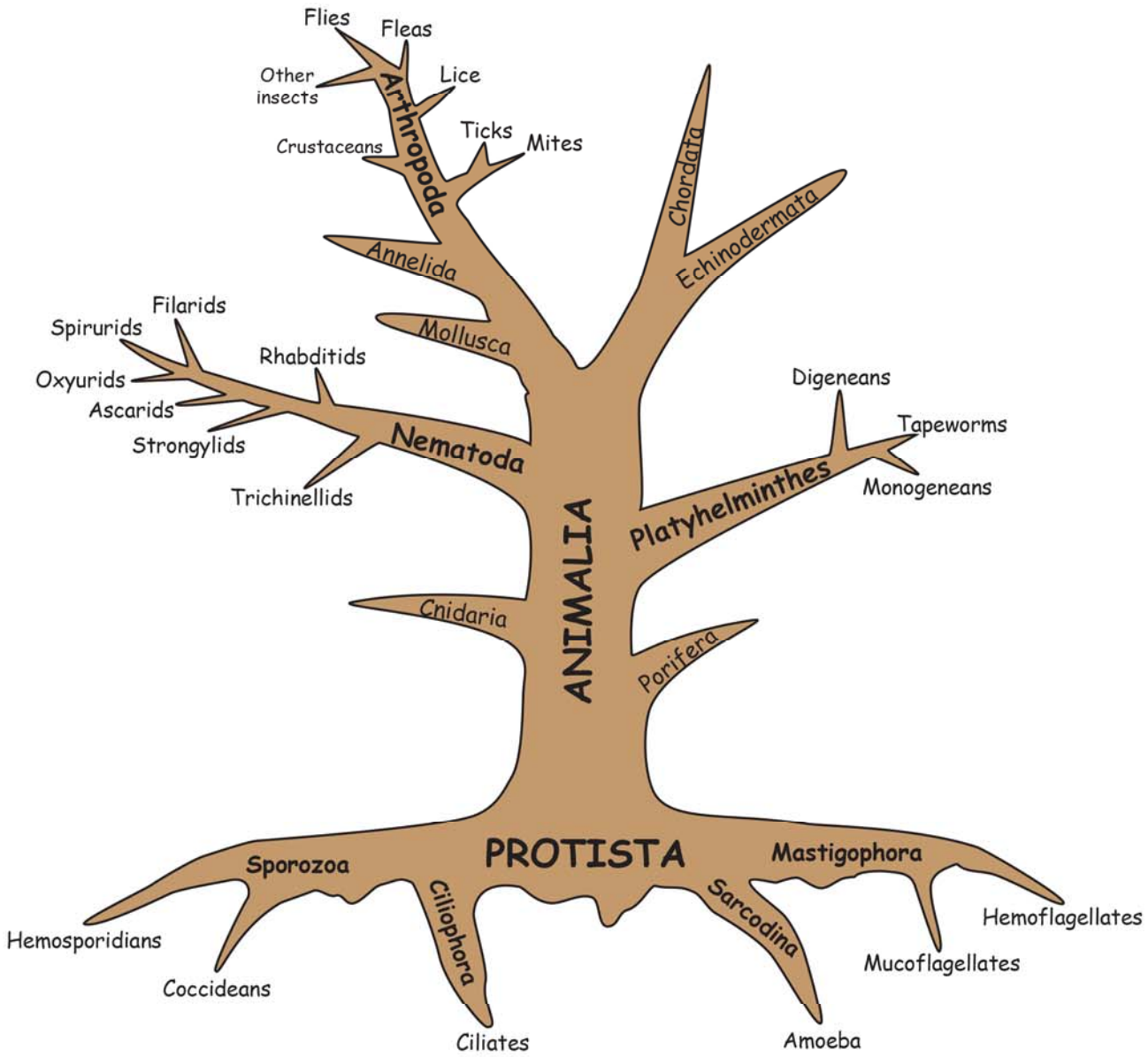

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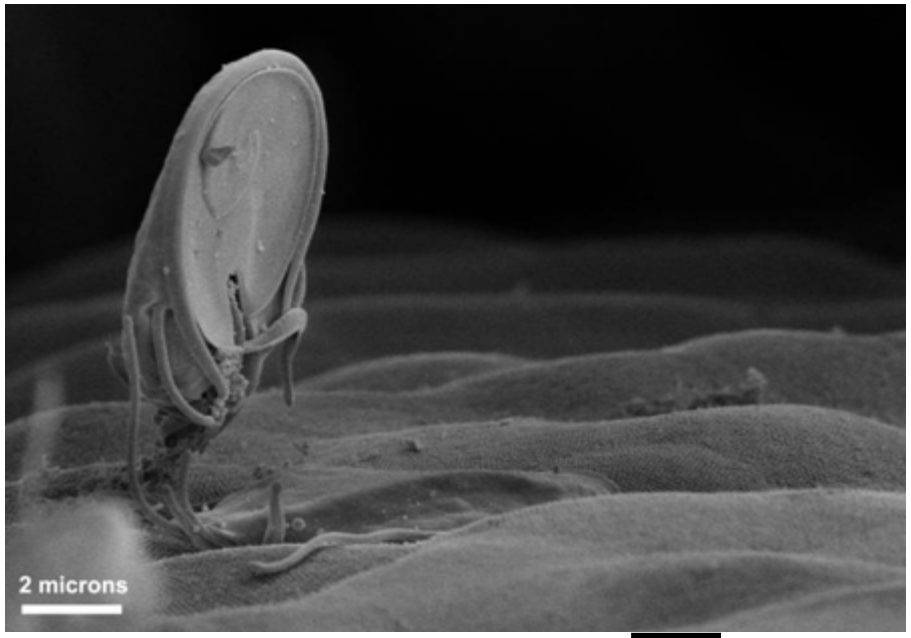
Protozoa

- Microparasites
  - Small (single cell) parasites
    - (Protozoa, [bacteria, viruses])
  - Intracellular & Extracellular
  - Individual organisms Multiply in the host.
    - "mechanism" of protozoan induced pathology

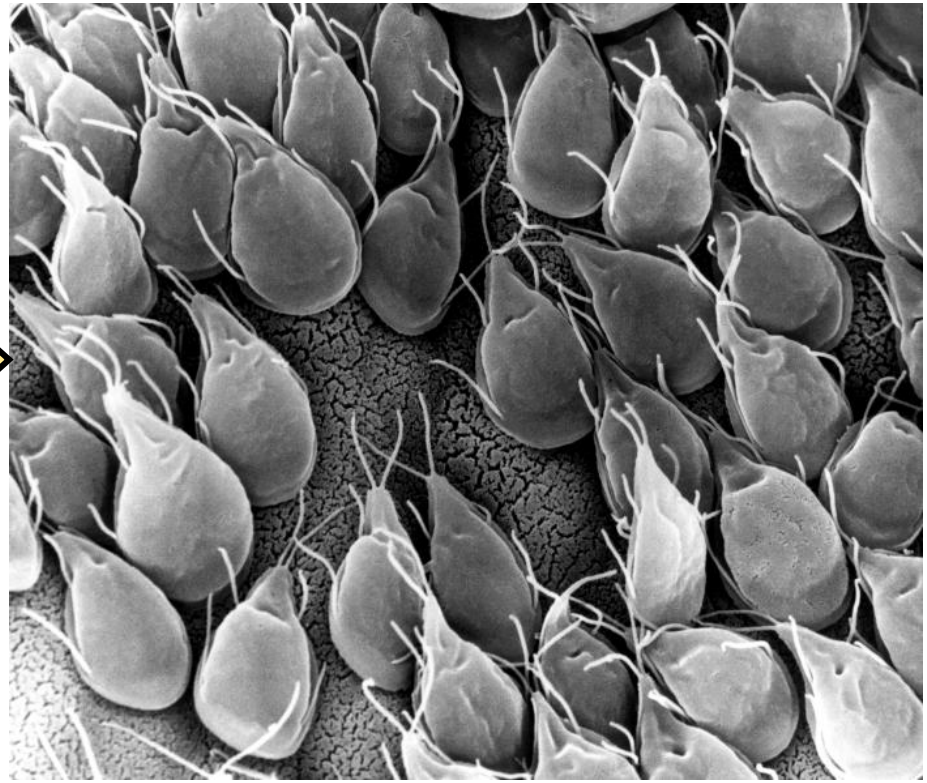


Giardia sp.

& other extracellular protozoa

Pathology:
Host organ dysfunction

Replication
(binary fission)



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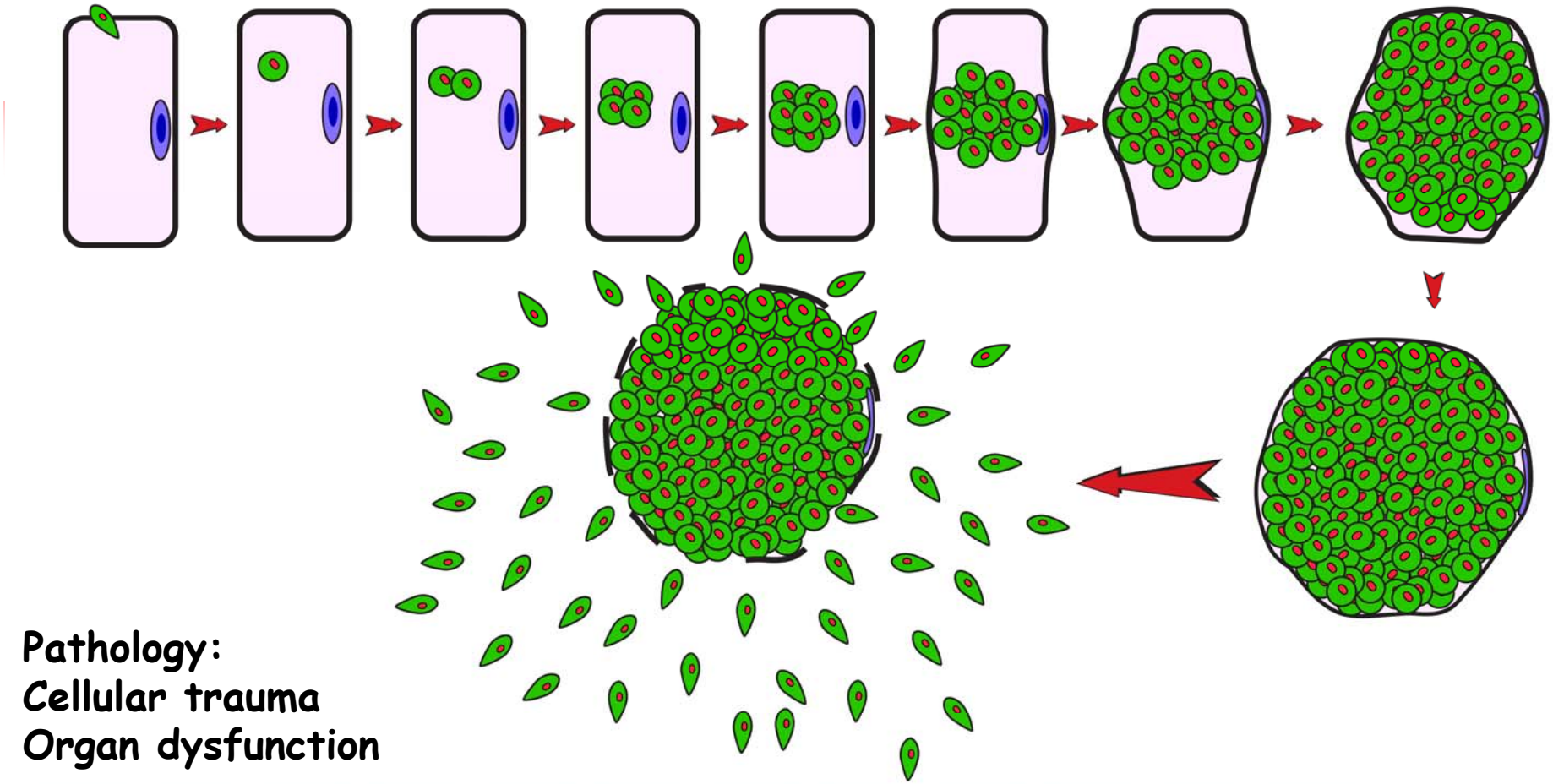
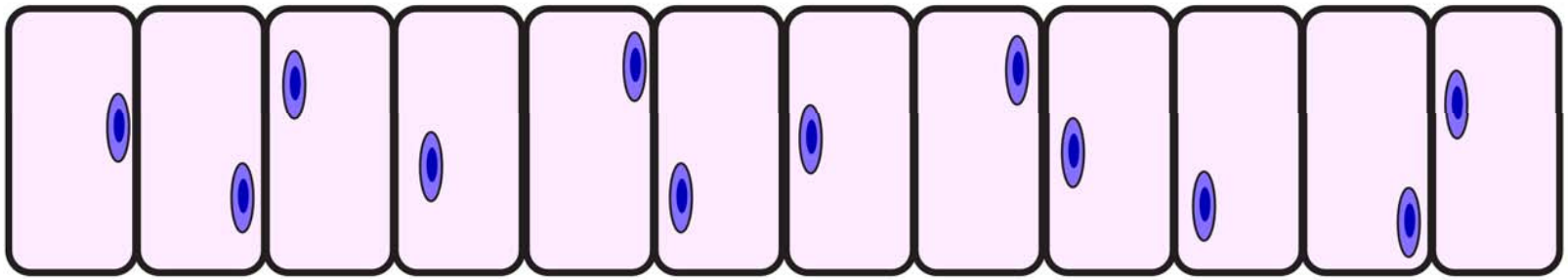
Coccidian Pathology



