

Murine Norovirus (MNV)

Classification

RNA virus, nonenveloped

Family

Caliciviridae

Affected species

Mice

Frequency

Currently, by far the most common virus in laboratory mice. The prevalence is unknown in wild mouse populations.

Transmission

MNV is transmitted by the fecal-oral route.

Clinical Signs and Lesions

None in immunocompetent mice or in most immunodeficient mice. Only in mice with severe deficiencies in innate immunity, specifically the interferon signaling pathways or multiple interferon receptors, can MNV infection lead to wasting and death. The infection was first described in animals with a deficiency in the STAT1 gene. Clinical signs include wasting, diarrhea, and death. Microscopically, hepatitis, peritonitis, and interstitial pneumonia were seen in infected immunodeficient animals. The infection is persistent in both immunocompetent and immunodeficient mice, with fecal shedding for months following infection.

Diagnosis

MNV infection is diagnosed by PCR or serology (MFIA™, ELISA, IFA). Antibody titers in MNV infection may be slow to rise and 8 weeks of exposure is recommended for sentinel mice housed on soiled bedding. In addition, there are many field strains of MNV and antibodies may only weakly cross-react from strain to strain, so it is important that the diagnostic laboratory use assays validated for the full spectrum of murine noroviral strains.

Interference with Research

None known in immunocompetent mice and most

immunodeficient mice, although there is little literature regarding this issue. The virus replicates in cells of the macrophage line and since animals become persistently infected, this may render these animals questionable for immunological studies involving macrophage-derived cells. In mice with certain defects of innate immunity, the animals become ill, rendering them unsuitable for research. Infected mice may be a source of infection for other mice in the facility.

Prevention and Treatment

MNV is a newly-described virus of mice. Since the virus is only recently described, does not appear to be symptomatic in most mice, and many populations of laboratory mice are infected, drastic measures are not necessarily the best approach to the elimination of MNV infection in a colony. Hysterectomy rederivation or embryo transfer appear to be effective in eradicating MNV from a population. Wild mice could serve as a reservoir of MNV infection and access of wild rodents to the animal facility should be controlled. Regular serologic testing of resident animals and quarantine of suspect incoming animals is advised.

Caliciviruses are notoriously difficult to eradicate from the environment (e.g. cruise ships and Norwalk virus). If depopulation and cleaning is chosen, 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.

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