



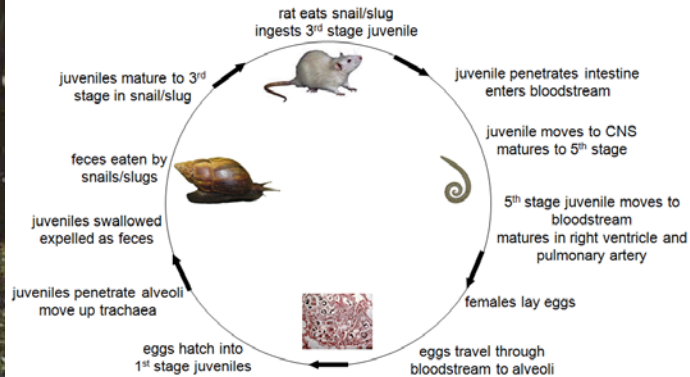
# Biology: taxonomy, identification, and life cycle of *Angiostrongylus cantonensis*

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photo: Juliano Romanzini, courtesy of Carlos Graeff Teixeira



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# CLASSIFICATION AND DIVERSITY

PHYLUM: Nematoda

CLASS: Rhabditea

ORDER: Strongylida

SUPERFAMILY: Metastrongyloidea

FAMILY: Angiostrongylidae

- Around 19 species are recognized worldwide in the genus *Angiostrongylus*
- Two species infect humans widely:
  - *Angiostrongylus costaricensis* Morera & Céspedes, 1971 causes abdominal angiostrongyliasis, especially a problem in South America
  - *Angiostrongylus cantonensis* (Chen, 1935) causes eosinophilic meningitis



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# NOMENCLATURE

## *Angiostrongylus cantonensis* (Chen, 1935)

- First described by Chen (1935) as *Pulmonema cantonensis*
- Also described as *Haemostrongylus ratti* by Yokogawa (1937)
- *Pulmonema* subsequently synonymized with *Angiostrongylus* and *ratti* with *cantonensis*
- *Angiostrongylus cantonensis* then widely accepted as the name of this species
- Ubelaker (1986) split *Angiostrongylus* into five genera:  
*Angiostrongylus* (in carnivores), *Parastrongylus* (murids), *Angiocaulus* (mustelids),  
*Gallegostongylus* (gerbils and one murid), *Stefanskostrongylus* (insectivores)
- And placed *cantonensis* in the genus *Parastrongylus*
- **But this classification is not widely used and most people still refer to the species as *Angiostrongylus cantonensis***



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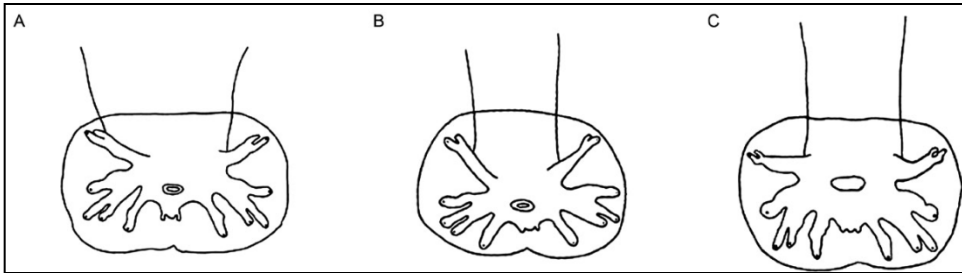
# MORPHOLOGY, TAXONOMY, IDENTIFICATION