Pathology:
Cellular trauma
Organ dysfunction



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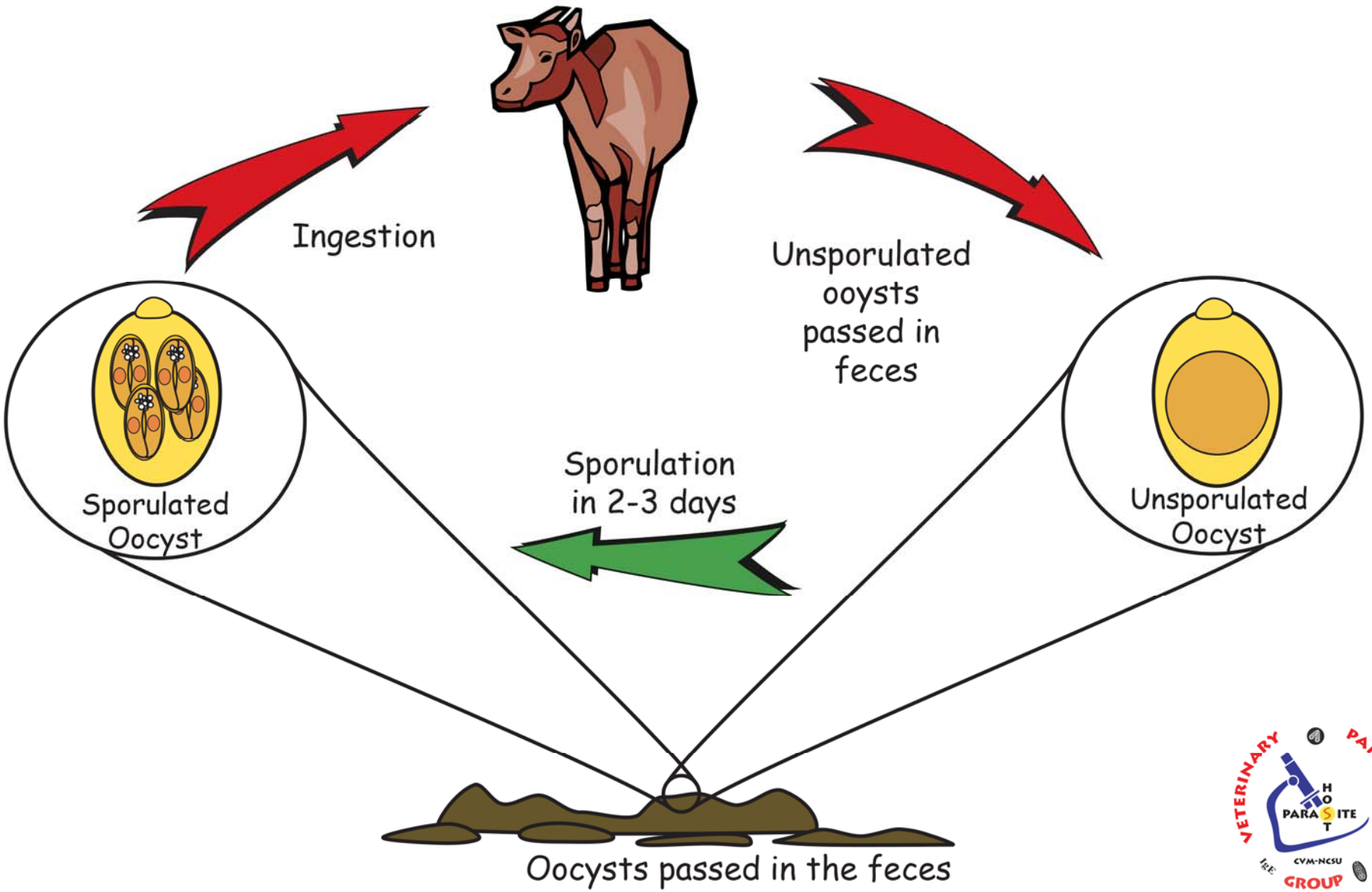
Coccidia *(Eimeria bovis)*



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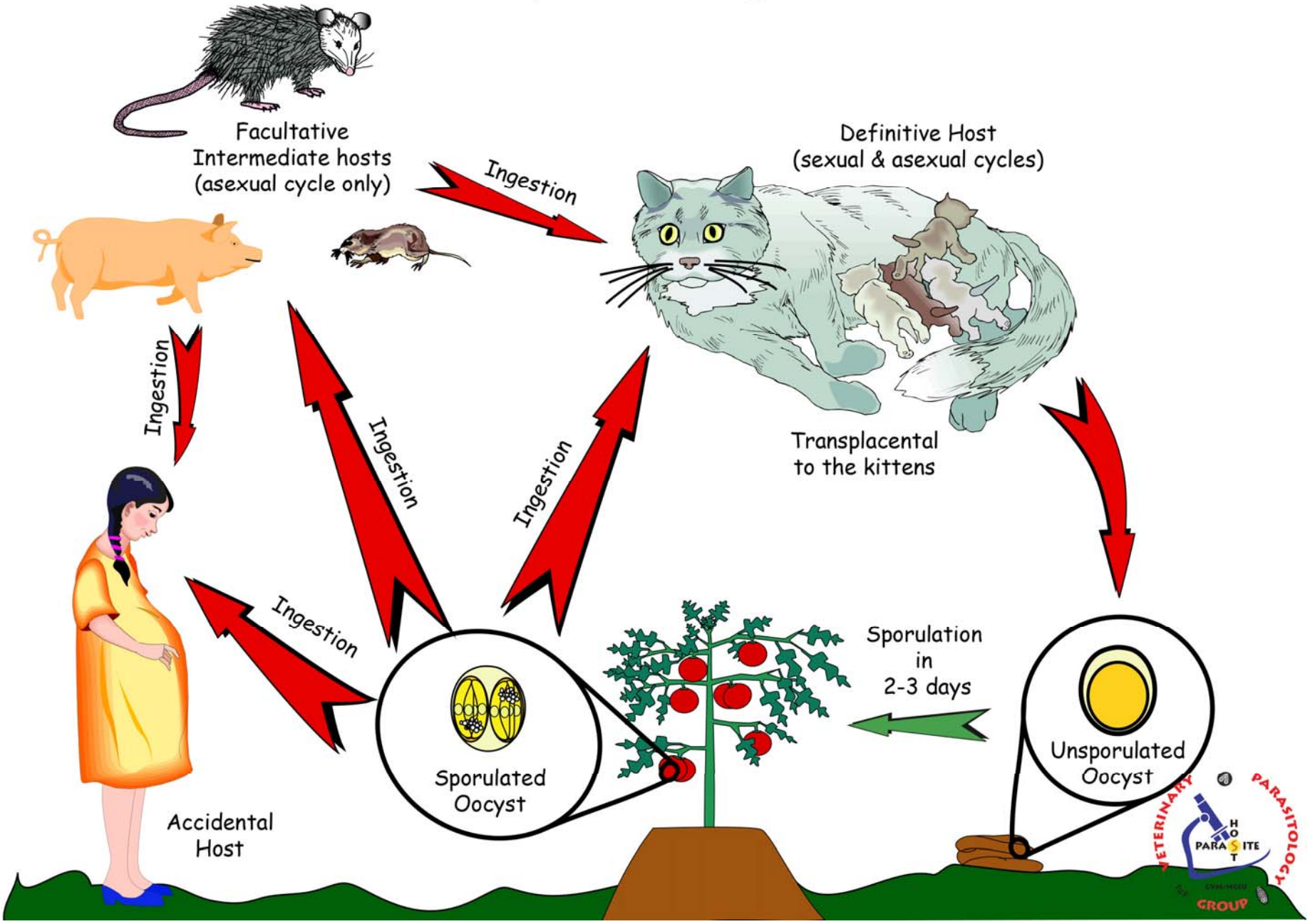
Toxoplasma gondii



