 

# Some crustacean species as transport hosts for *Trichinella nativa* in the White sea

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Nematodes of the genus *Trichinella* cause a worldwide zoonosis known as trichinellosis. Transition to the new host occurs only as a result of consumption of infected meat. Normally, only predators and carrion-eaters consuming meat of other mammals become infected. However, marine mammals, such as seals and beluga whales, are often infected with *T. nativa*, though they do not eat meat of other mammals. Thus the question arises: how do marine animals feeding exclusively on fish and invertebrates become infected with the meet-born parasite? According to the hypothesis proposed by several authors, *T. nativa* which only develop in hosts other than mammals, preserve infectivity inside the digestive tracts of invertebrates and fishes and in their feces. Some authors reported infestation of several species of rodents and few cats and dogs after consumption of trichinella-fed Gammaridae, Mysidacea and their feces (e.g. Britov, 1962; Fay, 1968; Bukina, 2015). Studies of transport hosts in marine life-cycles of *Trichinella* are scarce, most of them lacking negative control; in some older articles the species of *Trichinella* are not properly identified (until recently most authors considered all encapsulated *Trichinella* larvae as *T. spiralis*).

We tested the hypothesis suggesting possible transmission of *Trichinella* to a mammal host through several species of marine invertebrates. In preliminary experiments we tested the ability of two species of White sea crustaceans (amphipods and crabs) to serve as transport hosts for *T. nativa* and the ability of *T. spiralis* larvae (which is not naturally found in marine mammals) to infect a mammal host after being consumed by a crustacean. Both crustacean species used in the experiments are known to be active carrion-eaters and are part of the diet of several species of seals. Two of 3 laboratory mice (*Mus musculus*) were successfully infected with *T. nativa* by consuming the intestines of Gammarus sp. 2 hours after they were fed infected meat. The same result (2 of 3) was obtained with *Gammarus* sp. 24 hours after the feeding. Attempts to infect mice with amphipods 48 hours after the feeding were unsuccessful. All 3 mice which consumed intestines of *Hyas araneus*, 24 hours after the feeding on *T. nativa* infected meat, became infected. Of 3 mice, which consumed *Gammarus* sp. 2 hours after the feeding on meat infected with *T. spiralis*, 1 mouse become infected. The same result (1 of 3) was obtained with *Gammarus* sp. 24 hour after the feeding on T. spiralis infected meat. In positive control for T. nativa (mice fed on *Trichinella* infected meat from the same source) 5 of 6 become infected. In positive control for *T. spiralis* all 6 mice become infected. No *Trichinella* infection was observed in 9 negative control mice. In other

 

experiments we exposed 6 *H. araneus* (carapace length 3 to 6 cm) to *T. nativa* infected meat and 26 hours later gave their intestines to 6 golden hamsters (*Mesocricetus auratus*). We also fed one *M. auratus* with a benthic shrimp *Sclerocrangon boreas* 12 hours after the latter was exposed to *T. nativa* infected meat. Six hamsters fed on *T. nativa* infected meat from the same source (laboratory rabbit) served as positive control and 6 hamsters were used as negative control. One month later, 2 out of 6 experimental hamsters were found to be infected with *T. nativa*. All hamsters from positive control were infected and no infection was observed in negative control. Numbers of larvae per gram of host weight in 2 experimental hamsters (0.14 ± 0.06) were much lower than in positive control hamsters (6.67 ± 6.0) (and the difference became even greater when the numbers of larvae used in the experiment were taken into account). Surprisingly, the number of larvae per gram of host weight in the hamster that was fed shrimp (16.37) was higher than in positive control hamsters. Thus we can state the possibility of transmission of *T. nativa* (and theoretically *T. spiralis*) from dead mammals through invertebrates to non mammal-eating species. Loss of infection efficiency occurs even after 24 hours after consuming of infected meat by a transport host. However pinnipeds and whales feeding on crustaceans which swarm around corpses of big mammals can easily become infected with *T. nativa*.