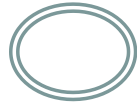


New World and Old World Monkeys

Disease II



Alpha herpesviruses



- B virus (BV), also known as Macacine herpesvirus 1, Herpesvirus simiae, herpesvirus B, monkey B virus, herpes B and previously known as Cercopithecine herpesvirus 1

Alpha herpesviruses



- Monkey B virus (*Cercopithecine herpesvirus 1*; BV) is a macaque α -herpesvirus that is similar to the herpes simplex viruses (HSV1 and HSV2) of humans.

Alpha herpesviruses



- In the natural host, the [virus](#) exhibits [pathogenesis](#) similar to that of [herpes simplex viruses](#) (HSV) in humans.
- Conversely, when humans are [zoonotically](#) infected with *Macacine alphaherpesvirus 1*, patients can present with severe [central nervous system](#) disease, resulting in permanent neurological dysfunction or death.
- Severity of the disease increases for untreated patients, with a [case fatality rate](#) of approximately 80%.
- Early diagnosis and subsequent treatment are crucial to human survival of the infection.

Alpha herpesviruses



- Linked with more than two dozen deaths since its discovery, Macacine alphaherpesvirus 1 **is the only identified nonhuman primate herpesvirus** that displays severe pathogenicity in humans.

Alpha herpesviruses



- Virus is latent in the trigeminal and lumbosacral ganglia.
- Intermittent reactivation and virus shedding may occur during periods of stress.
- Virus is shed in oral and genital secretions and in vesicle fluid. Transmission occurs through bites, scratches, and venereally.

Alpha herpesviruses



- The clinical features are analogous to Herpes simplex infection of humans.
- Disease in macaques is usually mild or asymptomatic.
- Lesions consist of vesicles and ulcers on the oral mucosa and lips and occasionally the conjunctiva.

Alpha herpesviruses



- The mucosal alterations are characterized by ballooning degeneration of epithelial cells with progression to vesicle formation.
- The presence of multinucleated syncytial giant cells with typical eosinophilic intranuclear viral inclusion bodies on the edge of areas of necrosis is pathognomonic.

Alpha herpesviruses



- BV can disseminate to the liver, lung, central nervous system, and other organs leading to severe necrotizing inflammation.
- Transmission to aberrant species can cause often fatal disseminated disease.
- Owl monkeys, marmosets, African green monkeys, Barbary macaques, bonnet monkeys, gibbons, and DeBrazzás monkeys are reported to be susceptible.

Simian varicella virus (SVV) or *Cercopithecine herpesvirus 9*

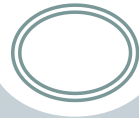


- Simian varicella virus (SVV) causes a natural erythematous disease in Old World monkeys and is responsible for simian varicella epizootics that occur sporadically in facilities housing nonhuman primates.

Simian varicella virus (SVV) or *Cercopithecine herpesvirus 9*



- SVV is closely related to varicella–zoster virus, the causative agent of human varicella and herpes zoster.
- Clinical signs of simian varicella include fever, vesicular skin rash, and hepatitis.
- Simian varicella may range from a mild infection to a severe and life-threatening disease, and epizootics may have high morbidity and mortality rates.



- Skin vesicles result from ballooning degeneration of the epidermis and include multinucleated syncytial giant cells
- The lungs and liver may grossly have a mottled appearance due to hemorrhage, especially in severely infected monkeys.
- Pulmonary pathology may range from mild edema to extensive congestion and hemorrhage with alveolar wall necrosis and thickening, and fibrin formation.
- The liver may exhibit multifocal necrosis and cytoplasmic vacuolation.



- **Viral intranuclear inclusions** are evident in infected alveolar cells and hepatocytes.
- SVV infection may be widespread with histopathology and inflammation apparent in other tissues including the esophagus, kidney, adrenals, and gastrointestinal epithelium.
- SVV antigens and viral DNA and RNA are readily detected in tissues of acutely infected monkeys.

Simian varicella virus (SVV) or *Cercopithecine herpesvirus 9*



- Prompt diagnosis is important for control and prevention of epizootics. Antiviral treatment for simian varicella may be effective if administered early in the course of infection.

Gamma herpesviruses



- Rhesus lymphocryptovirus or *Macacine herpesvirus 4* (RhLCV)
- It is a gammaherpesvirus in the Lymphocryptovirus genus.
- In immunodeficient animals, especially SIV infected rhesus macaques, RhLCV-infection may progress to malignant lymphoma **which is similar to the development of non-Hodgkin lymphoma in HIV-infected AIDS patients.**

Gamma herpesviruses



- Most common are B cell lymphomas that usually develop at extranodal locations, such as the gastrointestinal tract, the central nervous system, the nasal cavity, or in the
- These lymphomas are classified as *centroblastic, immunoblastic, large cell or Burkitt-like lymphomas* periorbital tissue.

Gamma herpesviruses



- A proliferative epidermal lesion termed “**oral hairy leukoplakia**” commonly observed in the oral mucosa and esophagus can be associated with RhLCV infection.
- Oral hairy leukoplakia is characterized by pale swollen acanthocytes causing a raised plaque on the mucosal surface.
- Acidophilic **Cowdry type A intranuclear inclusions** are present in cells in the middle and superficial epithelial layers bearing herpesvirus virions.

Bloody Nose Syndrome



- The “Bloody Nose Syndrome” of rhesus macaques is induced by the oxidase positive diplococcus *Branhamella catarrhalis*.
- The syndrome is most frequently observed in winter and may be associated with low humidity. Usually the disease is selflimiting.

Bloody Nose Syndrome



- It is characterized by **epistaxis and periorbital edema** accompanied by upper respiratory tract signs.
- Lesions consist of **mucohemorrhagic rhinitis** with Gram-negative diplococci in the exudate