

E. Cuniculi: Cause of Unexplained Neurological Diseases?



Illustration of a rabbit suffering from torticollis – or 'Wry Neck'

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Neurological disease is common in pet rabbits, but the causes of many of these diseases have been difficult or impossible to diagnose. Some of the most common neurological diseases include head tilt and loss of balance (torticollis or wry neck), urinary incontinence, and decreased use of hind and or front legs, paralysis and seizures. Many lay and veterinary publications have theorized that *Encephalitozoon cuniculi* (*E.cuniculi*) may be the cause of many or even all of these neurological problems. A review of the scientific literature, however, shows that very little is known about the organism.

E.cuniculi is an "obligate parasitic protozoal organism," which is to say that it lives only within other animals; it can not live or grow outside of its host as bacteria can. It is classified with similar protozoal parasites in a group called microsporidia. Rabbits are a favorite host of *E.cuniculi*, however this organism may infect a number of animals ranging from mice to man. Little is known about the biology of *E.cuniculi*. The exact routes by which it is transmitted are not known. It has been transmitted experimentally in mice by oral and nasal routes. That is to say, by ingesting or inhaling *E.cuniculi* spores, the infectious stage of the organism. Spores are also thought to be passed from mother to offspring prior to birth. This may be the most common way that pet rabbits are infected.

Once the organism has entered the rabbit, it is thought to travel through the body in white blood cells (macrophage), the cells that normally fight disease. The organism may ultimately infect tissues of the rabbit's kidney, brain, spinal cord and, rarely, liver and lungs. New, infective spores are formed in cells in the kidney and lung, and are passed in the urine and respiratory secretions. Although these spores do not grow or develop outside the rabbit, they are thought to survive for long periods of time.

The majority of rabbits who are infected by this organism show no clinical signs of illness. Occasionally infected rabbits may exhibit neurological signs, including those listed above. There have been no thorough studies of pet rabbits with neurological disease to show what proportion of those rabbits may be infected with *E.cuniculi*. Historically it has been thought to only rarely cause disease, however popular thinking in pet rabbit circles is that clinically ill rabbits may be common. The statistics in the literature for the disease are based on the incidence in laboratory rabbits; pet rabbits may have a much greater rate of infection.

In the past, a positive diagnosis of *E.cuniculi* could only be made at necropsy (autopsy). In the last several years there have been a variety of tests (looking for the rabbit's immune system's response to the organism) that will tell if a rabbit has been exposed to *E.cuniculi*. Unfortunately, these tests do not tell us if the signs or symptoms the rabbit may be experiencing are caused by the organism, and it is possible for a rabbit with a positive test for *E.cuniculi* to have neurological signs caused by some other cause.

There has been an increase in research in treating infections caused by *Encephalitozoon* because of infections caused by this and other similar organisms in immune-suppressed persons. Infections with *E.cuniculi* and a number of other microsporidian parasites are a common complication to AIDS patients. Of these infections, those caused by *E.cuniculi* have the best prognosis (chance) for cure. The drug used to treat these infections is now being investigated for treating *E.cuniculi* infections in rabbits. How successful these new treatments will be remains to be seen.

Prevention of the disease could be achieved through testing of animals. Because the disease is transmitted vertically (from mother to offspring), the testing of breeding animals is especially important. Pet shops and rabbit shows could contribute to the end of this disease by insisting that only serologically negative animals be sold or exhibited. The House Rabbit Society could help by insisting that serologically positive rabbits be adopted to homes without rabbits or to homes with other seropositive pets.

At this point in time there are more questions about *E.cuniculi* in our pet rabbits than there are answers. To find the answers we need to look further and work to diagnose the causes of neurological diseases in pet rabbits. The tools we need to make a diagnosis of *E.cuniculi* are becoming available and with any luck successful treatment is as well.

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