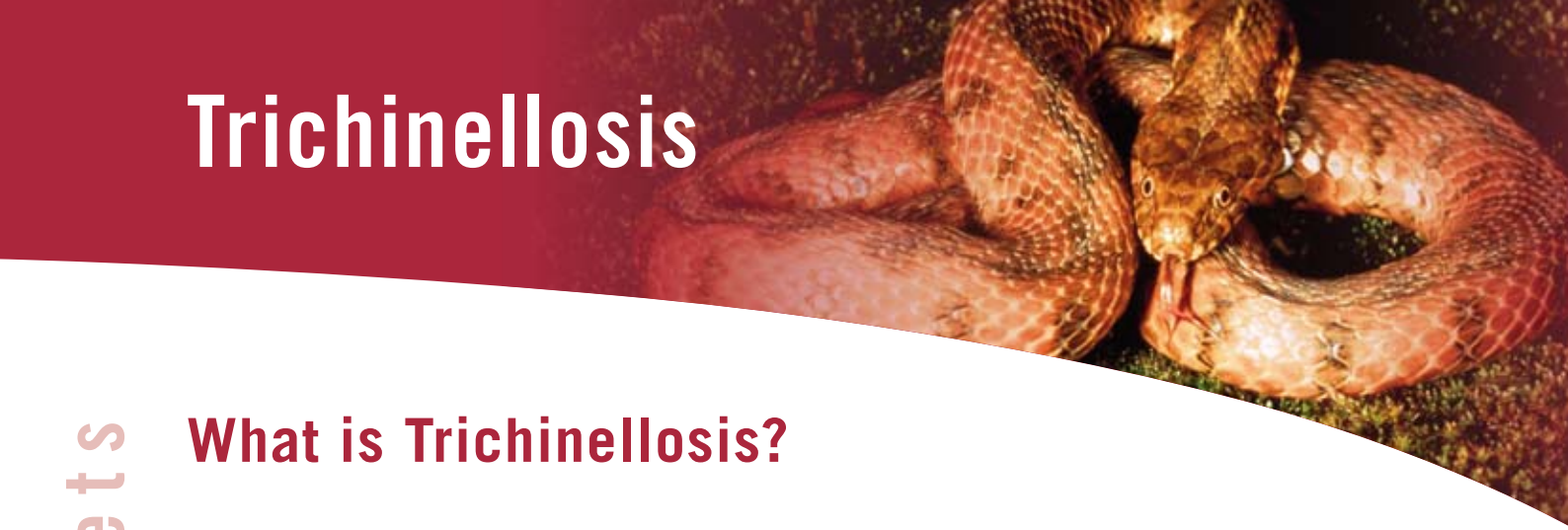
Trichinellosis



General Disease Information Sheets

What is Trichinellosis?

Trichinellosis is a serious zoonotic disease (an animal disease that can infect humans) caused by parasitic nematodes (roundworms) of the genus *Trichinella*. There are eight species and three additional genotypes in the genus, with various geographic and host preferences. Some species are freeze tolerant. Found around the world, *Trichinella* can infect most mammals, and a few species also infect reptiles or birds. While humans are susceptible to infection by all species of the parasite, *Trichinella spiralis* is the most common, infecting pigs, horses, rats, many carnivores, among other animals.

Trichinellosis is a disease listed in the OIE *Terrestrial Animal Health Code* which Members are obligated to report to the OIE. Diagnostic methods and related information are described in the OIE *Manual of Diagnostic Tests and Vaccines for Terrestrial Animals*.

Where is the disease found?

Trichinella is found on every continent except Antarctica. Most of the eight species have wide geographic and host distribution, a few of them are found only in specific areas and animals.

Humans are susceptible to every species. The disease is less common in countries where pork is not eaten.

How is the disease transmitted and spread?

Trichinellosis is spread by consuming infected meat or meat products. It is transmitted between animals by predation and scavenging, to pigs by feeding uncooked meat scraps or meat products or by eating rats, and to humans by consuming insufficiently cooked meat or meat products from an infected animal.

