

## Capillaria philippinensis (Pathogen – Intestinal Nematode)

### Organism:

*Capillaria philippinensis* belongs to the nematodes, is a pathogen, and causes disease. The first proven case of human infection with *Capillaria philippinensis* occurred in 1963 in a patient from the Philippines who died 3 days after admission to the hospital with a diagnosis of malabsorption syndrome. Although the significance was not recognized until 4 years later, *C. philippinensis* eggs were found in the stools and autopsy showed parasitism of the large and small intestines. In 1967, health authorities recognized infections causing severe symptoms and death in adult males, an infection that is now known to be widely distributed in the Northern Luzon area of the Philippines. Since that time, the disease has become widespread in Thailand and cases have been reported in Japan, Taiwan, Iran, and Egypt.



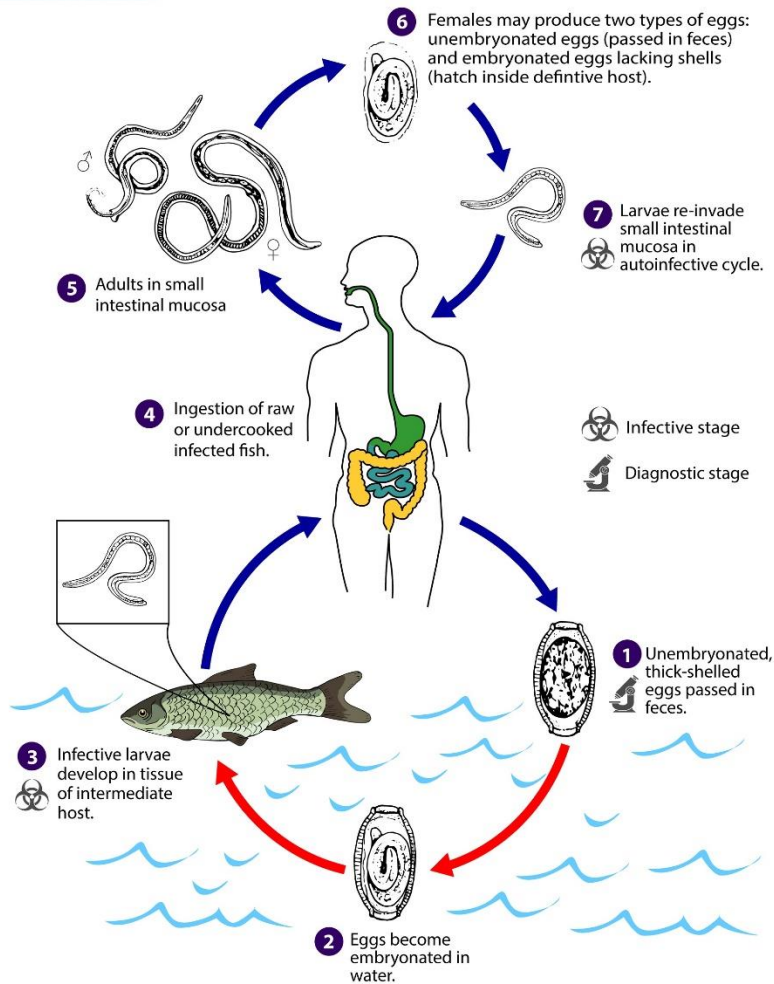
Capillaria philippinensis eggs

Adult worm

Worm x-section of intestine (CDC DPDx)



### Capillaria philippinensis



**Life Cycle:**

Although the exact mode of transmission is unknown, experimental infection is transmitted through small fish that serve as the intermediate host; often, whole, small fish may be ingested. Development to the infective stage in the fish takes at least 3 weeks. In areas of the Philippines where this infection occurs, people also eat raw shrimp, crabs, and snails. They also tend to defecate in the fields or water where the fish, shrimp, crabs, and snails are obtained, thus completing the life cycle. It has been suggested that defecation from humans to a water resource in the endemic area provides an excellent opportunity for *C. philippinensis* eggs to contact and be ingested by naturally susceptible fish. The worms live burrowed into the mucosa of the small bowel, mainly the jejunum. The adult worms are small. The male has ventrolateral caudal expansions and a very long, smooth spicular sheath. The female has two almost equal parts, with the anterior containing the esophagus and stichosome (esophageal glands) and the posterior containing the intestine and reproductive system. Females produce eggs with thin shells and free larvae, as well as the typical thick-shelled eggs that pass in the stool. All stages of development are seen in the human host, and internal autoinfection is a normal part of the life cycle. Eggs that are passed in stool have been described as “peanut shaped,” with flattened bipolar plugs and striated shells, measuring 36 to 45  $\mu\text{m}$  long by 20  $\mu\text{m}$  wide and somewhat resembling *T. trichiura* eggs.

**Acquired:**

Infection in humans is acquired through ingestion of small freshwater raw or undercooked fish, shrimp, crabs, and snails.

**Epidemiology:**

Although the life cycle is not completely known, the geographic range is well-recognized and continues to expand. Raw infected fish, shrimp, crabs, and snails may serve to transmit the larvae. In areas where this infection is endemic, adequate cooking of all suspect foods should reduce the number of cases. Infections have now been described in the Philippines, Thailand, Japan, Iran, Egypt, Taiwan, and Indonesia.

**Clinical Features:**

Symptoms are related to the worm burden; with large numbers of worms, there may be intestinal malabsorption and fluid loss along with electrolyte and plasma protein imbalance. Most of the abnormality is found in the small intestine, where the wall is thickened and indurated and contains many larval and adult worms. Watery stools are passed (up to eight per day), with fluid loss of several liters. Patients lose weight rapidly and develop muscle wasting, abdominal distention, and edema. Death from pneumonia, heart failure, hypokalemia, or cerebral edema may occur within several weeks to a few months. In some cases, patients reported chronic abdominal pain and diarrhea over a period of many months prior to diagnosis. On gastroduodenoscopy and subsequent histology, the jejunal mucosa revealed flattened villi, crypt proliferation, acute inflammation, and eosinophilic granulomata.

**Laboratory Diagnosis:**

Diagnosis is based on recovery and identification of the eggs in the stool, which might also contain larvae or adult worms. Knowledge of the geographic range would also provide specific clues to a possible infection. Unfortunately, without some index of suspicion, patients may go for many months with the cause of their symptoms remaining unexplained.

**Organism Description:**

Egg: Eggs that are passed in stool have been described as “peanut shaped,” with flattened bipolar plugs and striated shells, measuring 36 to 45  $\mu\text{m}$  long by 20  $\mu\text{m}$  wide and somewhat resembling *T. trichiura* eggs.

Adult worm: The adult worms are small. The male has ventrolateral caudal expansions and a very long, smooth spicular sheath. The female has two almost equal parts, with the anterior containing the esophagus and stichosome (esophageal glands) and the posterior containing the intestine and reproductive system.

**Laboratory Report:**

*Capillaria philippinensis* eggs present.

**Treatment:**

Some of the more common therapeutic agents, including mebendazole and albendazole, are effective in treating this infection and result in dramatic improvement in the patient’s condition within the first day.

**Control:**

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