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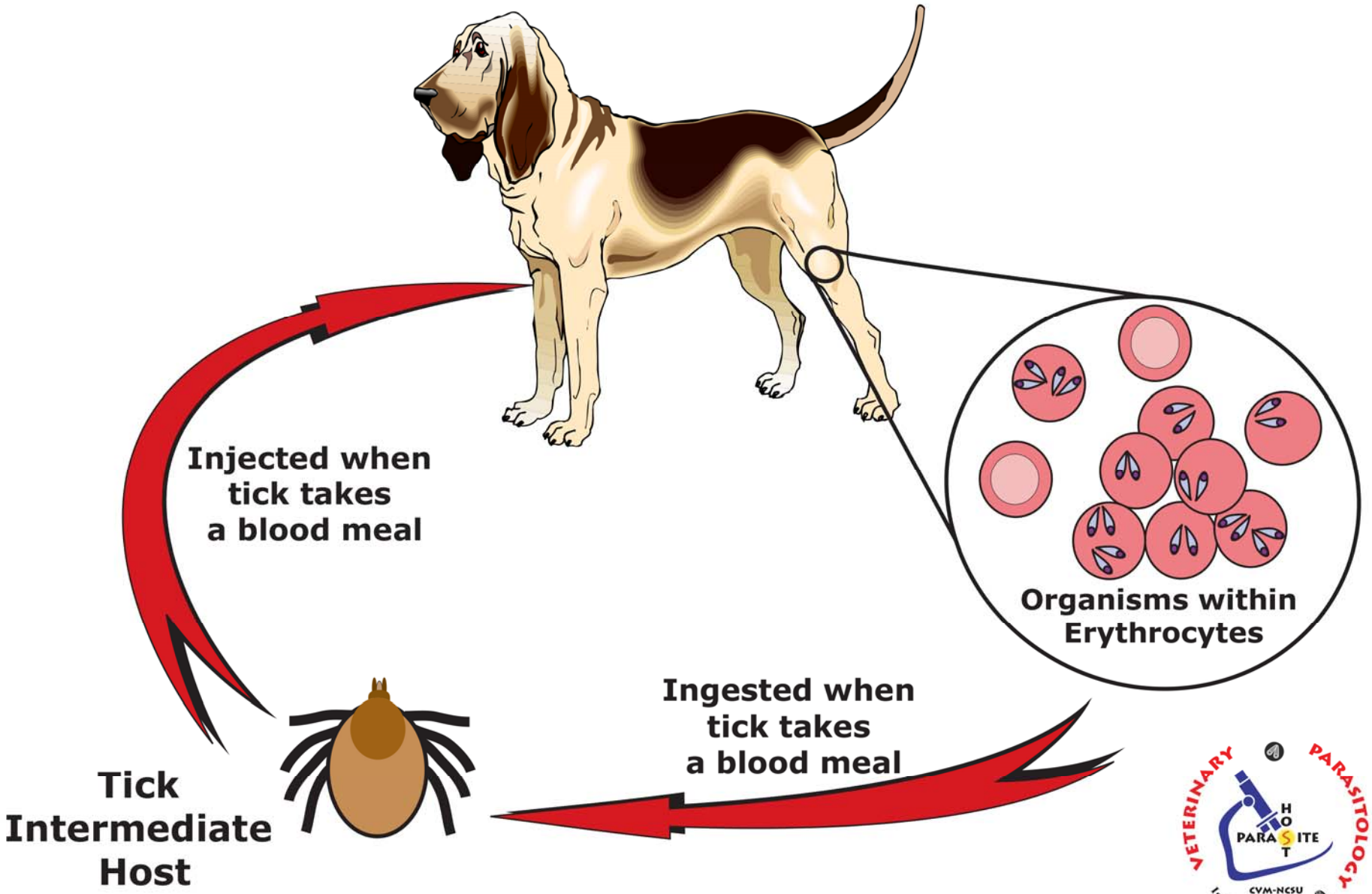
Babesia canis



Trematodes

- Macroparasites
  - Large parasites
  - Individual ADULT organisms do Not multiply in the host.

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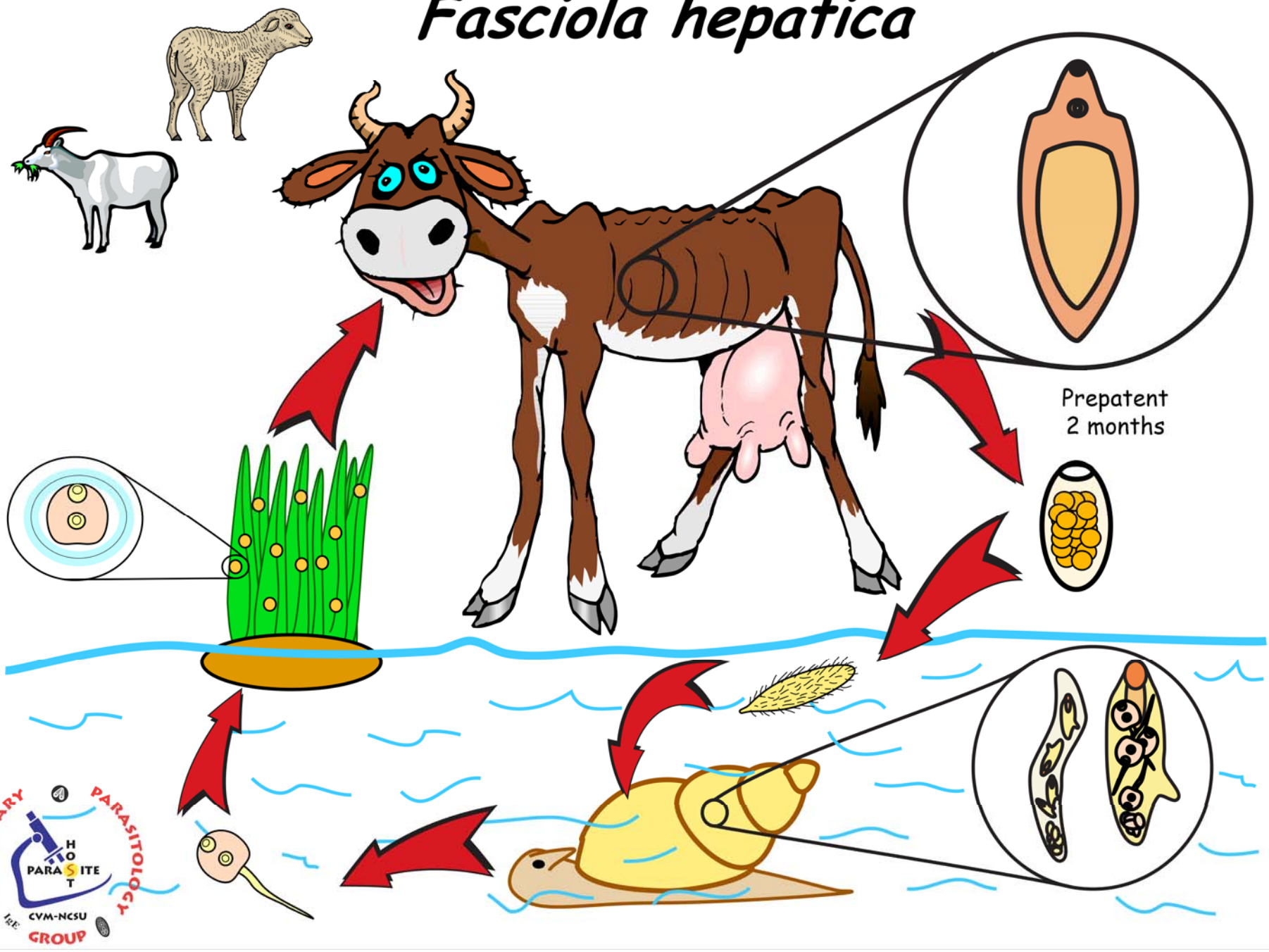
Fasciola hepatica



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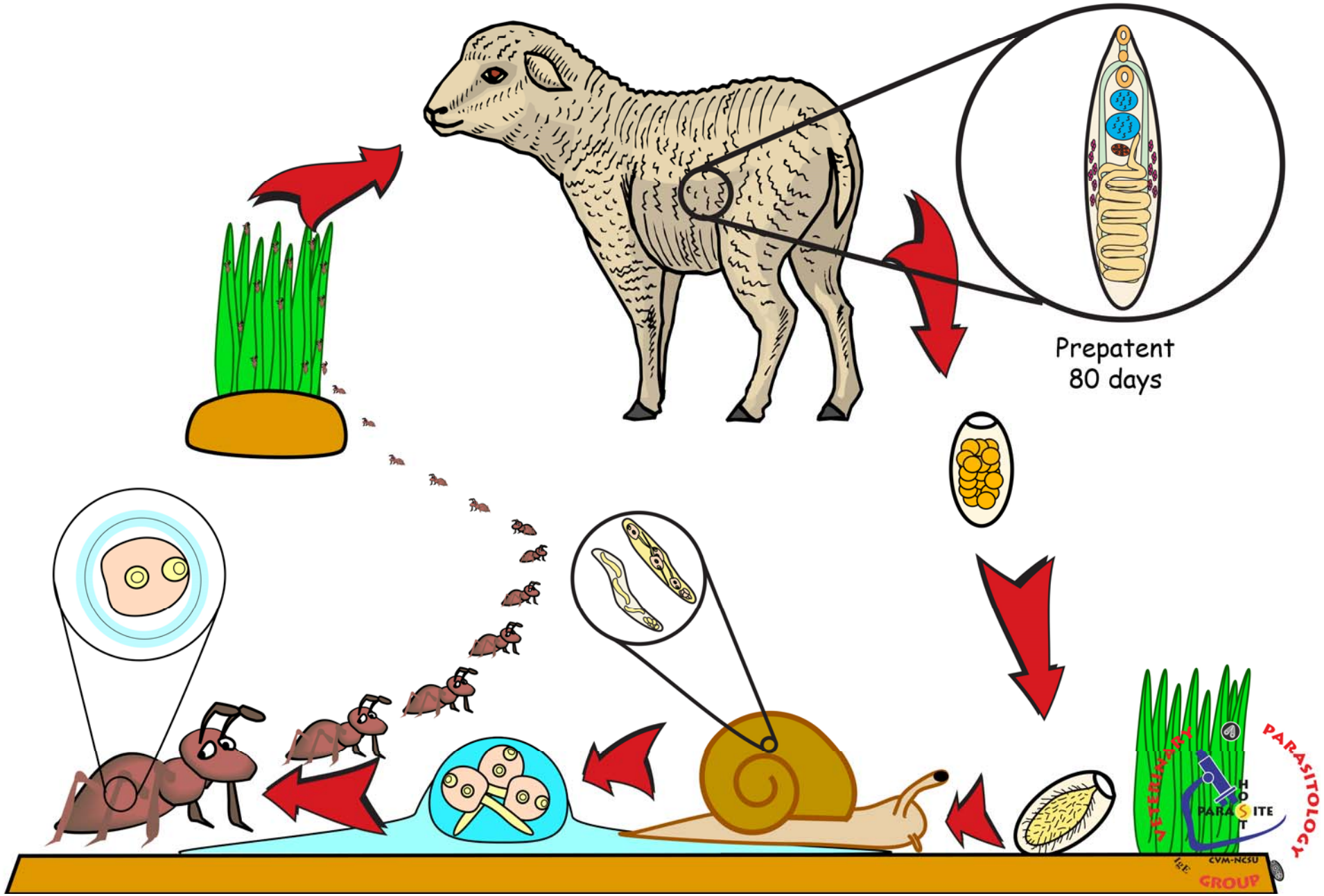
Dicrocoelium dendriticum



Cestodes

- Macroparasites
  - Large parasites
  - Individual ADULT organisms do Not multiply in the host.