Adult males

Caudal bursa

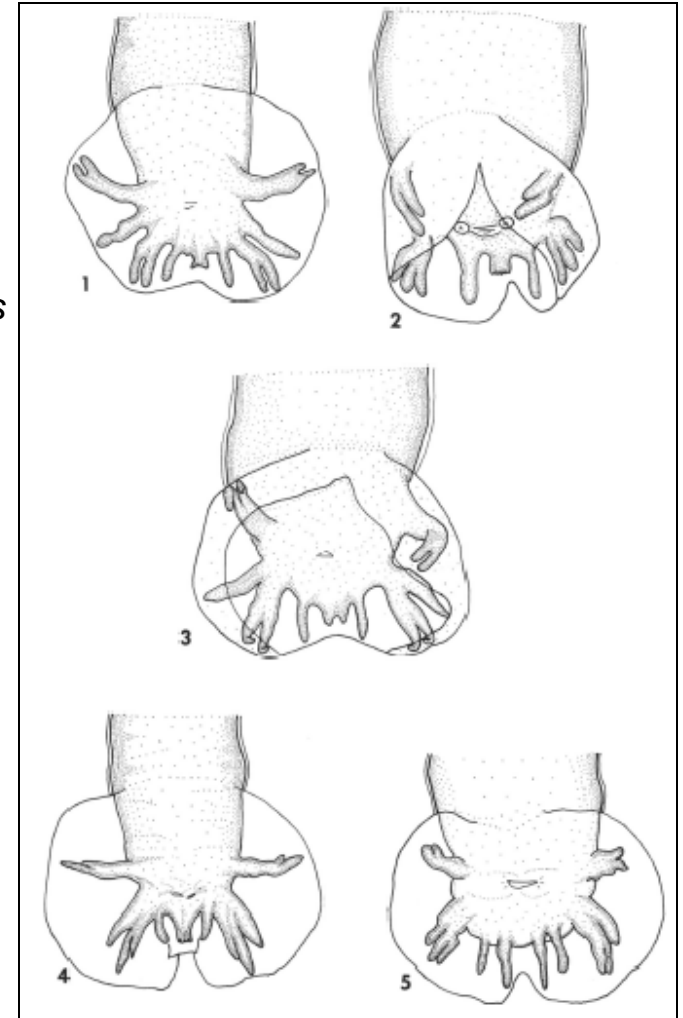
Ubelaker, 1986

1. *Angiostrongylus vasorum*
2. *Parastrongylus tateronae*
3. *Angiocaulus gubernaculatus*
4. *Rodentocaulus ondatrae*
5. *Gallegostrongylus ibicensis*



Maldonado et al. 2010

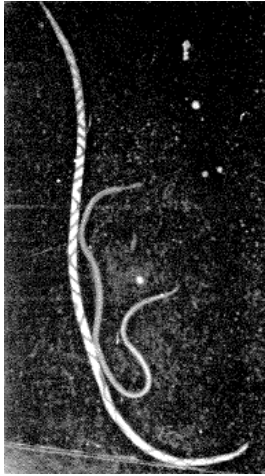
*Angiostrongylus cantonensis* – 3 locations in Brazil



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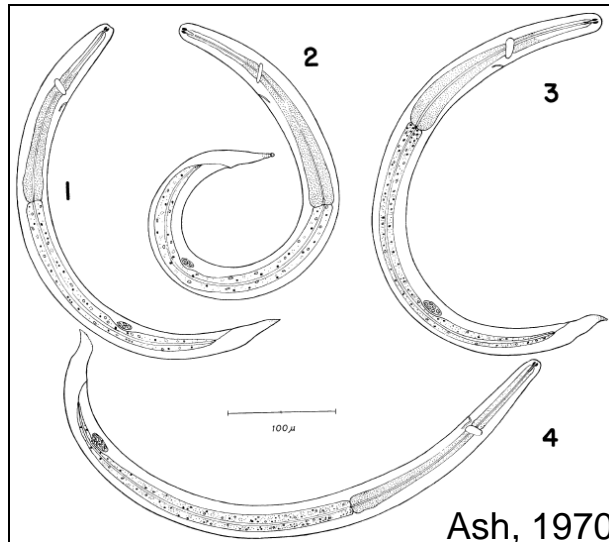


# MORPHOLOGY, TAXONOMY, IDENTIFICATION



## ADULT SIZE

- Female: 17-34 mm long, 0.28-0.56 mm wide
- Male: 15-25 mm long, 0.25-0.42 mm wide



1. *Angiostrongylus cantonensis*
2. *Aleurostrongylus abstrusus*
3. *Angiostrongylus vasorum*
4. *Anafilaroides rostratus*



Adult female with characteristic red (gut) and white (uterine tubules) spiral appearance

