

Toxoplasma gondii and *Neospora caninum* – similar but different

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The intracellular protozoan parasite *Toxoplasma gondii* (Nicolle and Manceaux 1909) is one of the most prevalent parasites of man and warmblooded animals worldwide. The domestic cat and other felines are definitive hosts in whose intestinal wall the parasite undergoes its sexual reproduction resulting in the development of microscopic oocysts that are excreted to the environment. Most warmblooded animals, including man, can act as intermediate hosts in which the parasite is found in the form of microscopic tissue cysts primarily in muscular and neural tissues. Most infections are unspecific and generally asymptomatic but primary infection during pregnancy – notably in humans and sheep – can lead to abortion or foetal damage. Human infection can occur through ingestion of raw or undercooked meat from i.e. sheep or pigs carrying tissue cysts of the parasite or from intake of oocysts originating from feline faeces. In Europe *T. gondii* is regarded as one of the major food-borne zoonotic organisms.

In the 1980s in Europe and North America a number of mostly young dogs with neurological disorders were found at post mortem examination to be infected with an organism that was first regarded as being *T. gondii*. However, due to ultrastructural and antigenic differences it was later identified as a new species distinct from *T. gondii* and it was named *Neospora caninum* (Dubey, Carpenter, Speer, Topper and Uggla, 1988). Some years after its discovery it was confirmed that canines were the definitive host of *N. caninum*, but also that the parasite could cause abortion in cattle – similarly to *T. gondii* in sheep. Today *N. caninum* is regarded as a significant abortifacient organism in bovines, which can suffer from miscarriage or transfer of the organism to its offspring during subsequent pregnancies. Although *T. gondii* is an important zoonotic organism there is no firm evidence that *N. caninum* can infect humans.

One of the most striking differences in the biology of the two parasites is that *T. gondii* induces an immunity which will protect a female animal infected before pregnancy from transmitting the organism to its foetus, whereas female individuals once infected with *N. caninum* can transmit the parasite vertically to its offspring during consecutive pregnancies. As a consequence, *N. caninum* can remain for years in a herd without the need of involvement of the canine definitive host. Thus, to control *N. caninum* in a bovine herd, infected female animals should be culled and not used for further breeding.

Diagnosis of *Toxoplasma* and *Neospora* infections is usually performed by means of serological analysis using specific antigens to the respective parasite. Commercial test kits are available. Post mortem identification can be performed by immunohistochemical or molecular methods. A live vaccine based on an attenuated strain of *T. gondii* is available commercially in some countries but it is not intended for humans and other animal species. No *N. caninum* vaccine is yet available.

Prevention of human *T. gondii* infection is through advising pregnant women to avoid the ingestion of raw or undercooked meat from primarily pigs, sheep and goats. Some countries offer screening of women for *T. gondii* infection during pregnancy.

T. gondii and *N. caninum* are prevalent in both Poland and Sweden. Their current status in different host species will be presented.