

ENCEPHALITOOZONOSIS / ENCEPHALITOOZON CUNICULI

Animal Group(s) Affected	Transmission	Clinical Signs	Severity	Treatment	Prevention and Control	Zoonotic
Rabbits; rodents; canids; and sporadic cases in a variety of mammals	Ingestion of environmentally resistant spores passed in urine/feces of infected host; transplacental.	Asymptomatic; neurologic; nephritis to end-stage renal failure; uveitis	Frequently asymptomatic in immunocompetent adult animals. However, progressive disease can be fatal.	Variably successful; prolonged benzimidazoles.	Environmental sanitation to prevent spore contamination.	Yes.

Fact Sheet compiled by: Karen Snowden

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Susceptible animal groups: Domestic rabbits, rodents (mice, rats, muskrats, guinea pigs, hamsters, ground shrews), domestic dog; sporadic cases reported in a variety of wild carnivores including farmed blue fox (*Alopex lagopus*), wild red fox (*Vulpes vulpes*), martens (*Martes spp.*) and mink (*Mustela vison*). Sporadic natural infections reported in several species of non-human primates, including squirrel monkeys (*Saimiri sciureus*), emperor tamarins (*Saguinus imperator*), Goeldi's monkeys (*Callimico goeldii*), and experimental infections reported in vervet monkeys (*Cercopithecus pygerythrus*).

Causative organism: *Encephalitozoon cuniculi*; phylum Microsporidia (intracellular eukaryotic single-celled organism; classified by some as protozoa, by others as fungi)

Zoonotic potential: Yes, immunocompromised human cases reported. Direct animal to human transmission has not been reported although molecular characterization shows animal and human genotypes identical.

Distribution: Ubiquitous; worldwide from tropical to temperate to cold climates.

Incubation period: Poorly defined in natural infections and dependent on spore dose. Death in experimentally infected puppies in 2-8 weeks and in experimentally infected immune deficient mice 10-27 days.

Clinical signs: Most frequently, the infection is asymptomatic in immunocompetent adult animals. Progressive neurologic signs including ataxia, head tilt, circling, head pressing, can present in rabbits and canids. Progressive glomerulonephritis to end-stage renal failure can occur in dogs. Uveitis, sometimes with cataract development, can occur in rabbits.

Post mortem, gross or histologic findings: Encephalitis with multifocal to disseminated mononuclear or granulomatous inflammatory infiltrates and perivascular cuffing in the brain; glomerulonephritis; uveitis with cataract formation; intracellular organisms commonly seen in vascular endothelium of brain, glomeruli and renal tubular epithelium of kidney.

Diagnosis: Microscopically, the Gram positive organisms can be visualized in histologic sections; microscopically visualized spores in body secretions such as urine sediment or CSF using modified trichrome stain or chitin-binding Calcofluor or Fungi-Fluor stain; PCR of tissue samples; detect parasite-specific antibodies using IFA or ELISA.

Material required for laboratory analysis: tissue, body fluids for staining and microscopy to visualize intracellular organisms or spores; tissue, body fluids for PCR; serum for antibody detection (IFA, ELISA).

Relevant diagnostic laboratories: Serologic screening is available for rodent/rabbit species through major

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laboratory research animal vendors. Molecular diagnostic testing is available only through research labs, not commercially available.

Charles River Laboratories

1-877-274-8371

A list of locations can be found at: <http://www.criver.com/about-us/locations>

IDEXX Reference Laboratories

One IDEXX Drive

Westbrook, Maine 04092

1-888-433-9987

A list of locations can be found at: <http://www.idexx.com/>

Treatment: Prolonged administration of albendazole has been used in humans and anecdotally used successfully in dogs. Prolonged administration of fenbendazole has been reported in rabbits.

Prevention and control: Environmental sanitation very important to prevent contamination with environmentally resistant spores; transmission of spores via fomites is probable. Research rodent/rabbit colonies use a serologic test and cull approach to eliminate carrier animals.

Suggested disinfectant for housing facilities: Environmentally resistant spores can be inactivated by chlorine, peroxide and other disinfectants with adequate contact time.

Notification: Not reportable in animals or humans.

Measures required under the Animal Disease Surveillance Plan: None.

Measures required for introducing animals to infected animal: Not recommended. Asymptomatic seropositive animals can shed parasite spores intermittently for months/years, posing risk of exposure of introduced uninfected animals to environmentally resistant spores.

Conditions for restoring disease-free status after an outbreak: Remove seropositive animals from population; rigorous environmental cleanup and disinfection

Experts who may be consulted:

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