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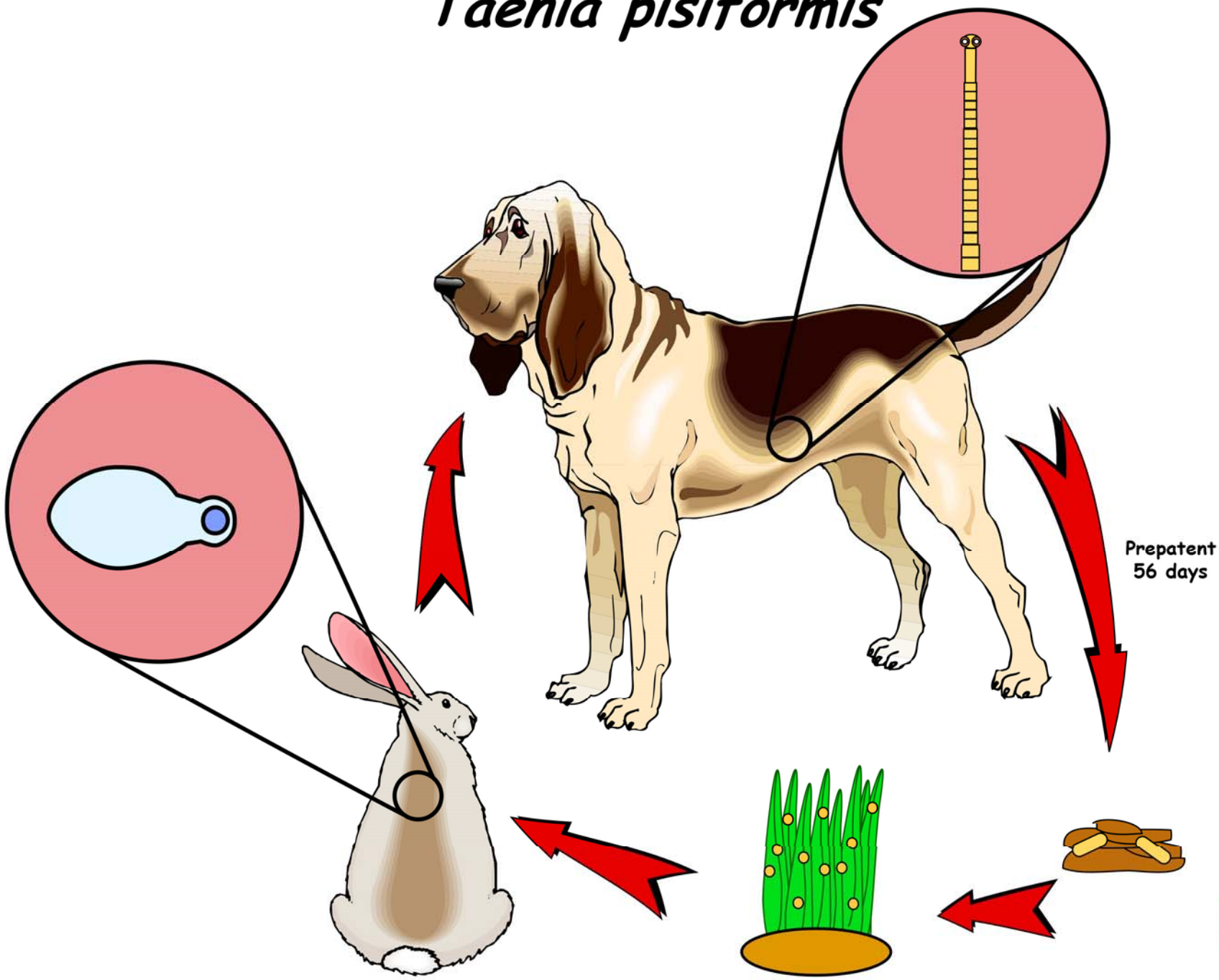
Taenia pisiformis



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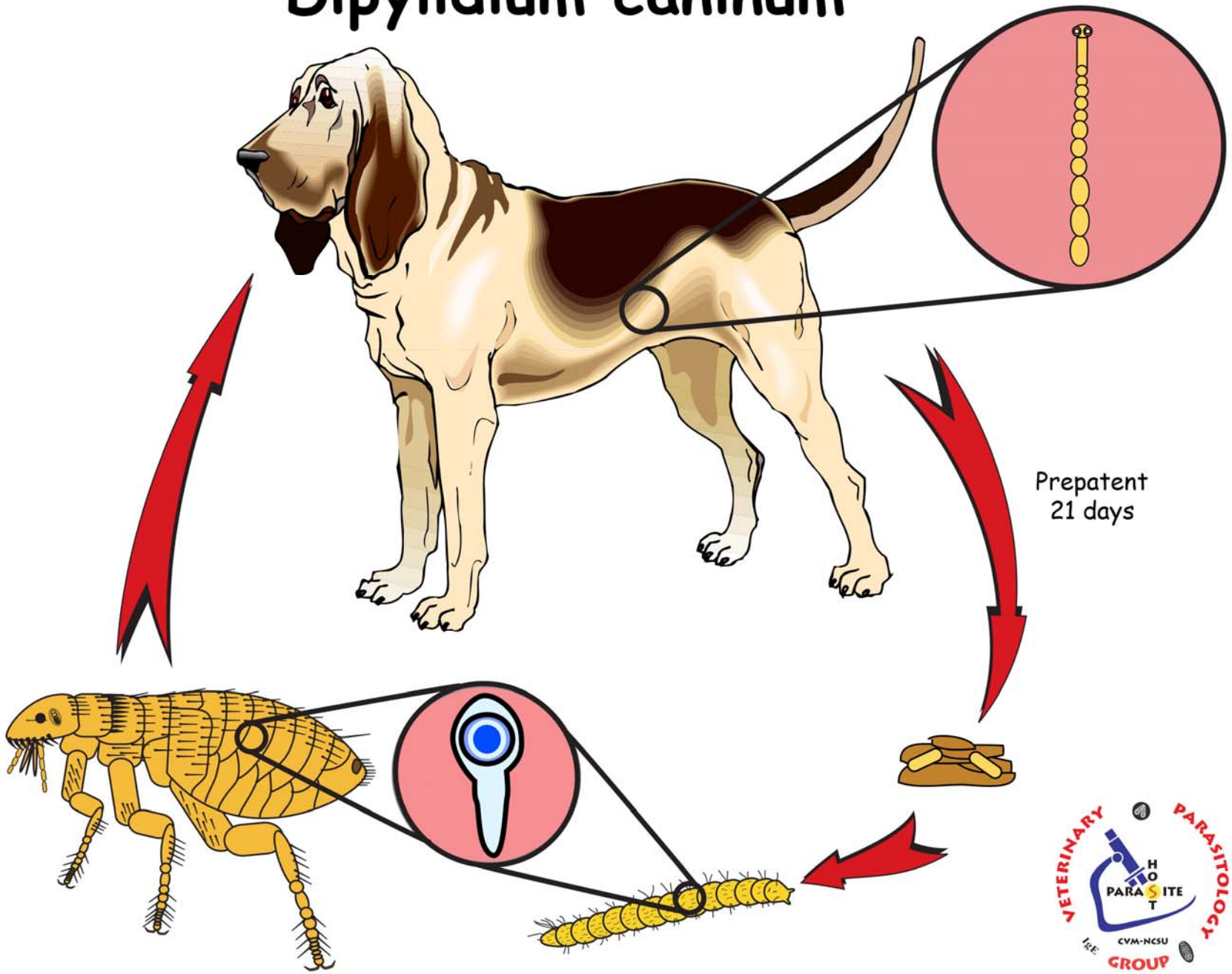
Dipylidium caninum



Nematodes

- Macroparasites
  - Large parasites
  - Individuals do Not multiply in the host.

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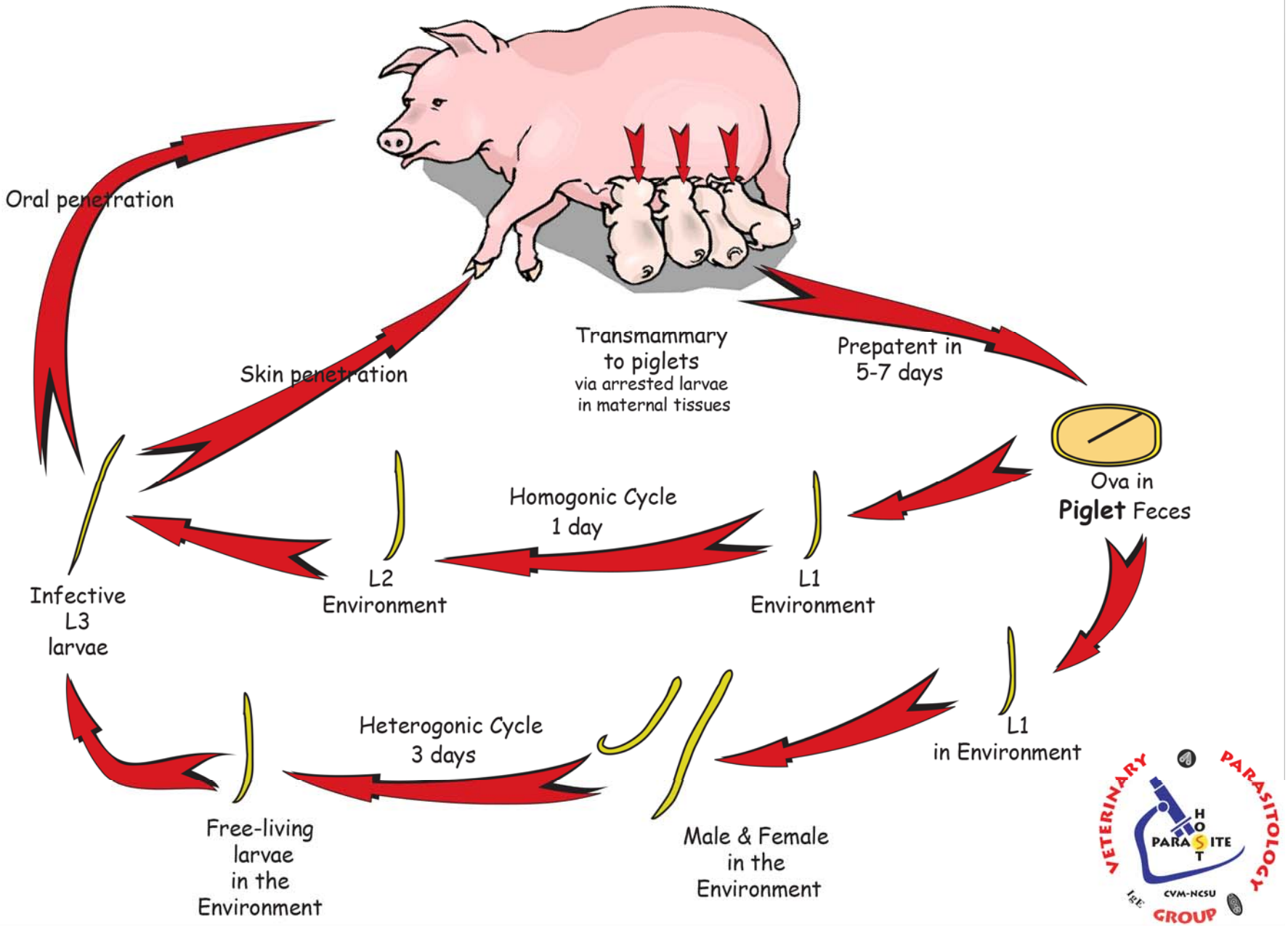
Strongyloides ransomi



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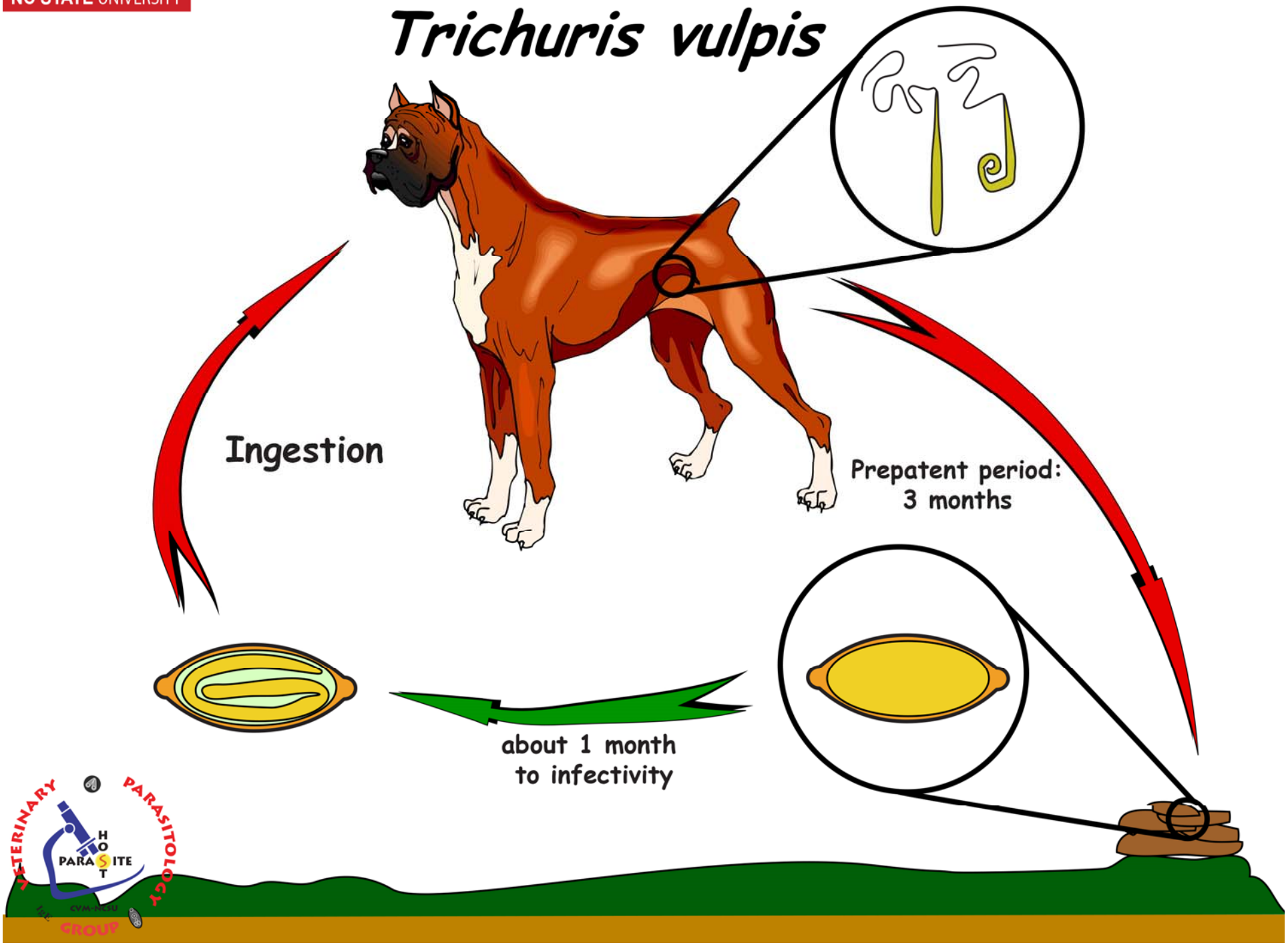
Trichuris vulpis



