

Questions and answers on botulism

Updated BfR FAQ, 23 January 2015

Botulism is a severe illness which is caused by toxins, the so-called “Botulinum toxins”. Under certain conditions, the toxins are released in food or feed by bacteria of the species *Clostridium (C.) botulinum* and then ingested with food. In rare cases, the germ itself can trigger botulism. The illness typically leads to specific neurological problems, for example, impaired vision, dry mouth, or difficulty speaking and swallowing, and it may be fatal. Both humans and animals are affected, including production animals, notably cattle but also poultry such as broilers and turkeys.

Since the mid 1990s, reports have additionally appeared in scientific publications on so-called visceral or chronic botulism in cattle populations. This is a disease the causes of which are as yet unknown and which was initially observed in high-performance cattle but also in calves. The disease is documented with a wide range of clinical symptoms. The clinical pictures described have not been scientifically verified yet. It is assumed that the cause is a toxicoinfection with *botulinum*. However, this cause has not been conclusively proven to the present day. Toxicoinfection means that the bacteria colonise the intestine where they release toxins which are then absorbed by the body.

In humans too, chronic syndromes are observed. It affects farmers and their families in whose facilities cattle have contracted the disease. The cause of the typically non-specific symptoms in affected humans has not been established to date either.

Below, the Federal Institute for Risk Assessment (BfR) answers questions on the subject of botulism.

What is botulism?

Botulism denotes the illness caused by “Botulinum neurotoxins“. Botulinum neurotoxins are produced by bacteria of the species *Clostridium (C.) botulinum* and can cause nausea, diarrhoea, and constipation as well as neurological symptoms with paralysis including respiratory paralysis. Both animals and humans can be affected by the disease. In Germany, approximately 20 persons come down with botulism per year.

How is acute botulism transmitted to humans?

Acute botulism in humans is predominantly a food-borne disease. It has always been associated with the consumption of processed food products in which bacteria had the opportunity to multiply and produce toxins under anaerobic conditions.

Another form of food-borne botulism is infant botulism in which bacteria colonise the intestine where they release toxins. In the leaflet entitled “Hinweise für Verbraucher zum Botulismus durch Lebensmittel” (in German only), the BfR has summarised how the risk of contracting the disease can be reduced:

http://www.bfr.bund.de/cm/350/hinweise_fuer_verbraucher_zum_botulismus_durch_lebensmittel.pdf

In addition, botulism can be caused by wound infections with *Clostridium botulinum*.

What foods are involved in the transmission of botulism?

C. botulinum is a germ found in the environment, meaning that it is omnipresent. The bacteria form heat-resistant spores and can contaminate food through dust or earth particles. Under anaerobic conditions and in the presence of sufficient nutrients, the bacteria form heat-sensitive toxins. For this reason, notably foods that are stored under anaerobic conditions may contain toxins. The consumption of such foods can cause botulism.

Home-made pickled vegetables or fruit and home-made preserves, including recipes with fish and meat, can be problematic. In contrast, industrial production ensures that the foods are sufficiently heated, so that the spores are killed off.

For so-called infant botulism which affects children in their first year of life, honey is a known source.

There are currently no indications that raw milk and fresh meat pose a risk of causing acute botulism in humans.

How prevalent is botulism in cattle populations?

The disease of botulism in domestic animals is neither a notifiable nor a reportable animal disease. In consequence, there are no scientifically collected data about the number of ill cattle or about the affected cattle populations.

Is it permissible for meat plants to slaughter and process affected cattle into food?

In principle, only healthy animals may be slaughtered and processed into food. If animals do not show any symptoms of disease but come from a farm in which animals have been affected by it, the farmer has an obligation to inform the abattoir accordingly. In such cases, the competent veterinarian initially verifies that the animal is indeed healthy.

High hygienic standards for the slaughter of cattle additionally ensure that pathogenic microorganisms are not transmitted to the meat.

What is visceral or chronic botulism?

Since approximately the end of the 1990s, scientific publications have reported on an aetiologically uncertain disease in cattle which is usually referred to as **visceral or chronic** botulism. The disease is characterised by a wide range of clinical symptoms. These include indigestion, abomasal displacement, emaciation, downer cow syndrome, foot and joint diseases, paralysis, taut abdominal wall, raised abdomen, difficulties swallowing as well as acute febrile mastitis (inflammation of the lactiferous glands). The disease was first found in high-performance cattle, although calves too were affected.

In addition, it has been suspected for some years now that farmers and their families who spend time in facilities in which cattle are ill with chronic botulism could contract the disease as well. However, this has not been confirmed by scientific evidence yet.

What are the causes of the disease referred to as visceral or chronic botulism?

There is no scientific explanation as yet as to what causes the disease. Some scientists assume that the underlying cause is a toxicoinfection with *C. botulinum*. When a toxicoinfection is contracted, bacteria colonise the intestine where they release toxins which are then absorbed by the body. This hypothesis has not been confirmed to date. Other scientists postulate a multifactorial scenario, i.e. they believe that various factors are involved in the development of the disease.

The Foundation Veterinary University Hannover conducted a study, sponsored by the Federal Ministry of Food and Agriculture and the Federal Office for Agriculture and Food, on the significance of (*C.*) *botulinum* for chronic illness in dairy cattle populations.

In their final report, the authors of the study conclude that no clear and direct connection between the occurrence of *C. botulinum* and chronic illness in dairy cattle facilities can be confirmed on the basis of the used statistical methods.

Details on this study as well as the final report can be accessed at the following link:

http://www.bmel.de/SharedDocs/Downloads/Tier/Tiergesundheit/Tierseuchen/Botulismus-Abschlussbericht-Hannover.pdf?__blob=publicationFile