

Occupational Health – Zoonotic Disease Fact Sheets #3

RABIES [(Hydrophobia, Lyssa)]

SPECIES: dogs, cats, cattle, horses & many species used in the laboratory possible

AGENT: Rhabdovirus - causes an acute almost invariably fatal disease.

RESERVOIR AND INCIDENCE: Worldwide distribution (few countries are exceptions). Primary reservoirs vary geographically, e.g. foxes, bats, raccoons, skunks, dogs, cats, cattle, and others. In the U.S. and Canada, wildlife rabies most frequently involves skunks, raccoons, and bats. There has been a progressive epizootic among raccoons in the eastern U.S. for over a decade. Involve wild and domestic species. Mostly wild species involved, only 10% of cases are in domestic animals, 16 cases have been confirmed in nonhuman primates, including chimpanzees, cebus, cynos, and squirrel monkeys. All source countries of NHP's have endemic rabies. In Germany, Paarman described 25 Avian cases of Rabies involving 11 chickens, 2 geese, 1 duck, 1 sparrow, 1 owl, 1 crow, 3 hawks, 1 kite, 1 magpie, and 4 buzzards with Negri bodies observed in only three. In the U.S., the Great Horned Owl may shed the virus in its droppings after consuming an infected skunk. Rodents and lagomorphs are unlikely to have rabies. In the U.S., rabies has been reported 13 times in ferrets since 1958, most often in pet ferrets acquired from pet shops.

TRANSMISSION: Virus laden saliva via bite, scratch, or abrasion. Tissues and fluids in the laboratory. Rabid dogs shed virus in saliva 5-7 days before showing signs. Cat does so for only 3 days before signs. Aerosol transmission has been documented in the laboratory and in caves where bats roost (requires a high concentration of suspended viral particles). Animals showing signs of rabies are usually shedding large amounts of virus.

DISEASE IN ANIMALS: Rabid animals of all species exhibit typical signs of CNS disturbance, with minor variations peculiar to carnivores, ruminants, bats, and man. The clinical course, particularly in dogs, can be divided into 3 phases: the prodromal, the excitative, and the paralytic. The term "furious rabies" refers to animals in which the excitative phase is predominant, and "dumb or paralytic rabies" to those in which the excitative phase is extremely short or absent, and the disease progresses quickly to the paralytic phase. In any animal, the first sign is a change in behavior, which may be indistinguishable from a GI disorder, injury, foreign body in the mouth, poisoning, or an early infectious disease. Temperature change is not significant, and driveling may or may not be noted. Animals usually stop eating and drinking and may seek solitude. Frequently, the urogenital tract is irritated or stimulated as evidenced by frequent urination, erection in the male, and sexual desire. After the prodromal period of 1-3 days, animals either show signs of paralysis or become vicious. Carnivora, pigs, and occasionally, horses and mules bite other animals or people at the slightest provocation. Cattle butt any moving object. The disease progresses rapidly after the onset of paralysis, and death is virtually certain within 10 days of the first signs. Rabid domestic cats and bobcats attack suddenly, biting and scratching viciously. Rabid foxes frequently invade yards or even houses, attacking dogs and people. The irrationality of behavior that can occur is demonstrated in the fox

that attacks a porcupine; finding a fox with porcupine quills can, in most cases, support a diagnosis of rabies. Rabid foxes and skunks are responsible for most pasture cattle losses, and have attacked cattle in barns. The rabid raccoon is characterized by its loss of fear of man, its frequent aggression and incoordination, and its activity during the day, being predominantly a nocturnal animal. In urban areas, they often attack domestic dogs. Bats flying in the daytime are probably rabid.

DISEASE IN MAN: There is usually a history of animal bite. Pain appears at the site of the bite, followed by paresthesias. The skin is quite sensitive to changes of temperature, especially air currents. Attempts at drinking cause extremely painful laryngeal spasm, so that the patient refuses to drink (hydrophobia). The patient is restless and behaves in a peculiar manner. Muscle spasm, laryngospasm, and extreme excitability are present. Convulsions occur. Large amounts of thick tenacious saliva are present.

DIAGNOSIS: Consider Rabies as a possible problem in any wild caught or random-source laboratory animal of unknown vaccination history showing central nervous system signs or symptoms. Virus isolation from body fluid or tissue Fluorescent antibody (FA) staining of tissues, including cornea, frozen skin, mucosal scrapings, as well as brain. Highly specific & rapid. Can now detect different strains (i.e. skunk vs. raccoon origin) via monoclonal antibody analysis which is specific for one antigenic focus on the viral particle. The identifiable strains correlate well with species and geographic distributions observed. This allows identification of source and is an important epidemiological tool. (5 strains have been isolated from terrestrial animals; 2 skunk, 1 raccoon, 1 gray fox, 1 red fox, More than 5 have been isolated from bats.)

TREATMENT: This very severe illness with an almost universally fatal outcome requires skillful intensive care with attention to the airway, maintenance of oxygenation, and control of seizures.

PREVENTION/CONTROL: Vaccination of high-risk personnel recommended. Virus is destroyed rapidly at greater than 50 C and survives no more than a few hours at room temperature (Can persist for years in frozen tissues) Vigorous first aid for bite wounds. Consult Health Authority if suspected exposure. Post-exposure immunization: Up to 50% of human rabies immune globulin is infiltrated around the wound; the rest is administered IM. Human Diploid Cell Vaccine (HDCV) is given as 5 injections IM at days 0, 3, 7, 14, and 28. Control disease in domestic animals by vaccination and enforced animal control measures. Discourage keeping of wild animals as pets. Discourage the vaccination of wild animal pets for rabies.

BIOSAFETY LEVEL: BL-2