

“Natural neurotropic infections in domestic animals as models for the equivalent zoonotic human disease”

Natural neurotropic infections in animals include viruses, bacteria, protozoa, fungi and, very rarely, algae. Some agents are ubiquitous, others are restricted by vector distribution and environmental conditions. Viruses include rabies rhabdovirus, American equine encephalitis alphaviruses (EEE, WEE, VEE in North America), Ross River Fever alphavirus (endemic to Australia, Papua New Guinea and other islands in the South Pacific), West Nile Fever flavivirus, Japanese encephalitis flavivirus (Asia), tickborne encephalitis flavivirus (Northern Europe and Asia), Kunjin flavivirus (Australia), Murray Valley Encephalitis flavivirus (Australia), Henipaviruses (Oceania and Asia). Histologic lesions include polioencephalomyelitis with lymphocytic perivascular cuffs, neuronal necrosis, gliosis and ring hemorrhage. Nonzoonotic viruses with relevant comparative neural pathogenesis include equine herpesvirus 1 (EHV-1), pseudorabies swine herpesvirus 1, Borna disease virus (Mid-Europe), louping ill flavivirus (Albion Highlands). Equine infectious anemia lentivirus mimics the human HIV lesions in horses. Horses are often the target of these viral infections, which are arthropod borne and amplified by some avian species, when the agents are flaviviruses and alphaviruses. Bacterial, parasitic, mycotic and algal agents will produce in both animals and humans the same devastating lesions, which can be necrotizing, suppurative, granulomatous or pyogranulomatous. Eosinophils may be seen with metazoan parasites. These agents may include gram positive and negative bacteria, following sepsis or penetrating wounds, *Halicephalobus gingivalis*, *Angiostrongylus cantonensis*, *Bailisascaris procyonis* (metazoans), *Trypanosoma*, Apicomplexa and amebae (protozoa), *Aspergillus*, *Cryptococcus*, *Blastomyces*, *Histoplasma*, *Coccidioides* (fungi), *Prototheca* (algae). The use of the various available and dependable morphological and molecular diagnostic tests will vary depending on the quantity of the agents in tissues, but histopathology is still the most powerful postmortem diagnostic and experimental tool in the hand of the board certified veterinary pathologist for the detection of these important zoonotic agents.