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Editorial

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Ebola lung

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Abbreviations: EBOV, ebola viruses; REBOV, reston ebola virus; ZEBOV, zaire-ebola viruses

Editorial

Ebola viruses (EBOV), the RNA viruses belong to the family Filoviridae, genus Ebola virus. EBOV has been identified in humans, chimps, gorillas, duikers (a small antelope), and recently, pigs. The identification of its reservoir species is unclear, but fruit bats are considered to be the natural reservoir for Ebola viruses in Africa. In 2009, Roger Barrette identified the Reston Ebola virus (REBOV), the only non-African known species of EBOV, was isolated from swine in Philippines, with antibodies against the virus detected in pig farmers. Pigs are remarkably versatile animals when it comes to acquiring and transmitting infections, now at least two types of Ebola viruses. REBOV, in contrast to African species of EBOV, does not cause clinical features in humans and experimentally inoculated pigs, although the EBOV infection may be fatal in cynomolgus macaques. In pigs and swine, EBOV mainly infects the lungs and respiratory tract, implicating a potential for airborne transmission of viruses. Several previous studies revealed that Zaire-Ebola viruses (ZEBOV), the African EBOV can infect pigs, transmit to in-contact pigs, and cause disease. While primates develop systemic infection associated with immune dysregulation resulting in severe hemorrhagic fever. Although there are reports suspecting or indicating aerosol transmission of EBOV from non-human primates to non-human primates or in humans based on epidemiological observations, contact exposure is considered to be the most significant route of infection with EBOV in humans. A variety of laboratory animals have been infected with ZEBOV using aerosols. Several recent studies revealed that infected pigs can efficiently transmit ZEBOV to non-human primates in conditions resembling farm setting. On examination of internal organs at the necropsy exposed damages mainly to the pig's lungs and liver. Microscopic lesions and antigen distribution in the organs are similar to several previous studies, except for the lesions and antigen distribution in the lungs. EBOV antigen is detected extensively in alveolar and sepal macrophages, as well as within pneumocytes and endothelial cells. Viral antigen is also identified within bronchiolar epithelial cells with adjacent segmental loss of epithelial cells and within respiratory epithelial cells of the trachea. The immunological staining for EBOV and the pattern of the lesions in lungs indicates infection in the lungs both, via respiratory epithelium and due to viremic spread of the EBOV. Interstitial pneumonitis is characterized by thickening and hyper cellular alveolar septa due to infiltration by primarily macrophages, with multifocal areas of alveolar edema and hemorrhage. Although viral antigen is detected only in alveolar macrophages of both species, there is remarkable difference in the type and quantity of cells infiltrating the lungs between the pigs and macaques. While large quantities of non-infected lymphocytes are recruited into the pig's lungs, macrophages/monocytes are essentially the only leukocyte type infiltrating the lungs in non-human primates. This phenomenon can be linked to the difference of the clinical features in these two animal species: systemic disease with no major respiratory manifestations in non-human primates versus respiratory distress in pigs (more severe in a specific age group). It will be significant to identify the similarities and differences in ZEBOV-induced pathogenesis and pathology between the non-human primates and pigs.

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Conflict of interest

The author declares no conflict of interest.

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