

A close-up photograph of raw meat, likely pork ribs, showing numerous small, white, thread-like parasites embedded in the muscle tissue. The meat is arranged in a grid-like pattern on a white surface.

Parasites

Hazards by
QAssurance

Parasites

- Anisakis Marina
- Cryptosporidium parvum
- Echinococcus granulosus
- Entamoeba histolytica
- Giardia lamblia
- Taenia Species
- Toxoplasma gondii
- Trichinella spiralis
- Other parasites

Parasites are organisms that obtain their nutrition and protection from other living organisms. The latter are referred to as hosts. Parasites often have multiple hosts and can be transmitted from animal to human, from human to human and from human to animal. They multiply in human and animal organs and are often excreted in the faeces. Various parasites can cause disease in humans. Transmission takes place through the consumption of contaminated food and water. Because they also occur in faeces, the transfer can also take place via faecally contaminated food and water.

Anisakis Marina

A. Simplex or *Anisaki Marina* is also known in the Netherlands as the herring worm. The parasite is a tiny worm visible to the naked eye that mainly occurs in the intestines of meat and fish. The parasite causes an illness known as anisakiasis. Therefore, a consumer can get ill by consuming raw and un-processed fish.

Parameter	Features
Group	Round worm
Origin	Marine mammals are final hosts fish / crustaceans are intermediate hosts
Foodstuff	Fish, raw and inadequately treated herring
Illness	Lavern anisakiasis: ingested larvae cause inflammation of the stomach and intestines similar to appendicitis.
Measures	Freezing: 24 hours at minus 20 o C. Heat to 50 o C, marinate to pH <4

Symptoms

Within an hour, the first signs and symptoms appear. Starting with a 'ticklish' sensation in the throat, followed by the coughing up of one or more little worms. An intense stomach discomfort follows these symptoms after one or two weeks, which indicates intestinal inflammation. After a while, *A. simplex* typically vanishes from the digestive tract on its own (2-4 weeks). The immune system eliminates worms that enter the body through the gut. Anyone who eats raw, untreated marine fish runs the risk of contracting an illness. *A. simplex* eggs can potentially be a source of illness and contaminate shellfish.

Cryptosporidium parvum

Parameter	Features
Group	Protozoa
Origin	Farm animals are intermediate hosts (intestinal parasite); human being is the final host
Foodstuff	Meat, food products contaminated with animal faeces.
Illness	Cryptosporidiosis: by ingestion of encapsulated fertilized eggs (= oocysts) that develop into adult protozoa in the human intestine and cause disease. Incubation: 3-14 days.
Measures	Good hygiene during slaughter.

Cryptosporidium is a parasite that causes severe diarrhea. It's a parasite that's well-known among AIDS patients. The microscopic parasite is found all over the world and feeds on a variety of animal species. Children are more likely than adults to get infected by this parasite. Unhygienic drinking water has been linked to multiple *Cryptosporidium* outbreaks. *Cryptosporidium* is found mainly in human and animal intestines.

Echinococcus granulosus

Parameter	Features
Group	Tapeworm
Origin	Dog is final host → eggs in faeces; human pig, sheep are intermediate hosts
Foodstuff	Vegetables and water contaminated with dog faeces.
Illness	Echinococcosis: eggs develop in the lung or liver of humans to the next intermediate stage, also called bladderworm → can cause serious illness.
Measures	Properly cook offal as food for dogs and other animals. Hygienic contact with dogs. No house slaughter, good inspection.
Notes	This disease is very rare in the Netherlands.

Echinococcus is a genus with six species that all belong to the tiny tapeworm family. *Echinococcus granulosus*, commonly known as dog tapeworm, and *Echinococcus multilocularis*, popularly known as fox tapeworm, are significant infections in people in Europe. The tapeworms of both species are small: *E. granulosus* is 3 to 6 mm long, whereas *E. granulosus* is 1.2 to 3.7 mm long.

Entamoeba histolytica

Entamoeba is parasitic single-celled protozoans that may infect a wide range of hosts. However, all animals share a life cycle that alternates between two different phases. The cyst stage of the parasite is an infectious but nonreplicative phase of the parasite that will evolve into active trophozoites capable of replicating in the host's gut. Trophozoites can generate cysts and proliferate through binary fission. A rigid wall protects the cysts, and they may survive in a damp environment for weeks to months. Cysts can withstand freezing and aren't usually destroyed by chlorination, but they can't withstand desiccation or temperatures beyond 50°C.

Parameter	Features
Group	Entamoeba (hystolytics)
Origin	Protozoa (amoeba)
Foodstuff	Human
Illness	Food / water contaminated by faeces, also by transport via flies, cockroaches
Measures	Amobic dysentery: uptake of cysts leads to diarrhea or more serious symptoms with death as a result.
Notes	Good sewerage. Cyst is destroyed at T> 55 o C and deep freeze. Especially tropical and sub-tropical areas; illness occurs in the Netherlands, itis often contracted abroad.

Giardia lamblia

Giardia lamblia is a tiny parasite with a single cell that lives in the intestines of people and animals. Giardiasis is a disease caused by a parasite that is found all over the world. Giardiasis, a disease caused by *Giardia lamblia*, can be contracted by drinking polluted water. In addition, people are occasionally affected as a result of consuming tainted food. The significant sources of contamination are giardiasis-infected human and animal faeces.