## 3<sup>rd</sup> STAGE SIZE (in snails/slugs)

- 425-524  $\mu\text{m}$  long, 23-34  $\mu\text{m}$  wide

## IDENTIFICATION - 3<sup>RD</sup> STAGE WORMS

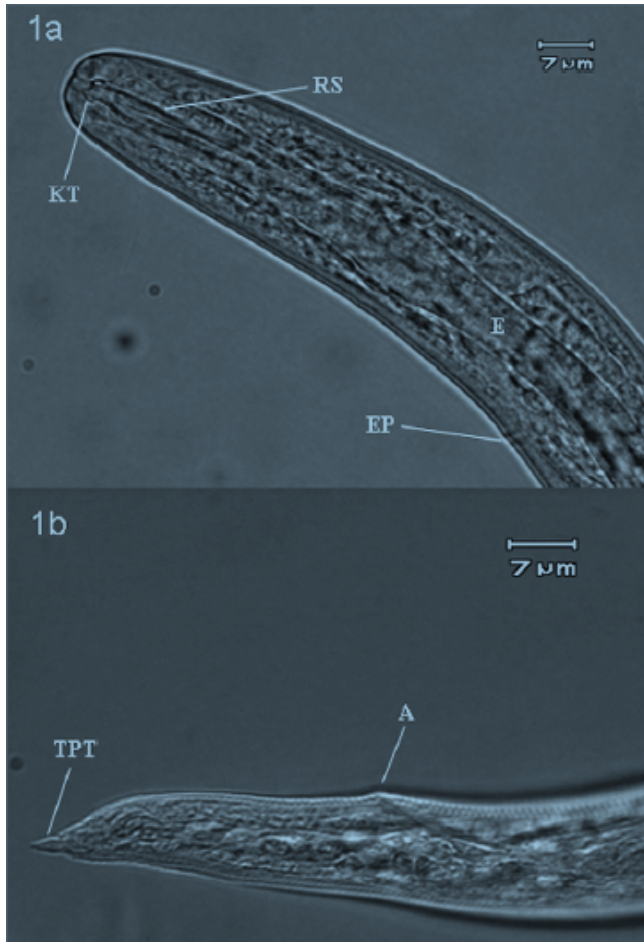
- size
- pointed tail with no transverse striations



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# LIGHT MICROSCOPY OF 3<sup>RD</sup> STAGE *ANGIOSTRONGYLUS CANTONENSIS*



1a. Anterior end showing knob-like tips (KT), rod-like structure (RS), esophagus (E) and excretory pore (EP)

1b. Posterior end showing tail pointed tip (TPT) and anus (A)

