



Infectious Agent Sheet: Zika Virus (ZIKV)

Zika virus is transmitted primarily through infected mosquitoes. The illness is usually mild, and mortality is uncommon. Infection during pregnancy can cause fetal microcephaly or other brain defects. A diagnosis can only be confirmed through laboratory tests on blood or other body fluids.

Classification

Enveloped, single-stranded, positive-sense RNA

Family

Flaviviridae

Affected Species

Human and nonhuman primates (NHPs)

Frequency

Risk of infection for NHPs in the United States is low. Several cases of human infections in the southern U.S., including Florida, were first reported in July 2016. The prevalence of Zika virus in monkeys and other nonhuman primates is currently unknown.

Transmission

Zika virus, first identified in Uganda in 1947, is transmitted to humans primarily through the bite of an infected *Aedes* species mosquitoes. These mosquitoes also spread dengue and chikungunya viruses, and are aggressive daytime biters (but bite at nighttime, too). Zika may also be contracted through sexual intercourse with an infected male, and be passed from a pregnant woman to her fetus. Zika spread through blood transfusion and lab exposure is currently being studied.

NHPs are also susceptible to Zika infections, and may get infected in the same way as humans. The risk of contracting Zika is highest in areas where mosquitoes lay eggs and breed; e.g., standing water or animal dishes.

Clinical Signs and Lesions

In humans, the most common symptoms of Zika are fever, rash, joint pain and conjunctivitis (red eyes). The illness is usually mild, and symptoms may last for several days to a week. Mortality is uncommon. For this reason, many people might not realize they have been infected. However, Zika virus infection during pregnancy can cause a serious birth defect called microcephaly, as well as other severe fetal brain defects. Once a person has been infected, he or she is likely to be protected from future infections due to protective antibodies.

More research is required to better understand the effects of Zika virus on NHPs, and several projects to study the effects of Zika infection on NHP fetuses are underway at different primate centers in the United States.

Diagnosis

In humans, recent history of travel can be important, especially in areas with active Zika virus transmission. While infection with Zika virus may be inferred based on symptoms (which are similar to those seen in dengue and chikungunya infections), a diagnosis can only be confirmed through laboratory tests on blood or other body fluids, such as urine, saliva or semen.

Zika serology assays may pick up cross-reacting dengue and/or other flavivirus antibodies; therefore, a positive Zika serology finding can only confirm a flavivirus infection. PCR-based assays can distinguish between various flaviviruses, including Zika, and should be utilized to confirm Zika infections in cases of positive serology findings.

Interference with Research

Although Zika virus was first discovered in an NHP with a mild fever in the Zika Forest of Uganda, they normally don't show any signs of illness at all. Experimentally-infected NHPs show a mild, transient fever without any other major symptoms. Microcephaly has not been common in NHP populations in areas of high Zika virus transmission; however, more research is needed to better understand Zika virus and microcephaly in NHP pregnancy.

Prevention and Treatment

Avoid mosquito bites by using insect repellents containing N,N-Diethyl-meta-toluamide, also called DEET or diethyltoluamide (e.g., Cutter and Sawyer), and picaridin (e.g., Cutter Advanced and Bug Guard Plus). Standing pools/bodies of water near homes and NHP colonies are mosquito breeding grounds and should be covered or sprayed to kill mosquitoes.

Zika virus is usually mild and requires no specific treatment in humans. Currently, there are no vaccines available, but several pharmaceutical companies are working on them. People sick with Zika virus should get plenty of rest, drink enough fluids, and use OTC analgesics like acetaminophen or ibuprofen to treat pain and fever. Similar precautions and treatment may also be useful in NHPs.

References

<https://www.cdc.gov/zika/index.html>

<http://www.who.int/mediacentre/factsheets/zika/en/>

Hayes EB. *Zika Virus Outside Africa: Emerging Infectious Diseases*. 2009, 1347pp.

Lanciotti RS, Kosoy OL, Laven JJ, Velez JO, Lambert AJ, Johnson AJ, et al. *Genetic and serologic properties of Zika virus associated with an epidemic, Yap State, Micronesia, 2007: Emerging Infectious Diseases* 2008, 1232pp.