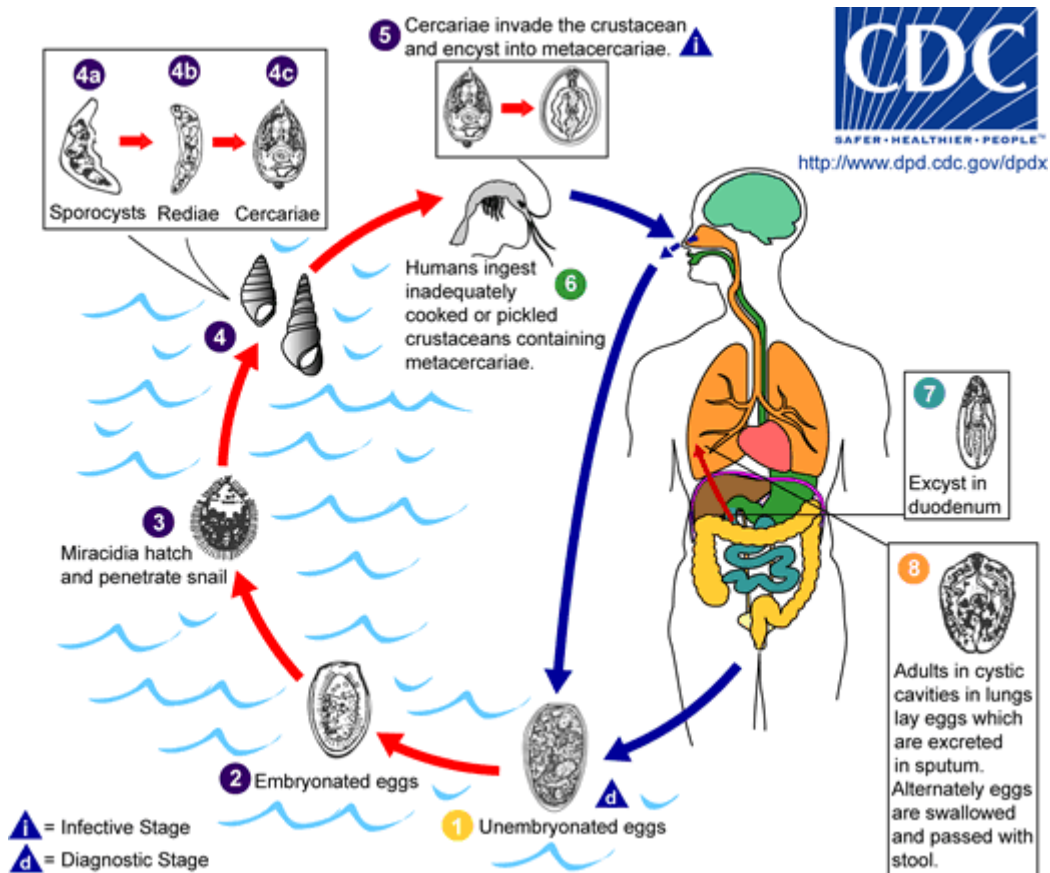


Paragonimiasis

Causal Agent:

More than 30 species of trematodes (flukes) of the genus *Paragonimus* have been reported which infect animals and humans. Among the more than 10 species reported to infect humans, the most common is *P. westermani*, the oriental lung fluke.

Life Cycle:



The eggs are excreted unembryonated in the sputum, or alternately they are swallowed and passed with stool **1**. In the external environment, the eggs become embryonated **2**, and miracidia hatch and seek the first intermediate host, a snail, and penetrate its soft tissues **3**. Miracidia go through several developmental stages inside the snail **4**: sporocysts **4a**, rediae **4b**, with the latter giving rise to many cercariae **4c**, which emerge from the snail. The cercariae invade the second intermediate host, a crustacean such as a crab or crayfish, where they encyst and become metacercariae. This is the infective stage for the mammalian host **5**. Human infection with *P. westermani* occurs by eating inadequately cooked or pickled crab or crayfish that harbor metacercariae of the parasite **6**. The metacercariae excyst in the duodenum **7**, penetrate through the intestinal wall into the peritoneal cavity, then through the abdominal wall and diaphragm into the lungs, where they become encapsulated and develop into adults **8** (7.5 to 12

mm by 4 to 6 mm). The worms can also reach other organs and tissues, such as the brain and striated muscles, respectively. However, when this takes place completion of the life cycles is not achieved, because the eggs laid cannot exit these sites. Time from infection to oviposition is 65 to 90 days.

Infections may persist for 20 years in humans. Animals such as pigs, dogs, and a variety of feline species can also harbor *P. westermani*.

Geographic Distribution:

While *P. westermani* occurs in the Far East, other species of *Paragonimus* are encountered in Asia, the Americas, and Africa.

Clinical Features:

The acute phase (invasion and migration) may be marked by diarrhea, abdominal pain, fever, cough, urticaria, hepatosplenomegaly, pulmonary abnormalities, and eosinophilia. During the chronic phase, pulmonary manifestations include cough, expectoration of discolored sputum, hemoptysis, and chest radiographic abnormalities. Extrapulmonary locations of the adult worms result in more severe manifestations, especially when the brain is involved.

Laboratory Diagnosis:

Diagnosis is based on microscopic demonstration of eggs in stool or sputum, but these are not present until 2 to 3 months after infection. (Eggs are also occasionally encountered in effusion fluid or biopsy material.) Concentration techniques may be necessary in patients with light infections. Biopsy may allow diagnostic confirmation and species identification when an adult or developing fluke is recovered.

Diagnostic findings

- Microscopy
- Antibody detection is useful in light infections and in the diagnosis of extrapulmonary paragonimiasis.
- Morphologic comparison with other intestinal parasites

Treatment:

Praziquantel* is the drug of choice to treat paragonimiasis. Bithionol is an alternative drug for treatment of this disease.

* This drug is approved by the FDA, but considered investigational for this purpose.