SENDAI VIRUS

CLASSIFICATION

Family: Paramyxoviridae
Genus: Respirovirus

- Enveloped, RNA virus
- Single-stranded, linear
- 15-16 kbp genome
- 150-250 nm in diameter
- Replicates in cytoplasm

PREVALENCE

Found in mice, rats, hamsters and occasionally guinea pigs. Historically significant, but relatively rare in modern laboratory colonies of mice and rats.

DIAGNOSIS

ELISA, IFA, RT-PCR

DISEASE/CLINICAL SIGNS

Hamster infection is usually asymptomatic. Rat infection is also generally asymptomatic, although minor effects on reproduction and growth of pups has been reported.

Under natural conditions in mice, infection is acute and restricted to respiratory epithelium and transient low-level viraemia can occur. Disease can occur in all ages of mice. Other signs and symptoms include: Chattering; Polypnea; Weight loss; Depression; Foetal resorption; Prolonged gestation; Death in neonates; Poor growth in weanling and young adult mice; Progressive wasting disease in athymic (nu/nu) mice

Two patterns of infection occur:

- Epizootic pattern occurs on introduction of infected animals into a colony, which results in some or all of the above signs and symptoms.
- Enzootic pattern occurs after some time of epizootic infection, and the disease becomes endemic to a colony when a constant supply of susceptible animals maintains the infection. This pattern of infection can be asymptomatic and is generally characteristic of breeding colonies.

Susceptible strains include 129/ReJ, 129/J, DBA/1J, C3H/Bi, DBA/2J, DBA/2. More resistant strains include C57BL/6J, RF/J, SJL/J, Swiss and AKR/J.

STRAINS

At least 13 strains exist; all strains are considered antigenically homologous and of a single serotype.

TRANSMISSION

Extremely contagious.
Spread via:

- Contact with respiratory secretions
- Aerosols

Airborne transmission is highly variable depending on numbers of transmitters, relative humidity, air flow and distance to susceptible individuals.

INTERFERENCE WITH RESEARCH

Effects include but are not limited to:

- Enhanced airway responsiveness (guinea pigs and rats)
- Chronic rejection of lung allografts (rats)
- Increased mitotic cell numbers in bronchial epithelium and in lung parenchyma
- Increased natural killer cell mediated cytotoxicity
- Induction of tumour necrosis factor and other cytokines
- Strong CD4+ and CD8+ T-cell response in respiratory tract (C57BL/6 mice)
- Decreased pulmonary bacterial clearance
- Enhanced numbers of cytotoxic T-lymphocyte precursors for life (mice)
- Altered host response to transplantable tumours

DURABILITY

Resistant to: Alkaline pH
Susceptible to: Environment outside of host (99% infectivity lost by 48 hours in 2% protein suspension); UV light; 70% ethanol; 2% formalin; Temperatures over 60°C

CONTROL

The most effective way to control infection is to cull infected animals and replace with virus-free sources. A strict burn-out period can be enforced (at least 8 weeks) to eliminate enzootic Sendai virus infection. Maintain regular health monitoring of supplier sub-populations and strict protocols for barrier colonies. Exclude wild mice from facility. Extreme care to be taken by testing transplantable tumour and cell lines before use.

POST INFECTION

Caesarean rederivation and embryo transfer can be used to obtain virus-free progeny from infected or exposed dams.

BIBLIOGRAPHY

Baker, D.G. 1998. Natural Pathogens of Laboratory Animals. Clin. Microbiol. Rev. 11:234.

Fox, J.G., Barthold, S.W., Davisson, M.T., Newcomer, C.E., Quimby, F.W., Smith, A.L. 2007. The Mouse in Biomedical Research, Second Edition, Volume Two, pp. 282-298.

National Research Council. 1991. Infectious Diseases of Mice and Rats, pp 35-42.

Nicklas, W et al (GV-SOLAS Working Group on Hygiene). 1999. Laboratory Animals. 33 (Suppl.1) S1:42-43.