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Lymphocytic Choriomeningitis Virus
(LCMV)

Classification
RNA virus, enveloped

Family
Arenaviridae

Affected species
Natural LCMV reservoirs are laboratory and wild mice. Most rodents are susceptible to infection, with hamsters especially sensitive to infection, while rats are naturally resistant. LCMV is zoonotic. Pregnant women are especially susceptible, with adverse fetal outcomes possible.

Frequency
Rare among laboratory mice; sporadic among wild mouse populations.

Transmission
LCMV may be transmitted thorough contact with saliva, nasal secretions, or urine. In natural infections of immunocompetent animals, virus is only shed by hamsters and mice infected prior to weaning. Among enzootically infected populations of mice, the most common route of transmission is *in utero*.

Clinical Signs and Lesions
The reaction of laboratory mice to infection with LCMV depends upon age, viral strain, and route of exposure. Naturally infected mice do not generally present clinical signs. Animals infected *in utero* are tolerant to the virus, which results in systemic, persistent subclinical infection. *In utero* infected animals are often runted as well, due to general effects of this subclinical infection on body systems. In the adult mouse, experimental infection results in an acute immune-mediated disease after one week of incubation. Lesions seen in natural LCMV infection are minimal, and are most likely to be found in aged animals from the colony. These lesions include the characteristic lymphocytic choriomeningitis (and lymphocytic infiltrates in liver, adrenal, kidney, and lung), immune-complex glomerulonephritis, and vasculitis.

Diagnosis
Diagnosis is best accomplished through serology, but this is of limited value in an endemically infected colony. MAP (mouse antibody production) testing or PCR testing can be of use in these cases, as can exposure of known naïve adult mice to a suspect colony. These naïve adults will seroconvert, and then IFA, MFIA™ or ELISA can be used to detect antibodies.

Interference with Research
The most important affect on research associated with an LCMV-infected colony is the potential infection of workers. LCMV frequently contaminates transplantable tumors in the mouse, hamster, and guinea pig, tissue cultures, viral stocks (leukaemia virus, rabies virus, PVM...), and sub-strains of *Toxoplasma gondii*. LCMV has numerous effects on the immune system. Infection with LCMV inhibits tumor induction due to polyoma virus, and mammary tumor virus in the mouse, and interferes with transplantable leukaemia in the guinea pig and the mouse. Infection is associated with depression of cellular immunity in the mouse. Rejection of cutaneous grafts or transplantable tumors may be delayed. In addition, infection will increase the sensivity of the mouse to ectromelia virus and to bacterial endotoxins.

Prevention and Treatment
All mice and hamsters entering a research facility should be shown to be free of LCMV. Wild mice should be excluded from the facility. All murine-derived biological products such as tumors, serum, or cell lines should be tested for the presence of viral contaminants before being used in mouse facilities or the laboratory. Experimental animals containing tumor transplants, cell line injections, or murine-derived product injections should be housed away from breeding animals. Testing for antibodies to LCMV should be part of regular health monitoring of any laboratory mouse colony.

If an infection with LCMV is diagnosed, all animals in the colony must be euthanized. If the source of infection is a cell line or transplantable tumor, it must also be

destroyed. The animal house must be cleaned and disinfected. As an enveloped virus, it probably does not remain infectious in the environment for more than a few days and is susceptible to detergents, disinfectants, drying, and ethanol. All other animal house materials should be discarded as hazardous waste (incinerated) or autoclaved. Hysterectomy rederivation is not effective due to vertical transmission. The virus infects female germ cells, and may contaminate sperm. If embryo transfer is used to attempt to clean a colony, the animals should be followed with PCR testing to detect any persistently infected animals.

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