

Occupational Health Program for Personnel Exposed to Vertebrate Animals East Tennessee State University

Rabies

Reservoir: Rabies is caused by a number of different strains of highly neurotropic viruses. The virus infects all mammals, but the main reservoirs are wild and domestic canines, cats, skunks, raccoons, bats, and other biting animals. However, historically the disease has not posed a problem in the animal laboratory setting. The incidence of rabies in wildlife in the U.S. has been rising in recent years, and the possibility of rabies transmission to dogs or cats with uncertain vaccination histories must be considered. In addition, rabies-susceptible wildlife introduced into the laboratory have the potential to harbor the infection.

Mode of Transmission: Rabies virus is most commonly transmitted by the bite of a rabid animal or the introduction of virus-laden saliva into a fresh skin wound or intact mucous membrane. Airborne transmission probably can occur in caves where rabid bats roost. Since the 1950s bats have increasingly been implicated as wildlife reservoirs for variants of rabies virus transmitted to humans. Apparently even limited contact with bats or other animals infected with a bat variant of rabies may be associated with rabies virus transmission. The virus also has been transmitted through corneal transplants from persons with undiagnosed central nervous system disease. Personnel who handle tissue specimens or other material potentially laden with rabies virus also should be regarded as at risk for infection.

Clinical Signs: The incubation period can range from five (5) days to many years. The disease produces an almost invariably fatal acute viral encephalomyelitis. Patients experience a period of apprehension and develop headache, malaise, fever, and sensory changes at the site of the prior animal-bite wound. Further progression of the disease is marked by paresis or paralysis, inability to swallow and the related hydrophobia, delirium, convulsions, and coma. Death is often due to respiratory paralysis.

Diagnosis and Prevention: Rabies is usually diagnosed with specific immunofluorescent antibody staining of brain tissue, corneal smears, mucosal scrapings or frozen skin-biopsy specimens. Virus isolation (usually from mice injected with tissue from suspected rabid animals) can be used to confirm the diagnosis. Most cases of human rabies in the U.S. result from a lack of identification or recognition of

risks (e.g. contact with bats) and failure to administer treatment. Any bite or scratch from a potentially rabid animal should be reported immediately to the supervisor. Also, the attending veterinarian (ETSU Division of Laboratory Animal Resources) should be notified, so that arrangements can be made for diagnostic evaluation of the biting animal. **Immediate and thorough washing of all bite wounds and scratches with soap and water markedly reduces the likelihood of rabies.** Human rabies immune globulin and rabies vaccine are recommended for bites as well as for exposures that do not involve bites (inhalation of dust in caves with bats) unless the patient has been previously vaccinated.

Preexposure Rabies Prophylaxis: Rabies pre-exposure vaccination is offered at no cost to individuals who have direct contact with unanesthetized dogs and cats and certain wild animals at ETSU. The vaccination consists of a series of three 0.1 ml injection of human diploid cell rabies vaccine (HDCV) into the upper arm on days 0, 7, and 28. Serologic testing for rabies antibodies is performed every two (2) years thereafter. Booster injection of the vaccine is only indicated if the titer falls below the limit recommended by the testing laboratory.

Hypersensitivity reactions to HDCV are possible:

A type I reaction or immediate hypersensitivity reaction is characterized by bronchospasm, laryngeal edema, generalized pruritic rash, urticaria and/or angioedema. Individuals with possible type I reactions should not receive further doses of HDCV.

A type II reaction occurs 2-21 days after a dose of HDCV is received. This delayed allergic reaction is characterized by a generalized pruritic rash or urticaria, arthralgia, arthritis, angioedema, nausea, vomiting, fever and/or malaise. Individuals with presumed type II hypersensitivity reaction should not receive any further doses of HDCV unless they are bitten by a rabid animal or they are likely to be inapparently or unavoidably exposed to the rabies virus.

Reference: Occupational Health and Safety in the Care and Use of Research Animals. National Research Council. National Academy Press 1997. ISBN 309-05299-8