

Keep your family healthy!

Practice good food

preparation techniques:

- Your goal is to remove whole or partial slugs/snails from food that will be eaten raw, plus wash away all of the “slime” left by slugs or snails, since the slime can contain parasites.
- Examine and remove all visible dirt from all fruits and vegetables, whether grown in your garden or purchased from a store or farmer’s market.
- Soak and wash vegetables and fruit for at least 1-2 minutes before you prepare them.
- Cooking for 5 minutes also kills the parasite.
- If you must handle mollusks, wear gloves and wash your hands thoroughly afterwards.
- Organically grown is not necessarily safer than conventionally grown—all produce should be washed before eating.
- Using hot soapy water, wash preparation area, cutting boards, and utensils after preparing raw produce.
- Boil freshwater crabs, prawns, frogs, and snails for at least 5 minutes before consuming. Freezing food at 5 °F for 24 hours also kills the parasite.

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Sources:

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Rat Lungworm Disease (Angiostrongyliasis)

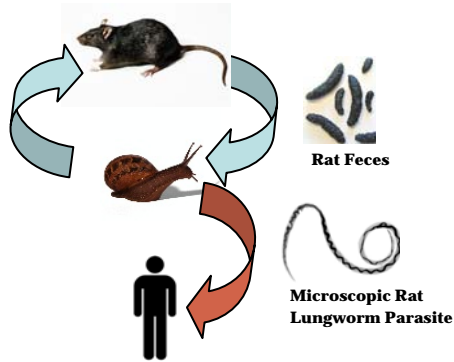
A rare disease
affecting the central
nervous system of
humans

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Life Cycle of the Parasite

Rat Lungworm is another name for the parasite *Angiostrongyloides cantonensis* which is present in rats in some parts of Hawaii. The parasite lays its eggs in the lung of the rat. The eggs then hatch and the larvae travel from the rat's respiratory system to the digestive tract. These "first stage" larvae are then excreted and eaten by mollusks (snails or slugs).



Inside a mollusk, larvae mature through a 2nd and 3rd stage. In the 3rd stage, the larvae can infect mammals. After being eaten by a mammal, the larvae travel to the mammal's brain where they mature and migrate to the lung where the cycle begins again. Usually **rats** are the affected mammal, but occasionally humans are infected. The larvae travel to the human brain, where they mature and cause an infection called **angiostrongyliasis** or **Rat Lungworm Disease**. Eventually the parasite dies, but an inflammation of the brain can still occur.

Human infection is considered "accidental" and humans are referred to as a "dead end host" because the parasite dies in the human body and cannot be transmitted to another host.

How can I avoid Rat Lungworm?

Wash fruits and vegetables, and control rats, slugs, and snails in your garden.

People can get Rat Lungworm Disease by eating raw foods contaminated with 3rd stage larvae of the Rat Lungworm parasite. Infected snails and slugs hidden in vegetables and fruits can be eaten accidentally if produce is not washed.

Freshwater prawns, frogs, and crabs can also carry the parasite. Eating any of these without cooking them can put you at risk of infection.

Watch out for these critters!

Carriers of the Rat Lungworm parasite in Hawaii include the following:



The **giant African snail** was introduced to Hawaii as decoration to home gardens. These can grow to be very large.



The **golden apple snail** has a distinctive golden-yellow color and is found in freshwater areas.



The **semi-slug** has a distinctive bump on the center of its back. It loves palm trees.



The **Cuban slug** has two stripes that run down its back. It is flat, long, and has fairly rough skin.

Freshwater crabs, frogs, and shrimp have also been found to carry the Rat Lungworm parasite.



Signs & Symptoms of Infection

Symptoms of Rat Lung Disease begin one to three weeks after the parasite is ingested and can last from a few days to several weeks or more. These can include:

- flu-like symptoms without coughing or wheezing
- severe headache, nausea, vomiting, sensitivity to light, stiffness of the neck and back, or a tingling sensation of the skin
- low-grade fever
- temporary paralysis or coma

If the parasite lodges itself and dies in the human brain, a serious condition could occur called eosinophilic meningitis (inflammation of the lining around the brain).



Symptoms of Rat Lung Disease are similar to other illnesses, making it hard to diagnose. If you think you may have angiostrongyliasis (Rat Lungworm Disease), let your health care provider know of potential exposures.

Slime and Catchment Water

The slime produced by slugs and snails has been found to contain the Rat Lungworm parasite in varying concentrations.

Cover your catchment tank to prevent slugs and snails from having access. Catchment water should not be ingested or used to brush teeth unless it has been boiled or treated.