charles river
accelerating drug development. exactly.

Rabbit Caliciviruses

(Rabbit Hemorrhagic Disease Virus [RHDV], European Brown Hare Virus, Rabbit Calicivirus)

Classification

RNA virus, nonenveloped

Family

Caliciviridae

Affected species

Rabbits

Frequency

Common in wild rabbits in some geographic areas; exotic and reportable disease in other areas. Extremely rare in laboratory rabbits. RHDV is the most clinically significant virus amongst several known rabbit caliciviruses.

Transmission

Rabbit caliciviruses can be transmitted in a variety of ways, including fomites, insect vectors, animal vectors, direct contact, and aerosol.

Clinical Signs and Lesions

Rabbits with RHD present with clinical signs after a short incubation period. Outbreaks can be explosive, with 30-80% of the population ill. Animals generally present with nervous system signs such as shaking, incoordination, and prostration. The disease is most severe in adult rabbits, and over 80% may die.

Lesions on necropsy are numerous, reflecting the sites of viral replication. Lungs are edematous with areas of hemorrhage and ecchymosis. There may be a serosanguinous discharge in the trachea or at the nares. The liver and spleen are enlarged and serosal ecchymoses are seen throughout the body. Disseminated intravascular coagulation is thought to be an important aspect of RHDV pathogenesis.

Diagnosis

Screening for RHDV is conducted via ELISA. The currently available commercial test kits detect antibodies against the VP60 capsid protein of RHDV. The RHDV ELISA will also detect antibodies to other rabbit caliciviruses; thus, positive initial results should be viewed cautiously, especially if no morbidity is observed. PCR specific for RHDV is also available and the virus can be detected from samples of liver, spleen, or lung.

Interference with Research

Animals with RHDV are severely ill and should not be used for research. Although some animals may recover from the acute illness, these animals may serve as reservoirs of infection for other animals.

Since the ELISA used for diagnosis of RHDV cross-reacts with other known rabbit caliciviruses, non-pathogenic caliciviruses may also be detected by this assay. These cross-reacting antibodies from exposure to other caliciviruses are not protective, however, against RHDV.

Prevention and Treatment

In some countries, a vaccine against RHDV is available. It does protect against infection, but its use in a research setting is not advised. Research colony health monitoring generally relies on negative serology results for its value. Regular serologic testing of resident animals and quarantine of incoming animals is advised. If a rabbit calicivirus infection is diagnosed, measures should be taken to prevent its propagation via material or contacts between animals. The persistence and stability of caliciviruses in the environment should be a primary consideration. Aggressive chemical decontamination with the help of detergents and oxidizing disinfectants is advised, as well as autoclaving or cold sterilization of materials in direct contact with animals.

Appropriate measures for the treatment of infected colonies will depend on their value and the possibility of replacing them. In general, total depopulation, thorough cleaning of all aspects of the animal room,

and restocking are recommended. Hysterectomy rederivation and embryo transfer should be successful in eradication of rabbit caliciviruses, but animals may not survive the initial infection long enough for these options to be useful. Staff who work in the animal houses must not have contact with wild rabbits, especially in rabbit calicivirus endemic areas.

References

Capucci L, Scicluna M T & Lavazza A (1991) Diagnosis of viral haemorrhagic disease of rabbits and the European brown hare syndrome. *Rev Sci Tech*, 10, 347-70.

Capucci L, Nardin A & Lavazza A (1997) Seroconversion in an industrial unit of rabbits infected with a non-pathogenic rabbit haemorrhagic disease-like virus. *Vet Rec*, 140, 647-50.

Capucci L, Fusi P, Lavazza A, Pacciarini M L & Rossi C (1996) Detection and preliminary characterization of a new rabbit calicivirus related to rabbit hemorrhagic disease virus but nonpathogenic. *J Virol*, 70, 8614-23.

Carman J A, Garner M G, Catton M G, et al. (1998) Viral haemorrhagic disease of rabbits and human health. *Epidemiol Infect*, 121, 409-18.

Chasey D, Lucas M H, Westcott D G, et al. (1995) Development of a diagnostic approach to the identification of rabbit haemorrhagic disease. Vet Rec, 137, 158-60.

Fox JG, Anderson LC, Lowe FM, Quimby FW, editors. *Laboratory Animal Medicine.* 2nd ed. San Diego: Academic Press; 2002. 1325 pp.

Marchandeau S, Le Gall-Recule G, Bertagnoli S, et al. (2005) Serological evidence for a non-protective RHDV-like virus. *Vet Res*, 36, 53-62.

Mcintosh M T, Behan S C, Mohamed F M, et al. (2007) A pandemic strain of calicivirus threatens rabbit industries in the Americas. *Virol J*, 4, 96.

Nagesha H S, Mccoll K A, Collins B J, et al. (2000) The presence of cross-reactive antibodies to rabbit haemorrhagic disease virus in Australian wild rabbits prior to the escape of virus from quarantine. *Arch Virol*, 145, 749-57.

Nicklas W, Baneux P, Boot R, et al. (2002) Recommendations for the health monitoring of rodent and rabbit colonies in breeding and experimental units. *Laboratory Animals*, 36, 20-42.

Nowotny N, Bascunana C R, Ballagi-Pordany A, et al. (1997) Phylogenetic analysis of rabbit haemorrhagic disease and European brown hare syndrome viruses by comparison of sequences from the capsid protein gene. *Arch Virol*, 142, 657-73.

Percy DH, Barthold SW. *Pathology of Laboratory Rodents and Rabbits.* Ames: Iowa State University Press; 2007. 325 pp.

Rodak L, Smid B, Valicek L, et al. (1990) Enzyme-linked immunosorbent assay of antibodies to rabbit haemorrhagic disease virus and determination of its major structural proteins. *J Gen Virol*, 71 (Pt 5), 1075-80.

charles river | research models and services

Charles River Research Models and Services
T: +1 877 CRIVER 1 • +1 877 274 8371
E: askcharlesriver@crl.com • www.criver.com