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ZEBRA-BORNE EQUINE HERPESVIRUS TYPE 1 (EHV-1) INFECTION IN NON-AFRICAN CAPTIVE MAMMALS

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A 2 year old male polar bear (Gregor) at the Zoo Nuremberg, Germany showed loss of appetite, depression, heavy salivation, difficult breathing and nervous symptoms (seizures) in September 2012. He was treated with penicillin/streptomycin (Veracin[®], Albrecht, Aulendorf, Germany) and dexamethasone (Hexadreson[®], MSD, Unterschleissheim, Germany), and within a few days the symptoms became less evident. The treatment was continued for one month and the symptoms disappeared completely. Equine herpesvirus type 1 (EHV-1) zebra strain was detected in the saliva samples of this male polar bear.

In November 2012, the 20 year old female Indian rhinoceros Purana had an abortion in the mid stage of pregnancy. The necropsy revealed a purulent placentitis and *Streptococcus dysgalactiae* ssp. *equisimilis* and *Streptococcus bovis* I were isolated.

Six days later, Purana suffered from blurred vision, shaky movement, and muscle cramp followed by rapid respiration, nervous manifestations, and bowel prolapse. She was treated with antibiotics, first penicillin/streptomycin parentally and then chloramphenicol (Chevita, Pfaffenhofen, Germany) because of a suspected encephalitis.

Due to the worsening of the CNS symptoms Purana had to be euthanised. A necropsy showed a non-purulent meningo-encephalitis, a bilateral non-purulent optic neuritis, a bilateral non-purulent mixed cellular iridocyclitis and chorioretinitis with a fibrinous component, an ongoing righthand endophthalmitis. Equine herpesvirus type 1 (EHV-1) zebra strain viral DNA was detected. Furthermore, the viral IR6 protein was detected in several tissues, most strongly in lung. Phylogenetic analyses of sequence of gB, IR6, UL45, UL49.5, and DNA polymerase isolated from Purana's tissues were aligned with reference sequences for the same regions of EHV-1, EHV- 9, and EHV-4 confirmed that the virus was nearly identical to a recently described EHV-1 strain that resulted in both non-fatal and fatal encephalitis in polar bears. This represents transmission of EHV-1 to a species that is not naturally sympatric with the natural host of the virus and broadens the host range to Asian non-equid perissodactyls. Thus, the mortality in species that are not con-specifics of zebras may suggest exposure to EHV may yield particularly severe outcomes for non-African mammals. Mixing of geographically dispersed mammals only occurs in zoological collections and circuses which may provide pathogens such as EHV's novel opportunities to disseminate to new hosts. The data suggest that EHV-1 and its close relatives are now prevalent and can infect different animal species with devastating and often fatal outcomes.

The mode of transmission remains unclear. Keepers could be a source of transmission via fomites or clothing, but there is also the possibility that it was transmitted by unknown live or abiotic vectors.