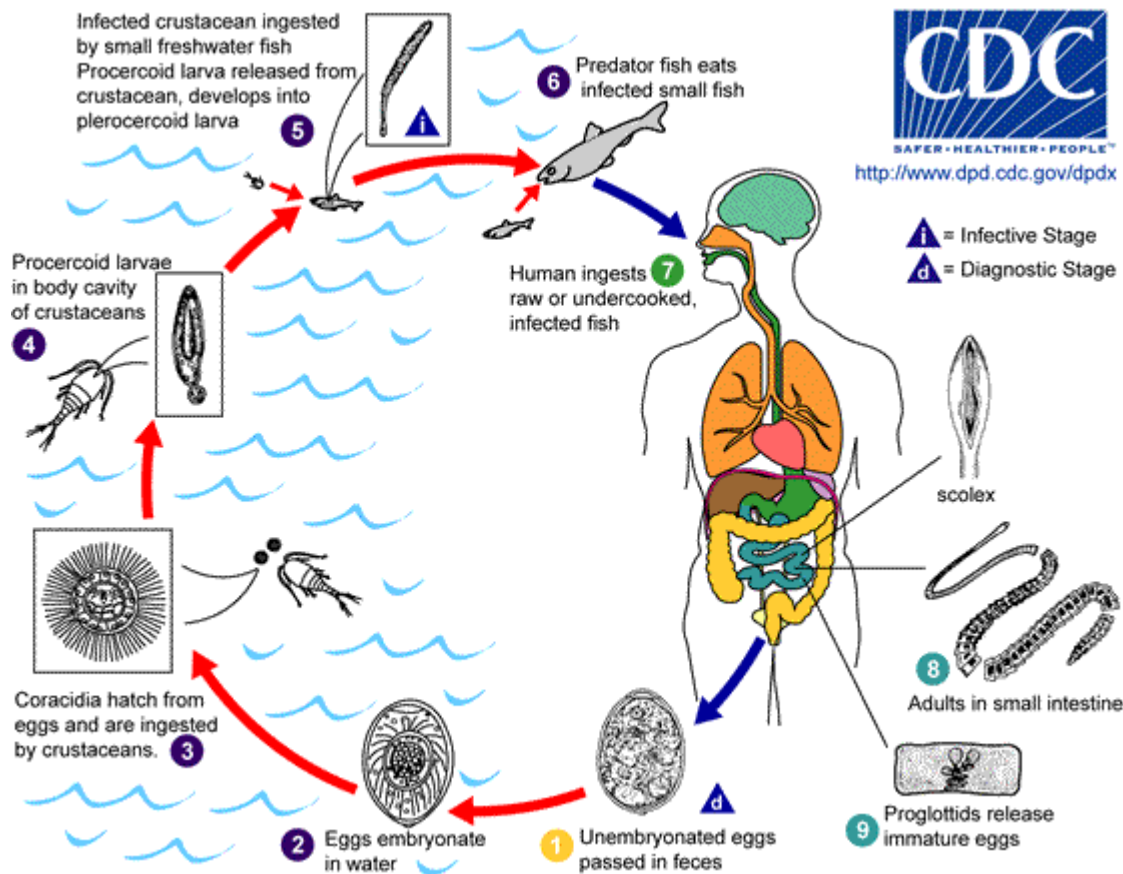


Diphyllobothriasis

Causal Agents:

The cestode *Diphyllobothrium latum* (the fish or broad tapeworm), the largest human tapeworm. Several other *Diphyllobothrium* species have been reported to infect humans, but less frequently; they include *D. pacificum*, *D. cordatum*, *D. ursi*, *D. dendriticum*, *D. lanceolatum*, *D. dalliae*, and *D. yonagoensis*.

Life Cycle:



Immature eggs are passed in feces **1**. Under appropriate conditions, the eggs mature (approximately 18 to 20 days) **2** and yield oncospheres which develop into a coracidia **3**. After ingestion by a suitable freshwater crustacean (the copepod first intermediate host) the coracidia develop into proceroid larvae **4**. Following ingestion of the copepod by a suitable second intermediate host, typically minnows and other small freshwater fish, the proceroid larvae are released from the crustacean and migrate into the fish flesh where they develop into a plerocercoid larvae (sparganum) **5**. The plerocercoid larvae are the infective stage for humans. Because humans do not generally eat undercooked minnows and similar small freshwater fish, these do not represent an important source of infection. Nevertheless, these small second intermediate hosts can be eaten by larger predator species, e.g., trout, perch, walleyed pike **6**. In this case, the

sparganum can migrate to the musculature of the larger predator fish and humans can acquire the disease by eating these later intermediate infected host fish raw or undercooked ⁷. After ingestion of the infected fish, the plerocercoid develop into immature adults and then into mature adult tapeworms which will reside in the small intestine. The adults of *D. latum* attach to the intestinal mucosa by means of the two bilateral grooves (bothria) of their scolex ⁸. The adults can reach more than 10 m in length, with more than 3,000 proglottids. Immature eggs are discharged from the proglottids (up to 1,000,000 eggs per day per worm) ⁹ and are passed in the feces ¹. Eggs appear in the feces 5 to 6 weeks after infection. In addition to humans, many other mammals can also serve as definitive hosts for *D. latum*.

Geographic Distribution:

Diphyllobothriasis occurs in areas where lakes and rivers coexist with human consumption of raw or undercooked freshwater fish. Such areas are found in the Northern Hemisphere (Europe, newly independent states of the former Soviet Union (NIS), North America, Asia), and in Uganda and Chile.

Clinical Features:

Diphyllobothriasis can be a long-lasting infection (decades). Most infections are asymptomatic. Manifestations may include abdominal discomfort, diarrhea, vomiting, and weight loss. Vitamin B₁₂ deficiency with pernicious anemia may occur. Massive infections may result in intestinal obstruction. Migration of proglottids can cause cholecystitis or cholangitis.

Laboratory Diagnosis:

Microscopic identification of eggs in the stool is the basis of specific diagnosis. Eggs are usually numerous and can be demonstrated without concentration techniques. Examination of proglottids passed in the stool is also of diagnostic value.

Diagnostic findings

- Microscopy
- Morphologic comparison with other intestinal parasites

Treatment:

Praziquantel* is the drug of choice. Alternatively, Niclosamide can also be used to treat diphyllobothriasis.

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