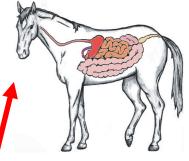
## Rat Lungworm Cycle



**Definitive Hosts** 

Rodents ingest L3 larvae that mature into adult worms that mate and lay eggs that hatch into L1 larvae.



First-stage L1 larvae passed in feces

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## Intermediate Hosts

Snails and slugs eat the infected feces. The L1 molts twice to produce L3 larvae. The L3 are embedded in snail tissue or excreted in slime.

Paratenic Hosts

L3 larvae ingested by paratenic hosts survive and remain infectious but do not mature into worms. Paratenic hosts include frogs, crabs, lizards, planarians, and some fish.



## Accidental Hosts\*

are infected by ingesting snails/ slugs or L3 larvae in paratenic hosts, on food or in liquids. L3 penetrate intestines in accidental hosts, move through the blood stream to the spine and brain and molt to L4 and L5 (mature worms) and cause eosinophilic meningitis. Accidental hosts (aka dead end hosts) include humans, dogs, cats and horses.\*

\*Accidental hosts: Numerous other animals have also become infected; including pigs, calves, some birds, alpacas, and many marsupial mammals.

The life cycle of *Angiostrongylus cantonensis*. As **definitive hosts**, rats acquire third stage larvae by ingesting infected **intermediate hosts**, aquatic or terrestrial snails and slugs. Larvae penetrate the stomach, enter the hepatic portal and mesenteric lymphatic systems and are carried to the heart and lungs. They enter alveoli, invade the pulmonary veins, are returned to the left heart and distributed around the body by the arterial circulation. Larvae reach the CNS, predominantly the cerebrum and cerebellum, grow and molt twice in the parenchyma and young adults invade the subarachnoid space of the brain. After about two weeks they invade the cerebral vein and move to the heart and pulmonary arteries where they mature. Eggs are carried in the blood to the lungs where they embryonate. First-stage larvae escape up the bronchial escalator, are swallowed, pass out in the feces, are ingested by **intermediate hosts**, snails and slugs, and develop to third-stage infective larvae. A broad spectrum of animals – planarians, prawns, crabs, frogs and lizards may serve as **paratenic hosts** and infection may occur through ingestion of **intermediate or paratenic** hosts, the latter often eaten raw or their juices used in preparation of local dishes. Infective larvae may also leave mollusks and contaminate vegetables such as lettuce.

Diagram created by the office of State of Hawaii Representative Richard P. Creagan, M.D. Image adapted from Wang, et al 2012. Eur J Microbial Infection Dis. // Caption adapted from Spratt, Species of Angiostrongylus in wildlife: A review, 2015.