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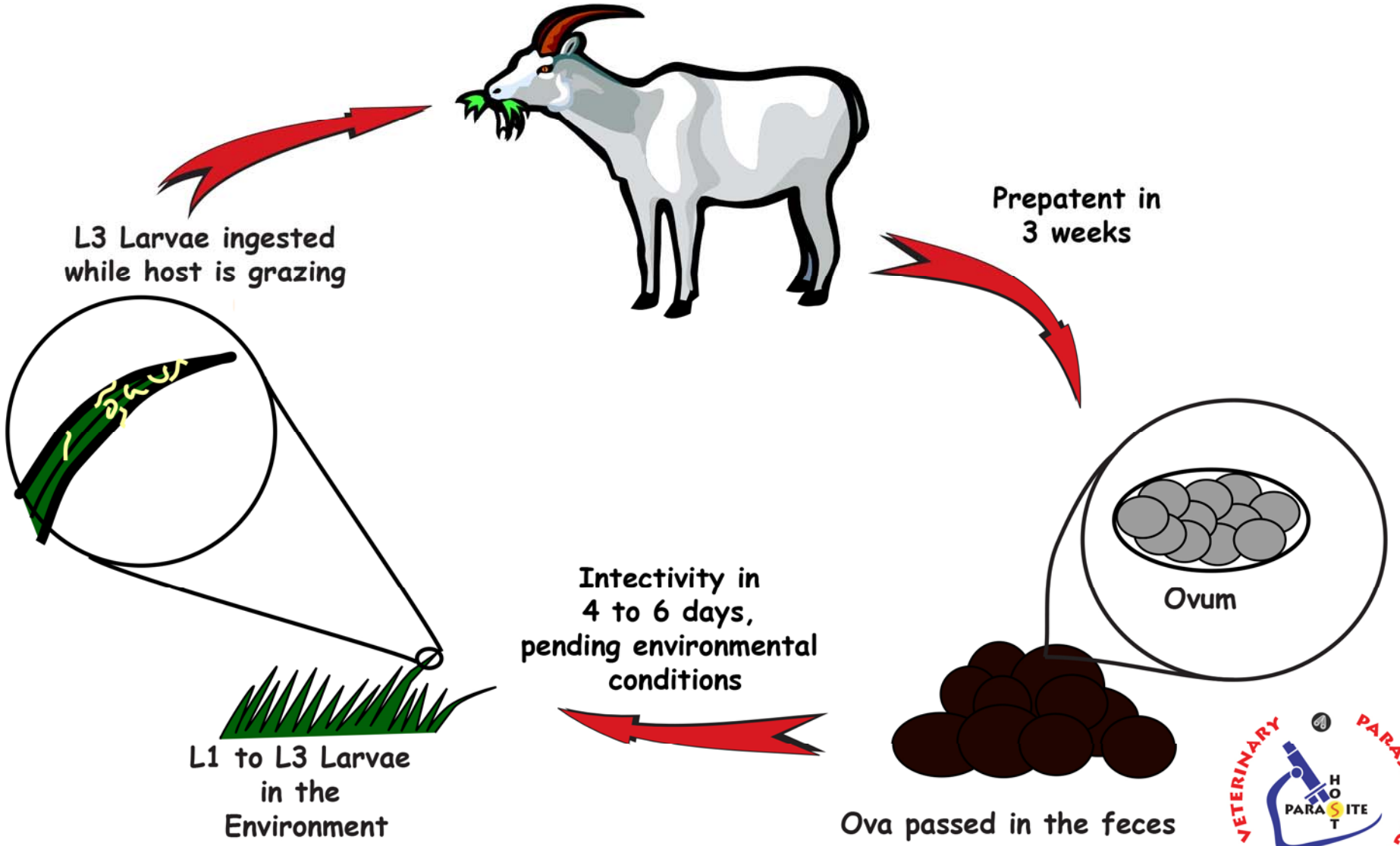
Haemonchus contortus



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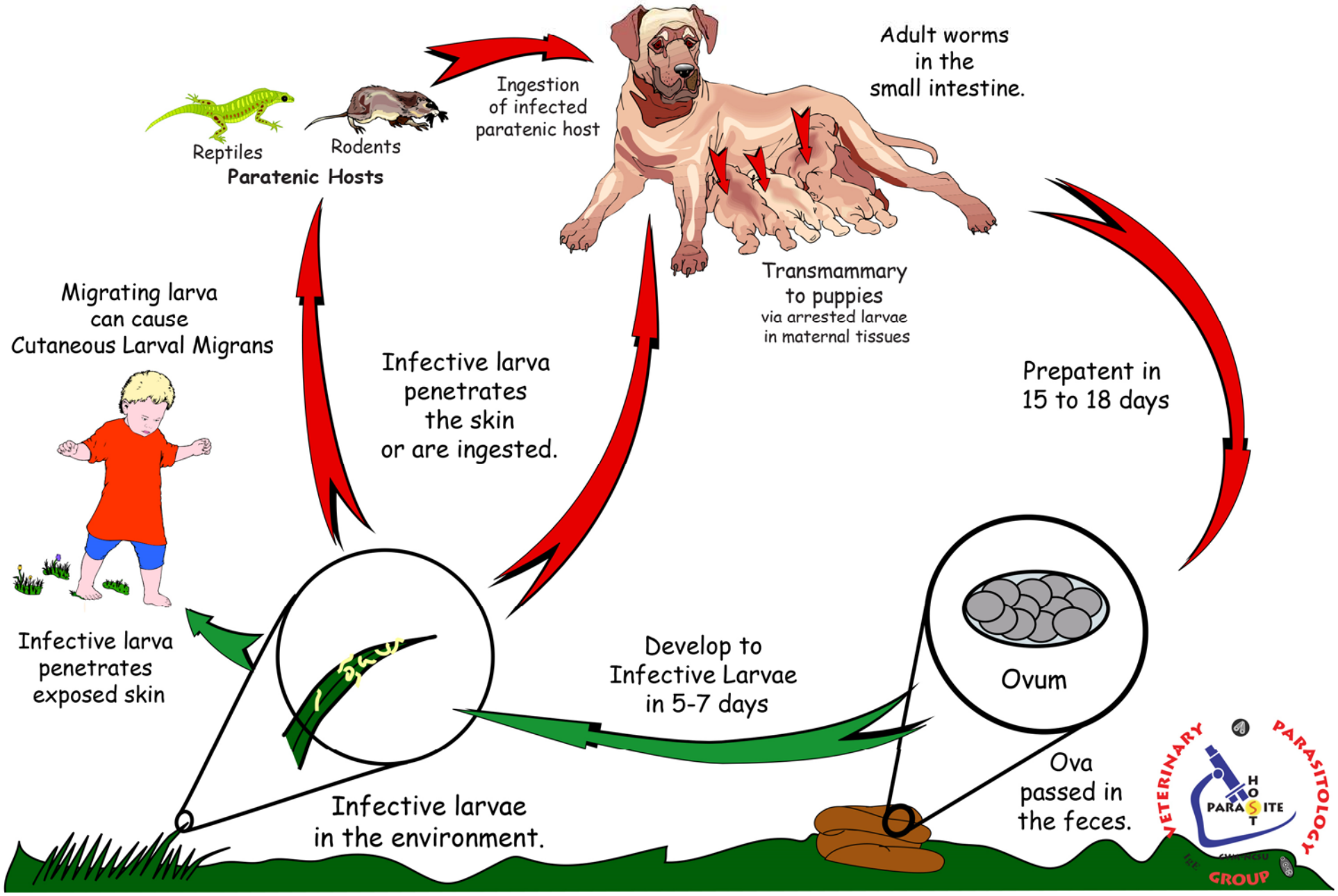
Ancylostoma caninum



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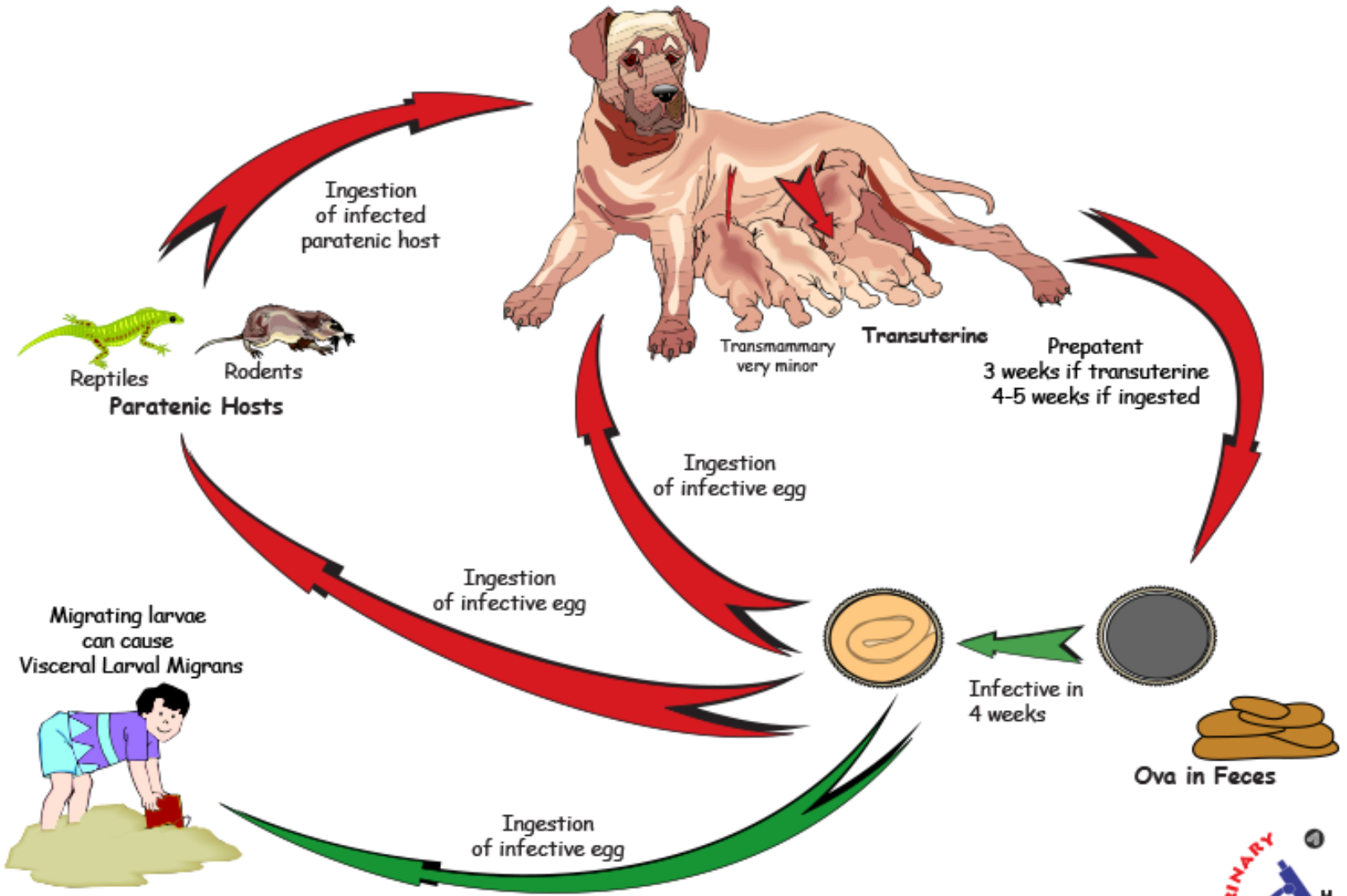
Toxocara canis