An infected human or animal has larvae lodged in its muscle. When a person or animal eats meat which is infected, the larvae are released from the muscle as it is digested and rapidly develop into adults in the intestine of the new host. The adult worms reproduce and produce live larvae that penetrate the wall of the intestine and travel via the lymphatic and blood system throughout the body to finally enter muscle cells. In some *Trichinella* species the cells turned 'nurse cells' form cysts that can remain viable for years.

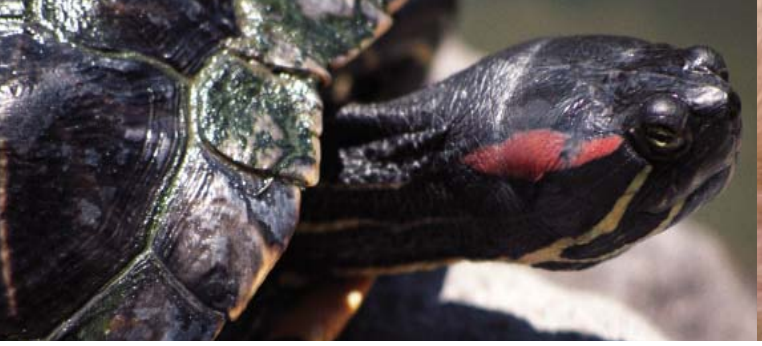
Host animals develop immunity and the adult worms are expelled from the small intestine. However, cysts remain in the muscle cells.

Trichinella is very prolific and an infected animal might have up to several hundred larvae per gram of muscle. The life cycle in animals can continue as larvae are able to survive in decaying carcasses for a long time, facilitating transmission by scavenging.

On the other hand, humans are a dead end for the parasite.

What are the clinical signs of the disease?

Although animals can be susceptible to serious illness from infection by *Trichinella* species, as has been shown experimentally, trichinellosis is rarely diagnosed as a disease in animals. It is, however, a serious disease in humans.



How is the disease diagnosed?

Detection of *Trichinella* is effected by direct and indirect methods as described in the OIE *Manual of Diagnostic Tests and Vaccines for Terrestrial Animals*.

As part of the meat inspection process, direct detection of *Trichinella* is performed by microscopic examination of muscle tissue squeezed between plates of glass. A more sensitive method is used nowadays. Muscle tissue is digested with enzymes, the residue is concentrated and examined under the microscope. The worms are easily identified and since they are liberated in the artificial digestion process, they can be seen moving under the microscope.

Indirect tests are based on the immune response of an infected animal and finding antibodies to the larvae. These serological methods can be more sensitive, but may not detect early infection, because some species such as horses do not maintain antibodies beyond about 6 months. Nevertheless, serological tests can be used for screening large numbers of animals or for surveillance. Serological tests, along with clinical signs are used to make a diagnosis in cases of human illness.

Molecular testing methods are used to distinguish the various species of *Trichinella* which may have unique characteristics such as freeze tolerance and preferences for hosts and geographic distribution. This information is important for managing outbreaks.

What is being done to prevent or control the disease?

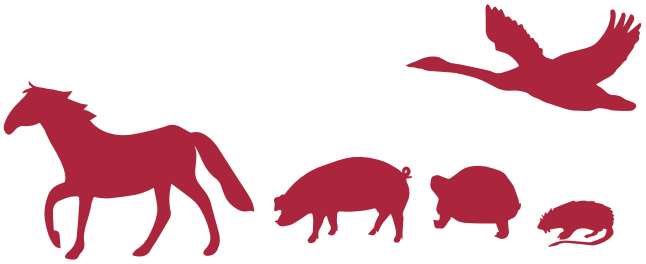
Once widespread in domestic pigs, the disease was controlled in many countries by banning the feeding of raw swill to pigs and the application of meat inspection methods for detecting *Thrichinella*. Rats are known to play a role in transmitting *Thrichinella*, so rat control is a necessary part of any eradication effort.

To systematically prevent trichinellosis from entering the food chain when there is a demonstrated risk, pork meat should be treated to a specific time temperature regimen for example to 60°C for 1 minute. Freezing is not recommended as a control measure; as some species are freeze tolerant.

Public education to make sure that meat is well cooked has also helped control the spread of the disease.

The OIE *Terrestrial Animal Health Code* lists the standards for certifying a country or zone to be free of trichinellosis.

Trichinellosis



What is the public health risk associated with this disease?

