

Dr. Heather Walden

*Angiostrongylus cantonensis* in Cuban tree frogs in Florida

*Angiostrongylus cantonensis*, known as the rat lungworm (RLW), is a zoonotic, metastrongyloid nematode that causes eosinophilic meningitis in humans, and in other aberrant hosts. The natural lifecycle of this parasite is indirect and involves a rodent definitive host, often the brown (*Rattus norvegicus*) and black (*Rattus rattus*) rats, and other rodent hosts, as well as a gastropod intermediate host. The lifecycle has been well described, and human infection occurs through accidental or intentional ingestion of raw or undercooked snails or slugs, or paratenic hosts that include crustaceans, frogs and some fish. Accidental ingestion through contaminated produce has also been implicated in human infections, commonly in the United States and Canada. Rat lungworm disease (RLD) in humans begins as enteritis, which can include diarrhea, abdominal pain, nausea and vomiting, as ingested infective larvae penetrate the intestine and enter the circulation. This is followed by coughing or other respiratory signs as they move through the lungs. Once in the brain, meningitis develops accompanied by high eosinophil counts, headache, muscle pain and weakness, neck stiffness, paresthesia, blurred vision and fatigue. In extreme cases, paralysis, coma and death may occur. There is no effective treatment, but with only supportive therapy consisting of corticosteroids and/or anthelmintics to reduce inflammation and other RLD-associated symptoms.

RLW has been reported in over 3000 human cases worldwide, with several outbreaks in China. In the US, most RLW human infections have been reported in Hawaii, topping at 104 cases from 1959-2016. However, the number of cases in Hawaii may be a major underestimate since Hawaii in a single year in 2017 reported 19 RLW cases. In the continental US, human case reports have been limited to Texas, Louisiana, Tennessee, and Alabama, although other non-human aberrant hosts have been reported in various states. In Florida, we conducted the first state-wide survey in the continental US focused on identifying RLW infection in both definitive and intermediate hosts. Our pilot survey identified RLW infection in gastropods (snails and slugs), wild rats, and rat fecal samples from 6 of the 18 sampled counties spread throughout the state, which is alarming. Over the past 2 decades, RLW has been increasingly found in other areas in other hosts in the continental US. Reports include a red-ruffed lemur, howler monkey, woodrat, opossum, armadillo and snails in Louisiana, an African pygmy falcon in California, a cotton rat in Oklahoma, a tamarin in Alabama, a miniature horse in Mississippi and an armadillo, white-handed gibbon, and orangutan in Florida. Recently in Hawaii, this parasite has been found in coqui frogs, centipedes, cane toads, house geckos, green anoles and the common myna. Although exact infection potential and host status remain under investigation, this demonstrates potential for other vertebrates and invertebrates to serve as paratenic hosts for this parasite. In this study, we seek to investigate the role other vertebrates play in the lifecycle, and whether the invasive Cuban tree frog is a potential paratenic host for *A. cantonensis*.

**In this study** we will have access to approximately 50 Cuban tree frogs (CTF) collected from the Gainesville area, and euthanized by a researcher on main campus (UF). We will collect leg muscle and liver samples from these animals and evaluate by histological analysis and PCR to verify the presence of *A. cantonensis*. We will also seek to collect additional live CTF (10-20) and examine for live larvae.

**Student role** – The student will assist with frog collection, histological evaluation and will conduct DNA extraction and PCR using the muscle and liver samples. The student will be under the guidance of Drs. Walden and Ossiboff (necropsy, histology). The student will need to complete online IACUC training, biohazard and lab safety training in Dr. Walden’s lab and training to perform lab tasks necessary for this project.