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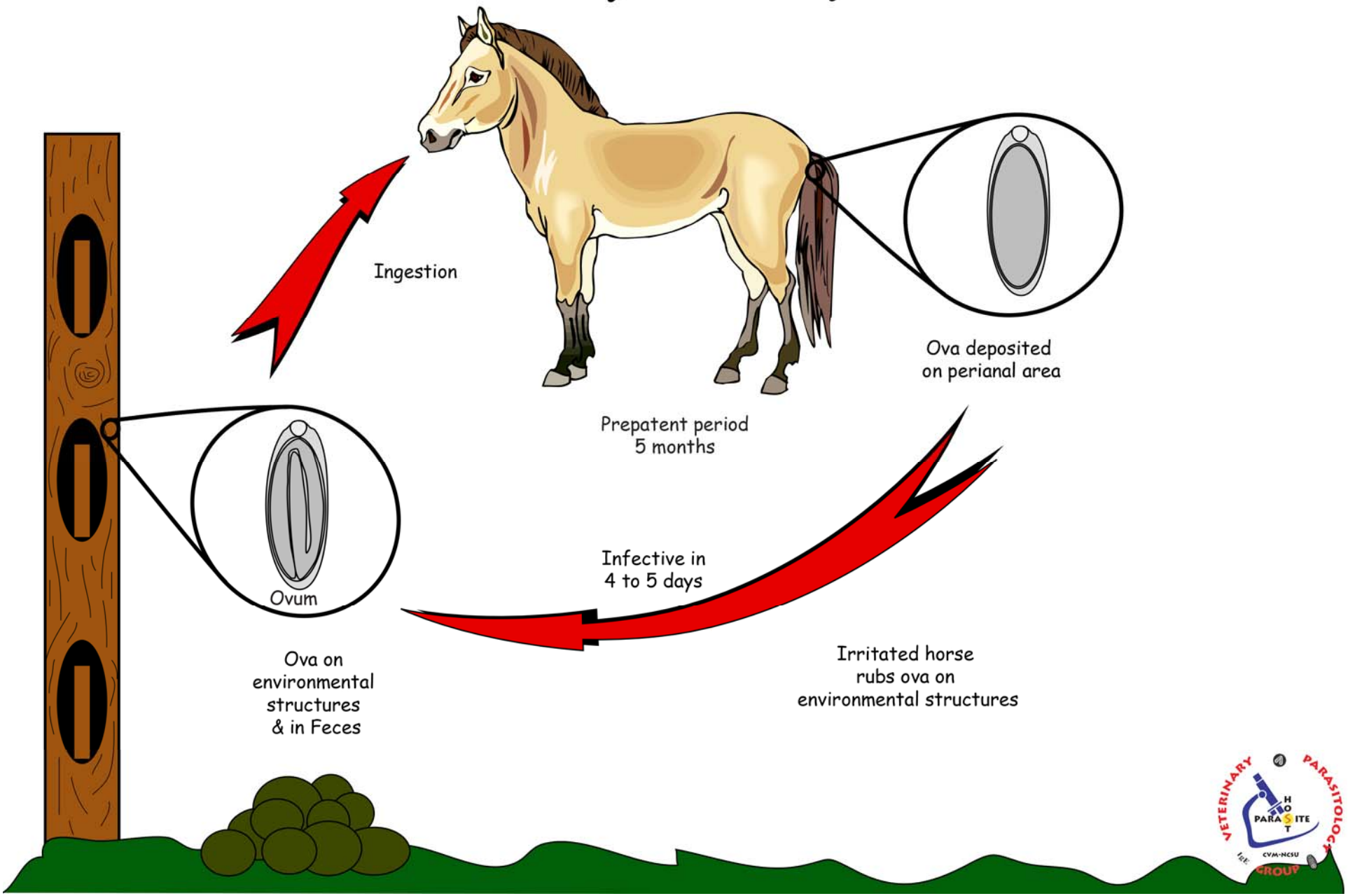
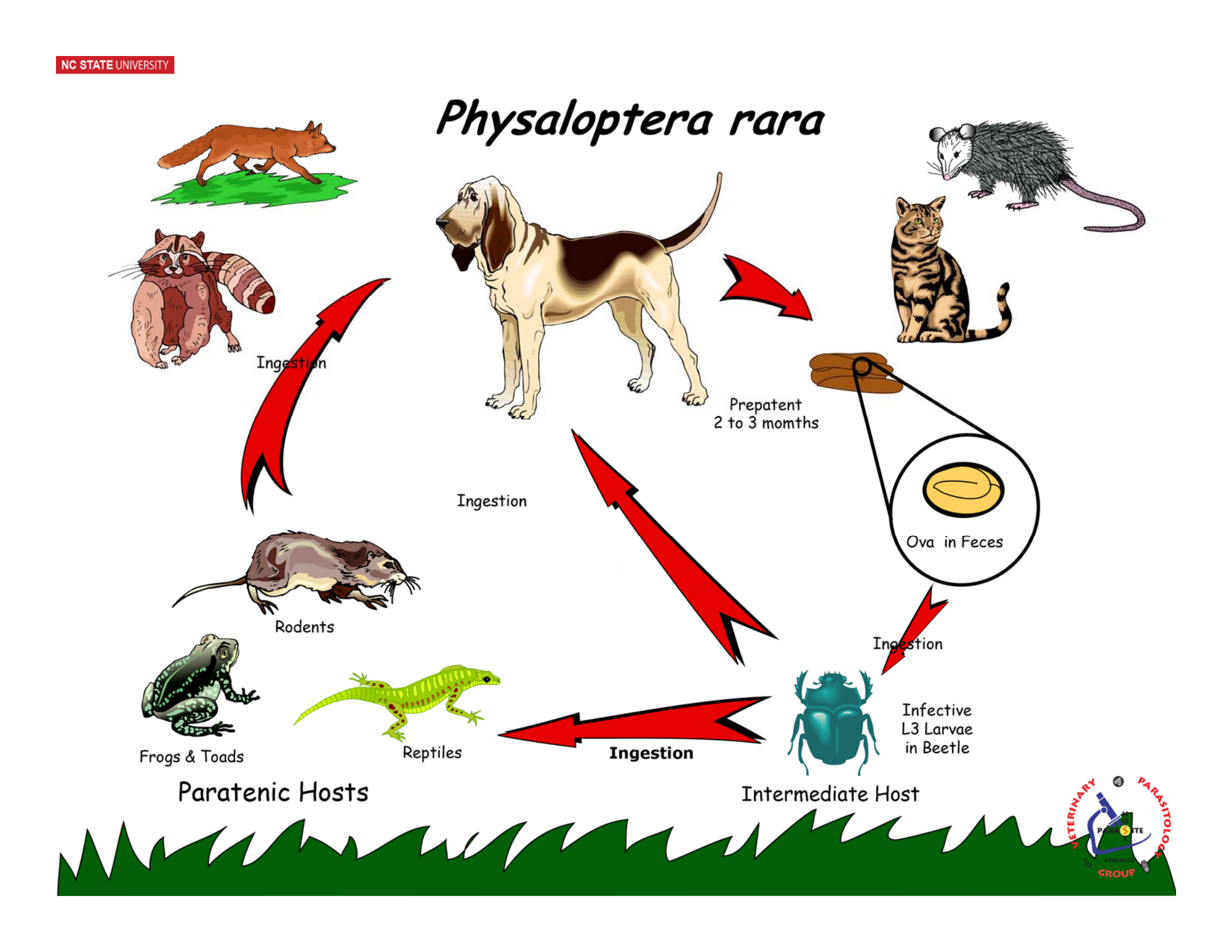
Oxyuris equi



Physaloptera rara



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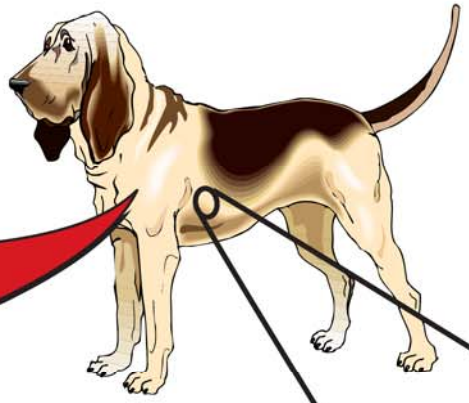
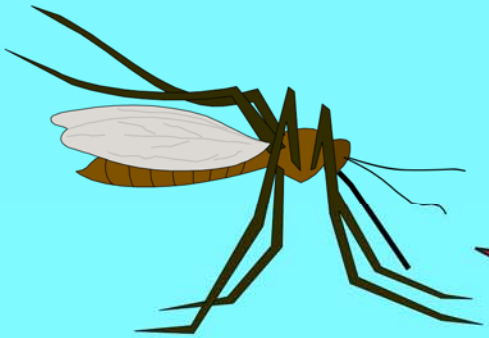
Dirofilaria immitis



L3 Larvae
enter dermis
when infected
mosquito feeds.

