

Mouse Rotavirus (Epizootic Diarrhea of Infant Mice or EDIM)

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Background: Diarrhea in young laboratory mice is often caused by mouse rotavirus, also called epizootic diarrhea of infant mice (EDIM).

Transmission: This virus is highly contagious and is transmitted via contaminated bedding, airborne dust, and through contact with infected mice. There is no evidence of transplacental infection. Animals are most susceptible between 0 and 14 days of age. The virus is shed in the feces for about 10 days post-infection. It is unclear if a carrier state exists in these animals.

Clinical Signs: Clinical signs are generally limited to mice under 14 days of age. These animals present with watery, mustard-colored stools, lethargy, and distended abdomens. Rectal impaction may occur at 12 to 16 days of age. If the impacted fecal material is not removed spontaneously or deliberately, the animals will die. Death in these animals appears to be associated with the rectal impaction rather than the viral infection itself.

Diagnosis: Diagnosis is usually based on serology, via ELISA or IFA or both. The diagnosis can be strengthened by demonstration of typical lesions in clinically ill animals.

Effects on Research: Rotavirus can alter host physiology in multiple ways, thus confounding research. Examples of such alterations include:

- Increased susceptibility to the pathologic effects of copathogens.
- Altered results of dietary and nutritional studies.
- Alterations in gastrointestinal physiology, confounding research involving the gastrointestinal system.

Prevention: To prevent this disease, obtain replacement stocks from sources that are known to be free of disease. Tumor lines should be assessed for infection using MAP tests or other appropriate tests. Personnel working with infected animals should not enter rooms that contain naïve animals.

All animals should be placed in microisolator caging environments that are handled with the aid of a laminar flow hood using sterile techniques during handling and observation of the animals.

Eradication: The most effective way to eradicate EDIM infections is to cull the colony and obtain clean replacement stock. However, this is not always a feasible option when working with valuable mice.

Caesarian rederivation or embryo transfer can be used to produce offspring that have not been exposed to the virus. Repeated serological evaluations should be performed prior to reintroduction of the mice into a naïve population.

A breeding moratorium of at least 8 weeks can also be used to prevent the spread of the virus from young weanling animals to younger naïve animals. The animals should be housed in microisolator caging and handled with standard microisolator techniques. This method requires repeated serologic testing and strict adherence to a zero-tolerance for breeding policy. It is important to note that transgenic and knockout mice often have altered immune systems that may allow them to sustain the infection for longer periods of time or to develop a carrier state. In these cases, the breeding moratorium would not be the appropriate means of eradication.

After the breeding moratorium, breeding pairs can be further manipulated to eradicate the disease. All animals should remain in microisolator caging environments that are handled with the aid of a laminar flow hood using sterile techniques during handling and observation of the animals. All breeding pairs whose first litter is diarrheal should be eliminated from the colony.

References:

Baker, DO. 1998. "Natural Pathogens of Laboratory Mice, Rats, and Rabbits and Their Effects on Research." *Clinical Microbiology Reviews*. 11: 231-266.

Parker, JC and Richter, CD. 1982. "Viral Diseases of the Digestive System." *The Mouse in Biomedical Research Diseases*. Academic Press, Inc. pp. 160-167.