Parameter	Features
Group	Protozoa (whip animal)
Origin	Intestinal tract mammals, birds, reptiles, amphibians
Foodstuff	Food / water contaminated through faeces.
Illness	Giardiasis: cysts cause illness (nausea, diarrhea), illness can last a long time (1-3 months). Incubation: 1-3 weeks
Measures	Personal hygiene, good drainage, no faecal contamination, water, heating.
Notes	Cysts resistant to chlorination.

Symptoms

The first symptoms appear one to two weeks after infection with *Giardia* has taken place. After that, patients suffer from diarrhea, smelly and greasy light-coloured. The duration of the disease in healthy people is 4 - 6 weeks.

Taenia Species

These tapeworms can be contracted by raw or undercooked pork or cattle.

Whenever the worm's eggs will be on a consumer's fingers, in the dirt, or food, for instance, and the eggs go orally and end up in the gut, the worm might cause illness. To avoid becoming contaminated with tapeworms, they are heated at a minimum of 145°F for 3 minutes.

Parameter	Taenia saginata	Taenia solium
Group	Tapeworm	Tapeworm
Origin	Cattle are intermediate hosts, humans are final hosts	Pigs are intermediate hosts; human can be intermediate and / or final host.
Foodstuff	Beef	Pork
Illness	Cattle can become seriously ill (cysticercosis) by ingesting eggs that develop into the first intermediate form (bladderworm). By ingesting beef bladderworm, adult tapeworms develop in the human intestine that makes eggs. In humans, this process leads to mild symptoms (taeniasis).	Damage to the intestinal wall and spread of worms to other organs → serious illness.
Measures	Good inspection of livestock. Heating meat (core temperature > 70 °C). Deep freezing	Good inspection of livestock. Heating meat (core temperature > 70 °C). Deep freezing
Notes	Contamination of humans is still real, and surveillance remains necessary.	Rare in the Netherlands, but present in Central America and South America.

Toxoplasma gondii

Parameter	Features
Group	Protozoa (Sporozoa)
Origin	The cat is the final host, warm-blooded animals are the intermediate host.
Foodstuff	Meat, vegetables infected through cat faeces.
Illness	Toxoplasmosis. Healthy persons: ingestion of cyst leads to mild flu; organism can remain in muscles for a long time; risk groups: pregnant women (meningitis and hydrocephalus in a child or abortion). Also, the elderly, young children and the sick can develop severe symptoms (blindness). Incubation: 1-3 weeks.
Measures	Good inspection. Do not eat raw, contaminated meat. Treating cats hygienically. Wash vegetables well (may be contaminated with cat oocysts). Cyst (form of infection) is killed at a room temperature of 70 °C and by deep freezing.
Notes	Contamination of cattle for slaughter has been strongly reduced in the Netherlands. Monitoring remains necessary due to high contamination pressure.

Toxoplasma gondii is a single-celled parasite found across the globe. *T. gondii* exclusively develops eggs (sporulated oocysts) in cats, contaminating soil, water, and food through faeces. Humans and mice, pigs, sheep, and birds get infected with these cysts. Humans and other animals serve as intermediary hosts for the cysts, which can then infect others. Toxoplasmosis is a relatively mild illness most of the time. Swollen lymph nodes, muscular soreness, and headache are common flu-like symptoms. Treatment is only required in rare cases.

Trichinella spiralis

Parameters	Features
Origin	Pigs and horses are infected by rodents, wild animals.
Foodstuff	Pork, horse meat, game
Illness	Trichinellosis. The consumption of encapsulated larvae in meat causes disease. Initial symptoms: gastrointestinal complaints. Larvae give rise to adult worms that mate and produce larvae in the human intestine that move through lymphatic channels and encapsulate in muscles, resulting in severe symptoms (paralysis). Mortality occurs
Measures	Good inspection of slaughtered cattle. A producer does not feed unheated animal waste and has good stable hygiene. Manufacturer: heating (core temperature > 70 °C, lowering a w, salting, smoking or deep-freezing bird's eye lens. Meat inspection law requirements. Consumer: no raw pork or game.
Notes	In the Netherlands, pigs and horses have low contamination. Presence is tested at meat inspection. Security remains necessary.

Symptoms

The earliest signs and symptoms appear 1 to 2 days after eating infected meat. Nausea, diarrhea, vomiting, fever, and stomach discomfort are the most common symptoms. These are followed by headaches, puffy eyes, aching joints and muscles, and overall weakness after 2 to 8 weeks. Later on, heart and breathing issues appear. Mild infections are sometimes misdiagnosed as influenza.

Trichinella spiralis is a worm whose larvae enter the body through the colon and produce trichinellosis. These find their way into numerous parts of the body. As a result, infections may be found worldwide, with wild animals being the most common cause of disease. However, *T. spiralis* may infect agricultural animals as well, such as pigs and horses. Thus, trichinellosis is a challenging illness to eliminate, despite all preventative precautions.

Other Parasites

Parameter	<i>Entamoeba histolytica</i>	<i>Clonorchis sinensis</i>
Foodstuff	Food / water contaminated by faeces, also by transport via flies, cockroaches	Undercooked or raw freshwater fish
Illness	Amobic dysentery: uptake of cysts leads to diarrhea or more serious symptoms with death as a result.	Clonorchis's: infections of gallbladder, liver by cyst consumption.
Measures	Good sewerage. Cyst is destroyed at T> 55 o C and deep freeze. Especially tropical and sub-tropical areas; illness occurs in the Netherlands but is often contracted abroad.	Cysts are destroyed at 50 o C.

Hazards by QAssurance