Thiengo et al. 2010. *Acta Tropica*

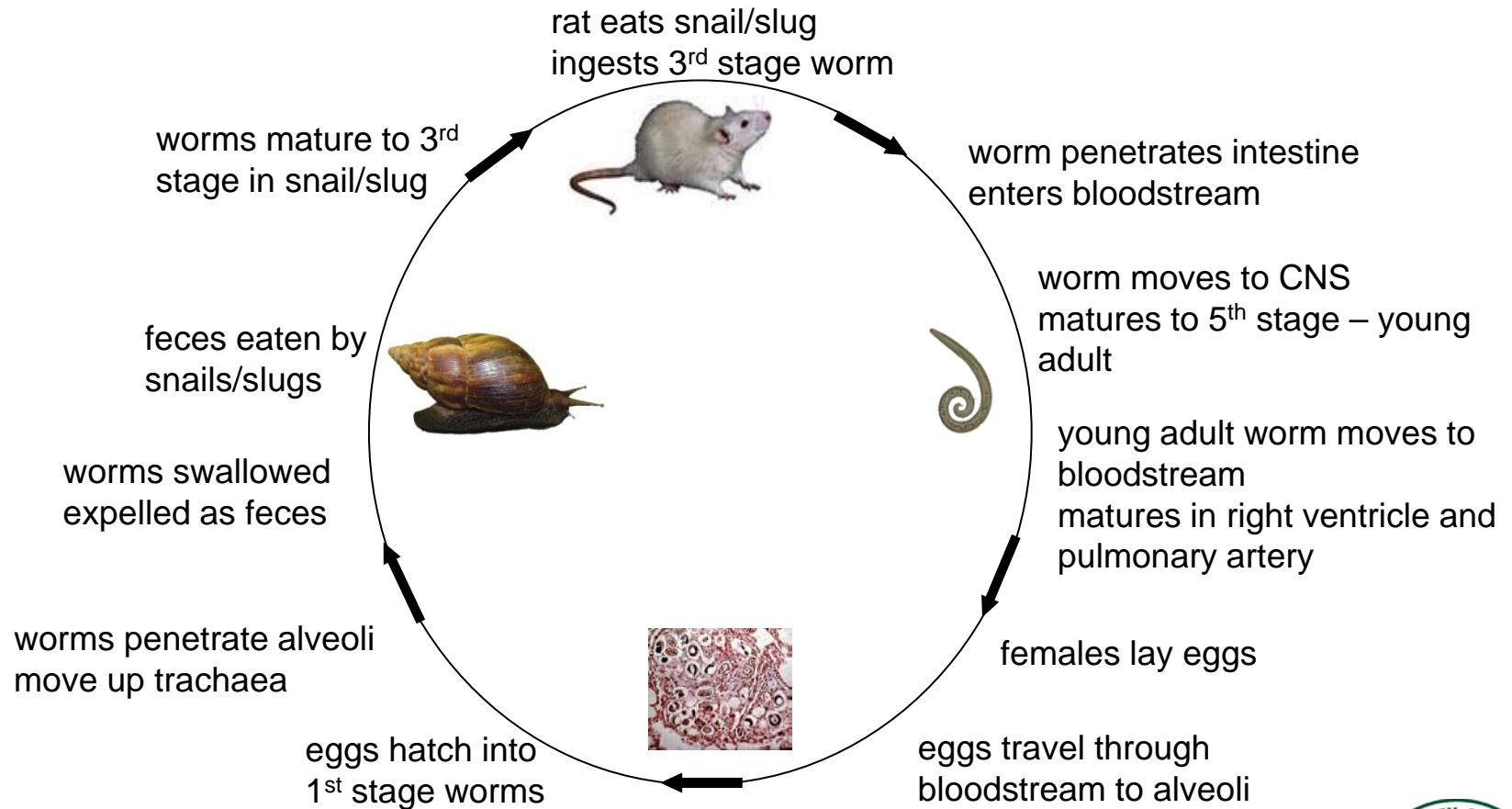


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# LIFE-CYCLE

- Definitive host – rats (various species)
- Intermediate host – snails/slugs (various species)



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# *Angiostrongylus cantonensis* in a rat brain

