

# PNEUMONIA VIRUS OF MICE (PVM)

## Background

Pneumonia virus of mice (PVM) is a virus affecting the respiratory tracts of rats and mice. It is a ssRNA virus of the family Paramyxoviridae.

## Transmission

PVM is transmitted via aerosol and contact exposure to the respiratory tract. Susceptibility is strain dependent and can be increased by a variety of local and systemic stressors.

## Clinical Signs

In immunocompetent rats and mice, the infections are short-lived, without clinical signs. No pathologic lesions have been reported in naturally infected rats and mice. No carrier state develops.

In immunocompromised mice, such as athymic nudes, chronic pneumonia with wasting occurs. This infection is fatal. Mild rhinitis and interstitial pneumonia has been reported after experimental infections of immunocompetent mice. Persistent interstitial pneumonia was reported in experimentally infected athymic nude mice.

## Diagnosis

Diagnosis is usually based on serology, via ELISA or IFA or both.

## Effects on Research

PVM infections in immunocompromised mice, such as athymic nudes, are fatal and should be avoided.

In immunocompetent mice, PVM can alter the pulmonary architecture and induce a strong, measurable immunological response. This can interfere with immunological and toxicological studies and measurements of pulmonary cell kinetics and metabolism.

## 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.

Strict traffic patterns should be established to ensure that virus is not introduced into colonies of immunocompromised animals. Personnel working with infected animals should not enter rooms that contain naïve or immunocompromised animals.

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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 SV 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. It is also unclear if immunocompromised mice develop a persistent infection. In these cases, the breeding moratorium would not be the appropriate means of eradication.

## References

- Baker, DG. 1998. "Natural Pathogens of Laboratory Mice, Rats, and Rabbits and Their Effects on Research." *Clinical Microbiology Reviews*. 11:231-266.
- Richter, CB. 1986. "Mouse Adenovirus, K virus, pneumonia virus of mice." In *Viral and Mycoplasmal Infections of Laboratory Rodents*. Ed. Bhatt, PM et al. Academic Press, Inc. pp. 170-183.