Trichinellosis is a serious disease of humans. It is estimated that there are likely ten thousand human infections per year worldwide.

The symptoms depend of the stage of the infection. Initially when larvae or adults are in the intestines there may be abdominal discomfort with nausea, diarrhoea, vomiting, fatigue, fever, and abdominal discomfort.

As larvae migrate into the muscles they may cause severe pain, headaches, fevers, chills, cough, eye swelling, aching joints and muscle pains, itchy skin, rash, and diarrhoea or constipation. The severity of the disease is related to the number of larvae ingested, and fatalities can occur with high doses.

In most developed countries where trichinellosis has been controlled in domestic pigs, human infection is more likely from eating game or horse meat. However the majority of cases in the world are still caused by eating insufficiently cooked meat from domestic swine and wild boar.

More Information?

References:

1. OIE *Terrestrial Animal Health Code:*
   www.oie.int/en/international-standard-setting/terrestrial-code/access-online/

2. OIE *Manual of Diagnostic Tests and Vaccines for Terrestrial Animal:*
   www.oie.int/en/international-standard-setting/terrestrial-manual/access-online/

3. OIE Technical Disease Card:
   www.oie.int/en/animal-health-in-the-world/technical-disease-cards/

4. The Center for Food Security and Public Health, Iowa State University
   www.cfsph.iastate.edu/

5. Merck Veterinary Manual:
   www.merckvetmanual.com/mvm/index.jsp?cfile=htm/bc/toc_50000.htm

6. *Atlas of Transboundary Animal Diseases Animales Transfronterizas*
   P. Fernandez, W. White; Ed.: 2011

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www.oie.int/en/our-scientific-expertise/reference-laboratories/list-of-laboratories/

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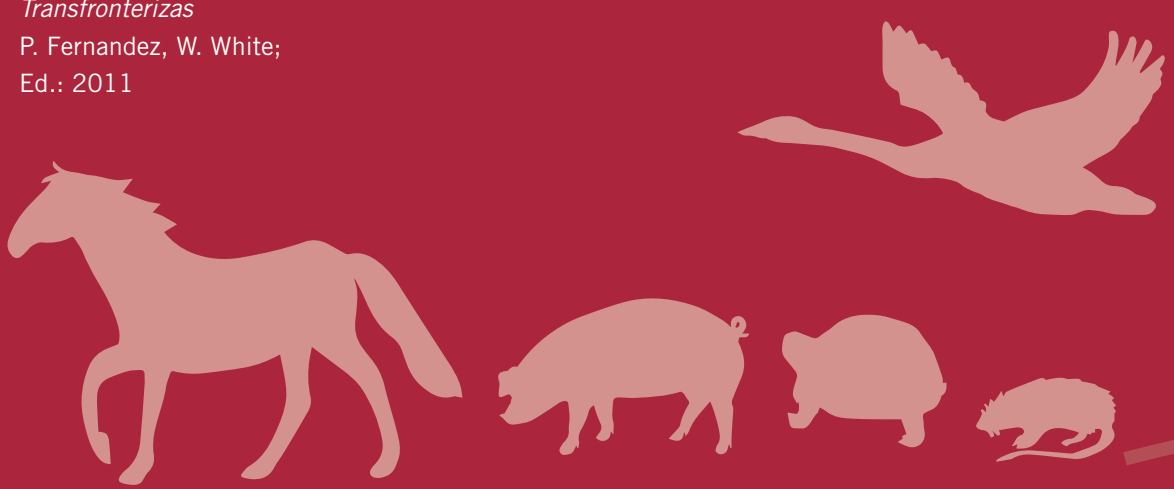

Key Facts

- 1835 was the year that James Paget, a medical student in London, first saw the coiled worms in the muscle tissue of a human cadaver. The life cycle was elucidated some 10 years later by feeding infected meat to different animals.

- In France and Italy outbreaks due to consumption of horse meat from imported animals infected more than 3,000 people between 1975 and 2005.

- Countries where the disease is prevalent in wild animals can be free of the disease in domestic animals thanks to the application of appropriate control measures. However control measures as part of a meat inspection programme require significant expenditures, the EU, for example, spending an estimated 570 million euros annually.

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