Photo: Camila Krug, from Graeff-Teixeira et al 2009



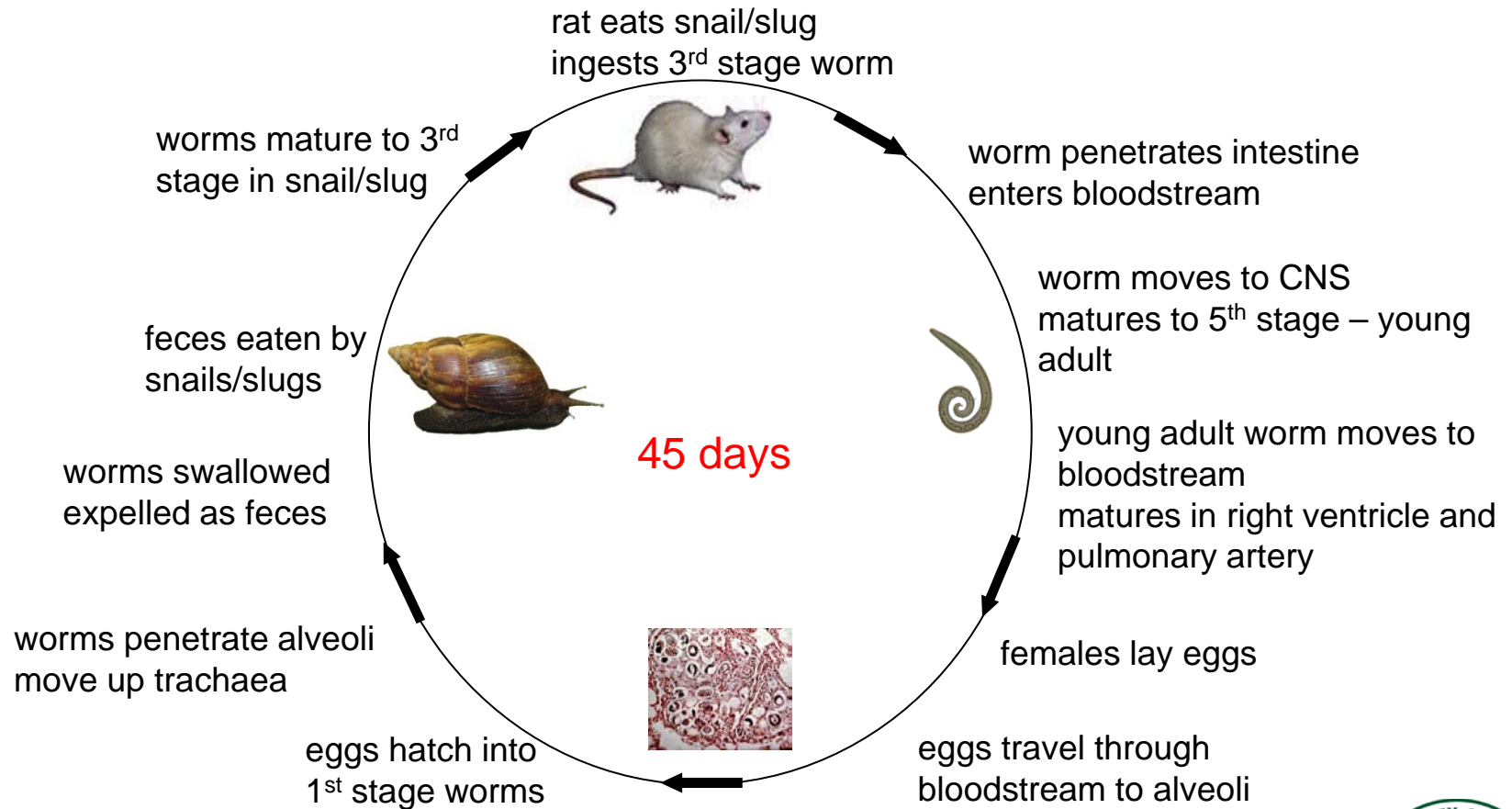
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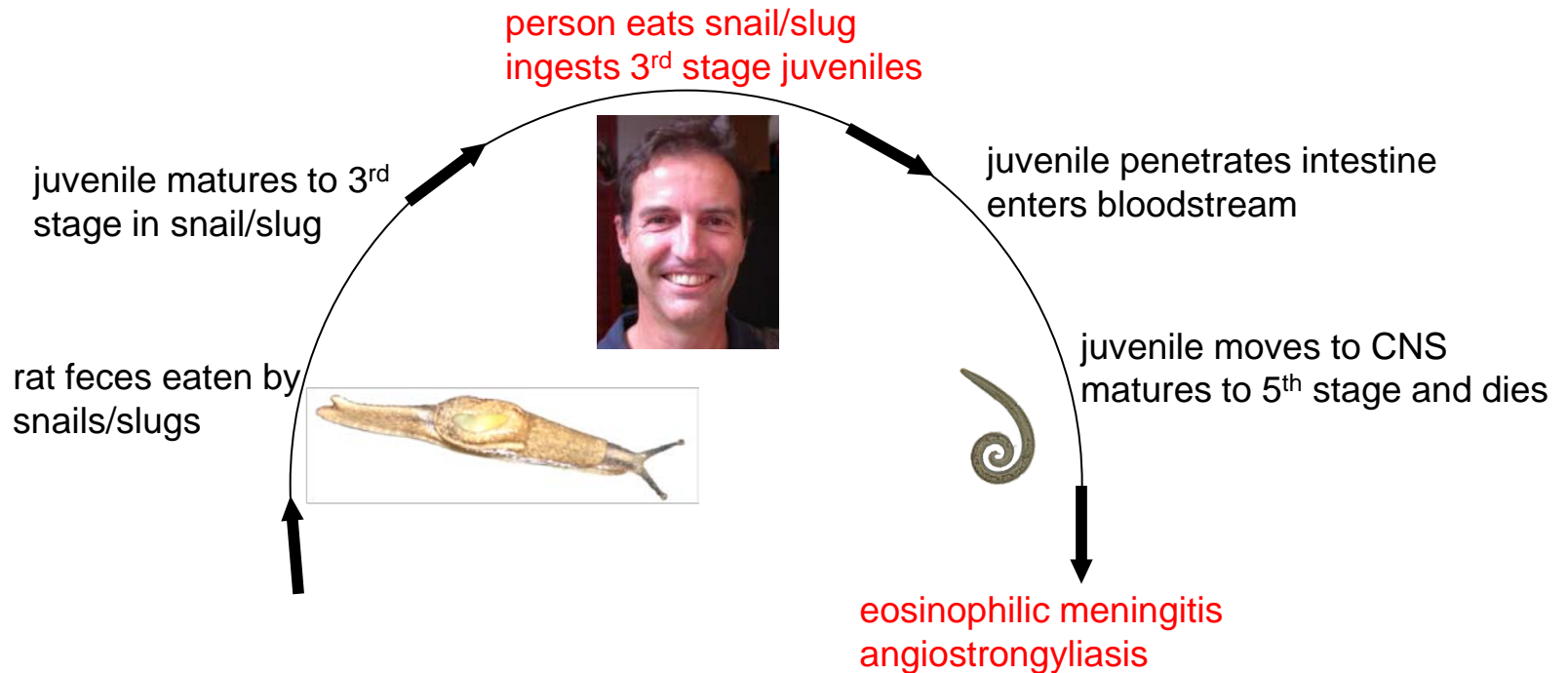


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# HUMAN INFECTION

- Accidental host – humans (and other mammals)



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# SOME KEY PUBLICATIONS

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# THANKS

## Questions?



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