Prepatent Period
6 Months



Mosquito
Intermediate
Host
(Microfilaria
to Infective L3)

Ingestion
of
Microfilaria

Microfilaria
in
Blood Stream

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Arthropods

- Macroparasites
  - Large multicellular parasites
  - Individual organisms do Not multiply / replicate in or on the host.
  - Although the pathology of some arthropods (mites & lice) is due to their reproduction on the host.
  - **Vectors for other disease agents**

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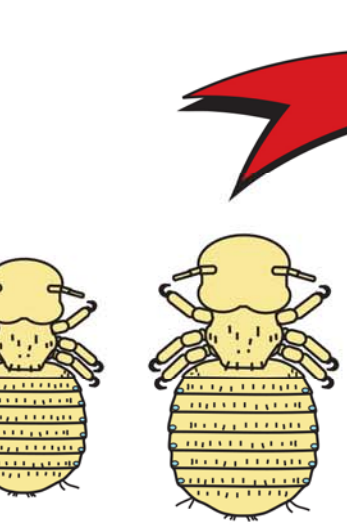
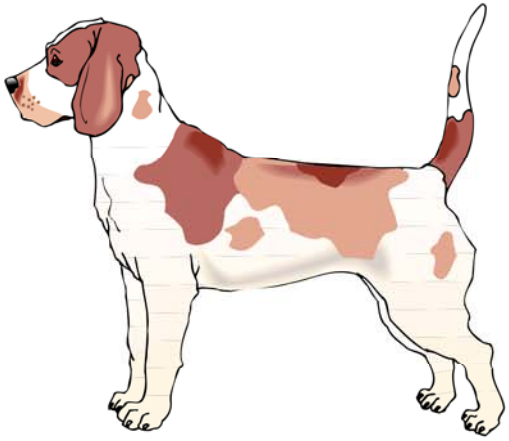
Trichodectes canis



Adults

All Stages occur on the Host's Integument

Eggs (Nits) attached to Hair



Transmission to Other Hosts via Direct Contact or Infested Grooming Tools

Nymphs hatch from nits in about 5 days

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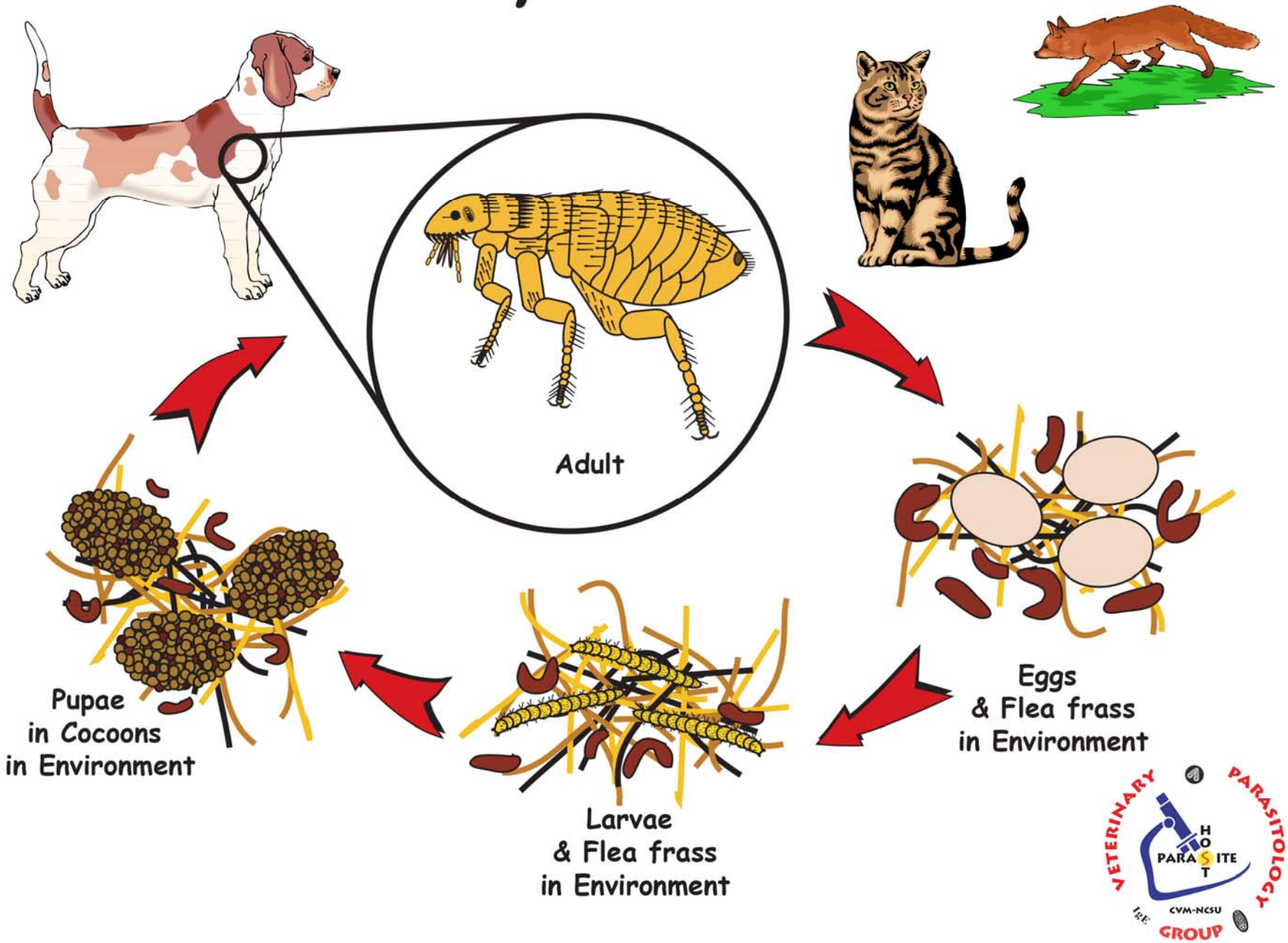
Ctenocephalides felis



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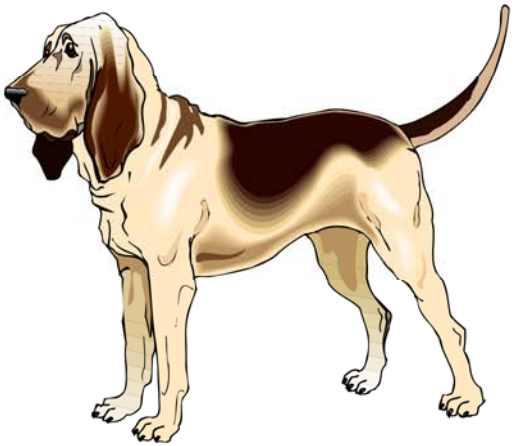
Demodex canis



Transmission to Other Hosts via Direct Contact

Eggs

Larva

Protonymph

Deutonymph

Adults

All Stages occur in the Host's Follicles and Sebaceous Glands

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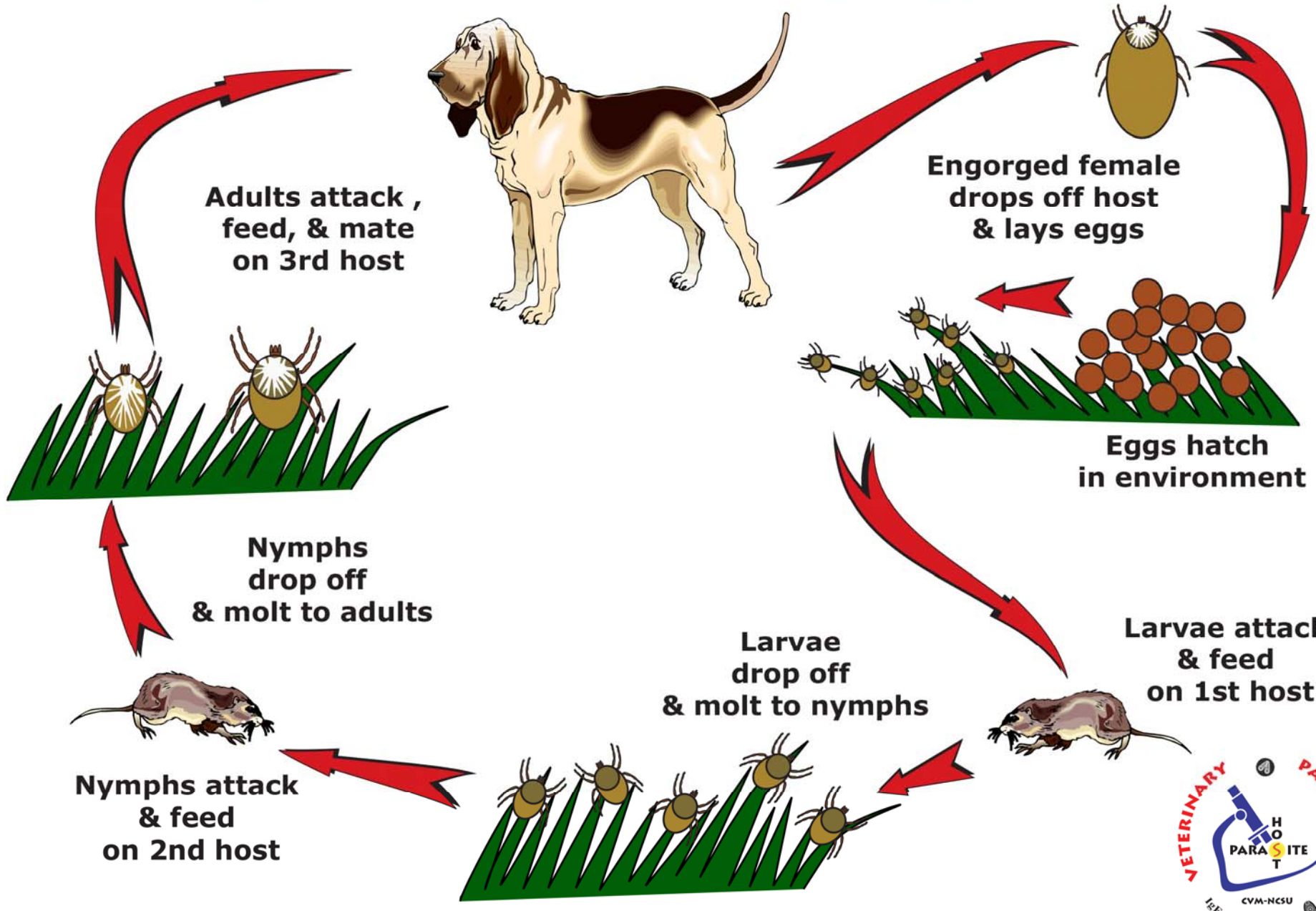
Dermacentor variabilis



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Controlling Parasites

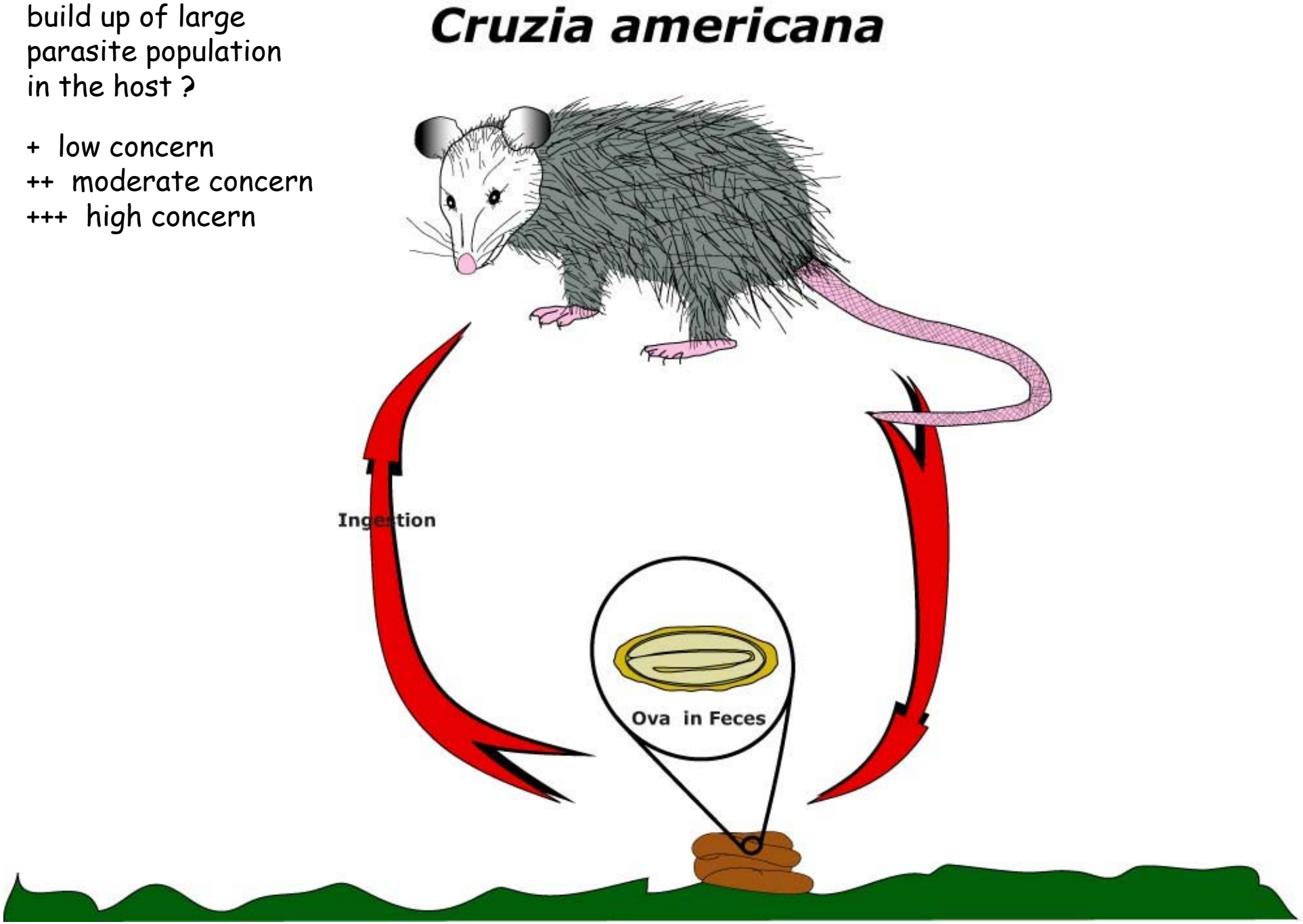
Assume you are working at a Wildlife Rehab facility with limited funds for the treatment of parasites.

