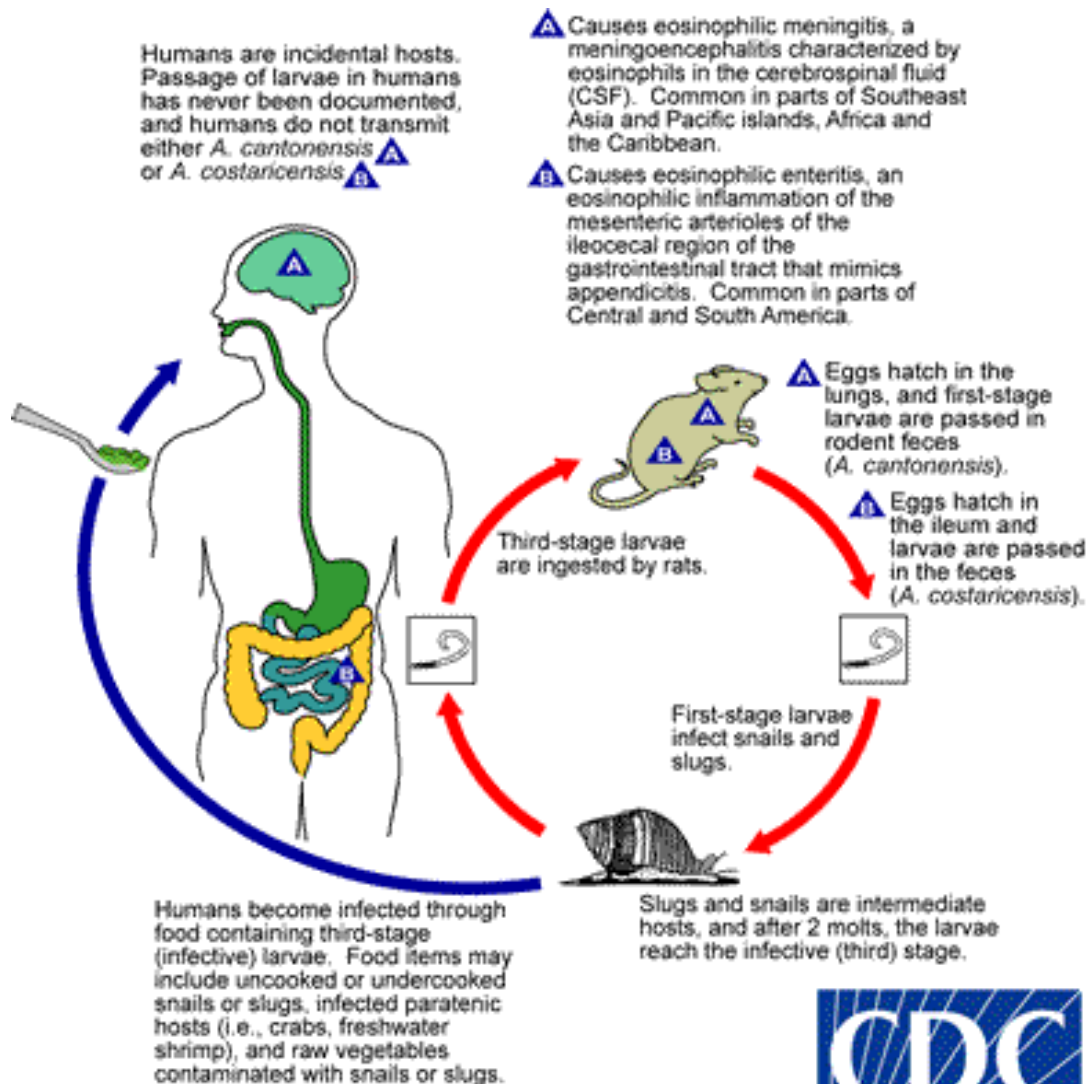


Angiostrongyliasis

Causal Agents:

The nematode (roundworm) *Angiostrongylus cantonensis*, the rat lungworm, is the most common cause of human eosinophilic meningitis. In addition, *Angiostrongylus* (*Parastrongylus*) *costaricensis* is the causal agent of abdominal, or intestinal, angiostrongyliasis.

Life Cycle:



<http://www.dpd.cdc.gov/dpdx>

Adult worms of *A. cantonensis* live in the pulmonary arteries of rats. The females lay eggs that hatch, yielding first-stage larvae, in the terminal branches of the pulmonary arteries. The first-stage larvae migrate to the pharynx, are swallowed, and passed in the feces. They penetrate, or are ingested by, an intermediate host (snail or slug). After two molts, third-stage larvae are produced, which are infective to mammalian hosts. When the mollusk is ingested by the definitive host, the third-stage larvae migrate to the brain where they develop into young adults. The young adults return to the venous system and then the pulmonary arteries where they become sexually mature. Of note, various animals act as paratenic (transport) hosts: after ingesting the infected snails, they carry the third-stage larvae which can resume their development when the paratenic host is ingested by a definitive host. Humans can acquire the infection by eating raw or undercooked snails or slugs infected with the parasite; they may also acquire the infection by eating raw produce that contains a small snail or slug, or part of one. There is some question whether or not larvae can exit the infected mollusks in slime (which may be infective to humans if ingested, for example, on produce). The disease can also be acquired by ingestion of contaminated or infected paratenic animals (crabs, freshwater shrimps). In humans, juvenile worms migrate to the brain, or rarely in the lungs, where the worms ultimately die. The life cycle of *Angiostrongylus (Parastrongylus) costaricensis* is similar, except that the adult worms reside in the arterioles of the ileocecal area of the definitive host. In humans, *A. costaricensis* often reaches sexual maturity and release eggs into the intestinal tissues. The eggs and larvae degenerate and cause intense local inflammatory reactions and do not appear to be shed in the stool.

Geographic Distribution:

Most cases of eosinophilic meningitis have been reported from Southeast Asia and the Pacific Basin, although the infection is spreading to many other areas of the world, including Africa and the Caribbean. Abdominal angiostrongyliasis has been reported from Costa Rica, and occurs most commonly in young children.

Clinical Features:

Clinical symptoms of eosinophilic meningitis are caused by the presence of larvae in the brain and by local host reactions. Symptoms include severe headaches, nausea, vomiting, neck stiffness, seizures, and neurologic abnormalities. Occasionally, ocular invasion occurs. Eosinophilia is present in most of cases. Most patients recover fully. Abdominal angiostrongyliasis mimics appendicitis, with eosinophilia.

Laboratory Diagnosis:

In eosinophilic meningitis the cerebrospinal fluid (CSF) is abnormal (elevated pressure, proteins, and leukocytes; eosinophilia). On rare occasions, larvae have been found in the CSF. In abdominal angiostrongyliasis, eggs and larvae can be identified in the tissues removed at surgery.

Diagnostic findings

- Microscopy
- Morphologic comparison with other intestinal parasites

Treatment:

No drug has proven to be effective for the treatment of *A. cantonensis* or *A. costaricensis* infections. Relief of symptoms for *A. cantonensis* infections can be achieved by the use of analgesics, corticosteroids, and careful removal of the cerebral spinal fluid at frequent intervals.