**ENCEPHALITOZOOONOSIS / ENCEPHALITOZOOON CUNICULI**

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

**Fact Sheet compiled by:** Karen Snowden  
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**Fact Sheet Reviewed by:** Elizabeth Didier; Susan Rohrer; Meredith M. Clancy

**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
ENCEPHALITOZOOSONIS 

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

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