1. Which of the following 3 parasites would likely cause the most concern for re-infection & a build-up of parasites?

2. What would you generally do to control reinfection?

Concern for reinfection, build up of large parasite population in the host ?

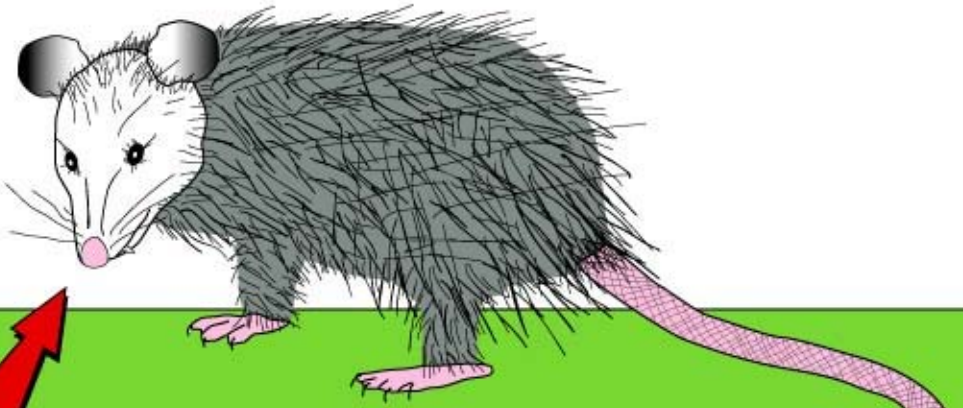
+ low concern
++ moderate concern
+++ high concern

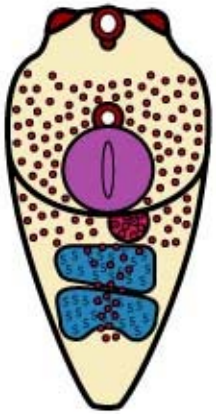


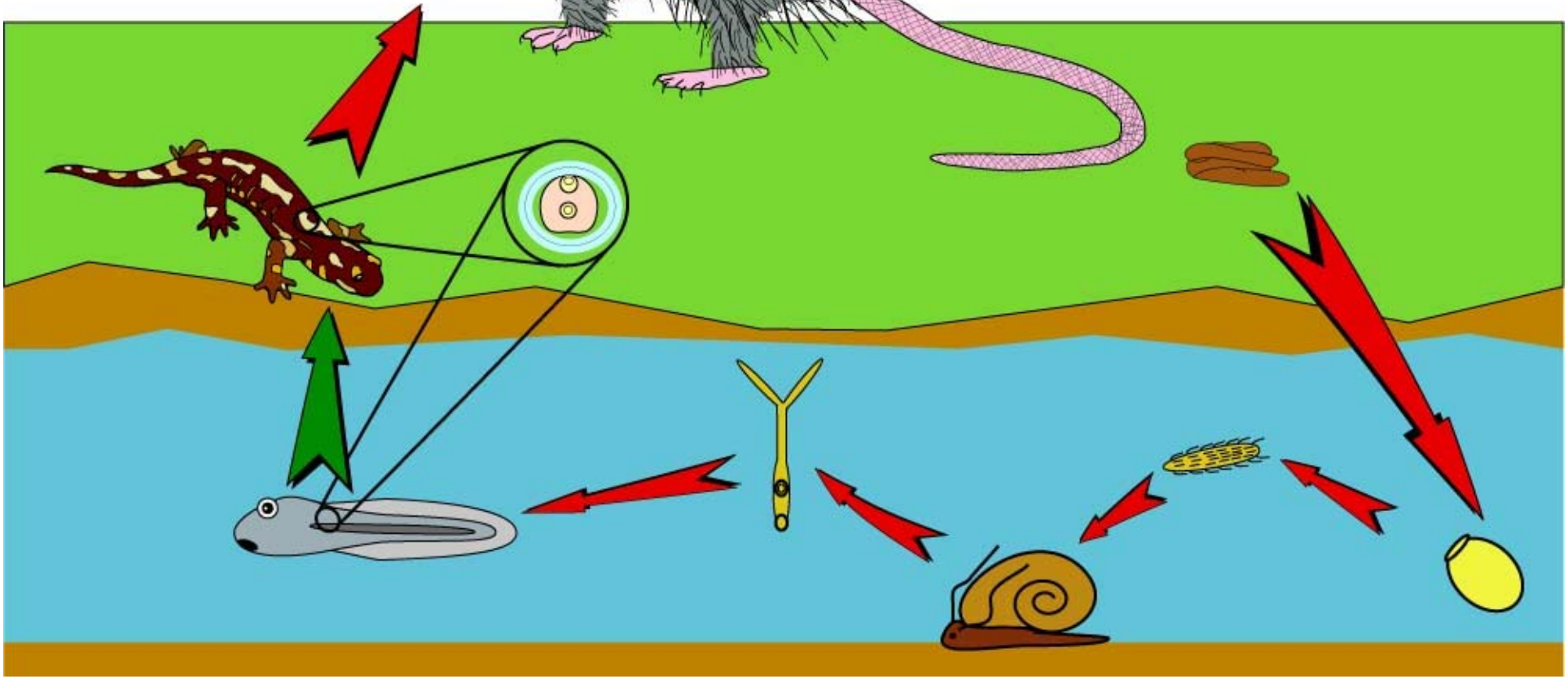
Didelphodiplostomum variable

Concern for reinfection,
build up of large
parasite population
in the host ?

\+ low concern
++ moderate concern
+++ high concern

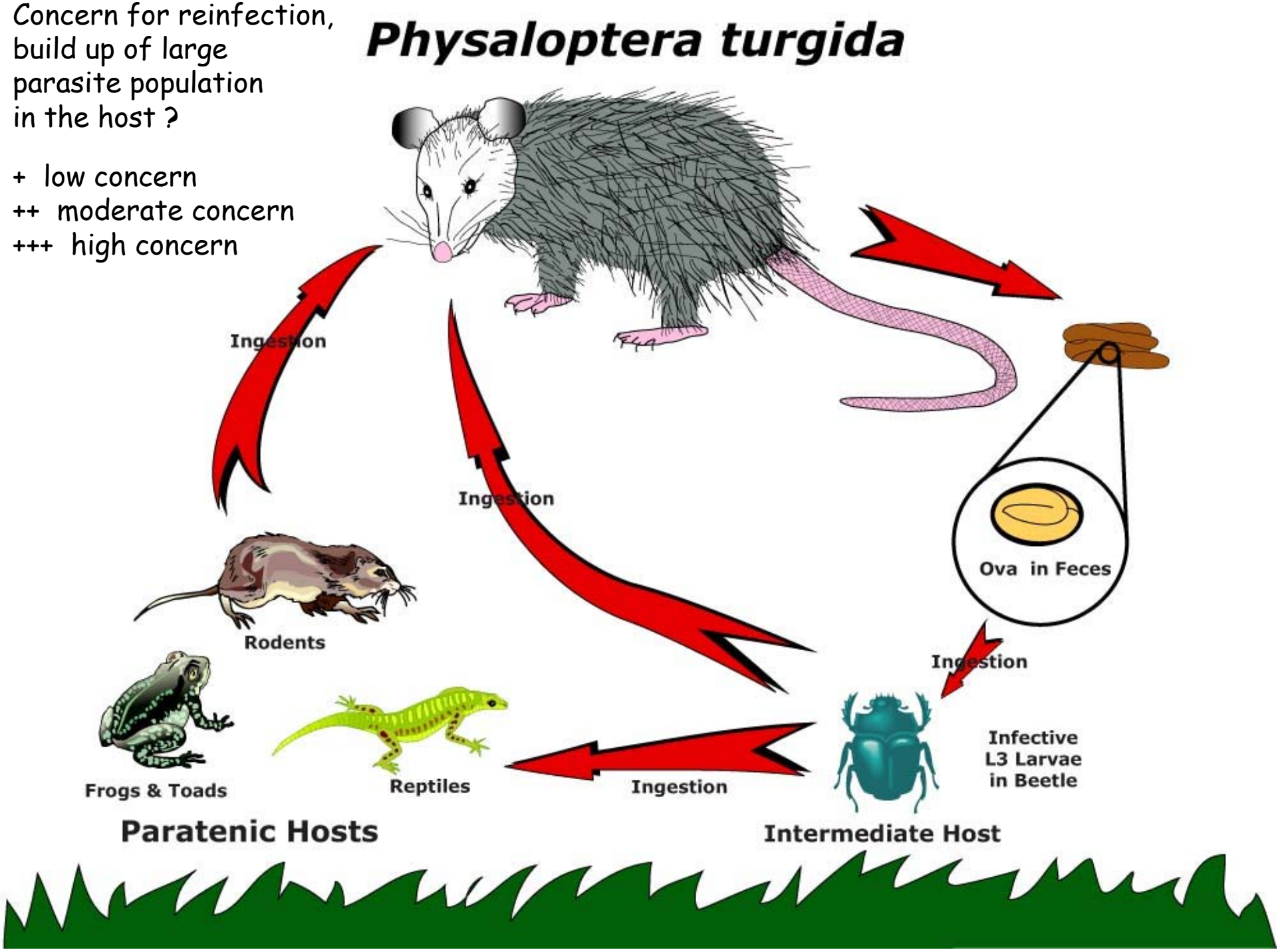






Concern for reinfection, build up of large parasite population in the host ?

+ low concern
++ moderate concern
+++ high concern



Take Home

Importance of knowing life cycles for successful clinical cases and disease control.

Concepts that should become "second nature":

- Infection v/s Infectious v/s Disease
- Host Specificity: Low v/s High
- Life Cycles: Direct v/s Indirect

Take Home

- Concepts & Definitions that should become "second nature":
  - Patent v/s Prepatent
  - Stage: Larval v/s Adult
  - Hosts: Definitive v/s Intermediate v/s Paratenic
  - Zoonosis

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