Zika Virus, PRVABC59_BC, Barcoded

Catalog No. NR-51174

For research use only. Not for human use.

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Manufacturer:

BEI Resources

Product Description:

Virus Classification: *Flaviviridae*, *Flavivirus*
Species: Zika virus
Strain/Isolate: PRVABC59_BC barcoded (also known as ZIKV-BC-1.0)[1-3]
Comments: NR-51174 was constructed by introducing a genetic barcode consisting of 8 consecutive degenerate codons into a region of non-structural protein 2a (NS2a; nucleotide position 4008-4031) of the Zika virus (ZIKV), strain PRVABC59.[1-3] Following bacteria-free cloning and rolling circle amplification (RCA), linearized and purified RCA products were used for production of "synthetic swarm" virus via transfection. This synthetic swarm consists of viruses that are genetically identical except for the degenerate nucleotides in NS2a region with ~64,000 theoretical combinations, all encoding for the same amino acid sequence.[1-3] Zika virus (ZIKV), PRVABC59 was isolated from the blood of a human in Puerto Rico in December 2015.[4] The complete genomic sequence of ZIKV, PRVABC59 has been determined (GenBank: KU501215).[4]

ZIKV is a member of the Spondweni serocomplex of mosquito-borne flaviviruses. ZIKV is vectored primarily by *Aedes* spp., but has also been isolated from *Anopheles*, *Eretmapodites*, and *Mansonia* mosquitoes.[5] Phylogenetic analyses indicated that there are two major lineages of ZIKV, African and Asian.[6] A third lineage circulating in West Africa was recently described.[7]

The first human infections with ZIKV were reported in Nigeria in 1954.[8] Only sporadic infections were seen until 2007, when a large outbreak occurred in Yap State, Federated States of Micronesia.[9] There was another large outbreak in French Polynesia in 2013, concomitant with a Dengue fever epidemic,[10,11] and the virus has subsequently spread throughout the South Pacific.[12-15] Autochthonous transmission of ZIKV in Brazil was reported early in 2015,[16,17] and has since been reported in countries throughout Central America and the Carribean. It seems likely that the Asian lineage of ZIKV was introduced into Brazil by travelers from one or more Pacific Island countries.[18] The outbreak in the Americas has become the most widespread in history. An estimated 80% of human ZIKV infections are asymptomatic, and symptomatic disease is generally mild and characterized by fever, maculopapular rash, arthralgia, and nonpurulent conjunctivitis. However, ZIKV infections were confirmed in infants with microcephaly,[19] outbreaks in Brazil and elsewhere have been accompanied by a marked increase in the number of children born with microcephaly,[20] and sufficient evidence has since accumulated to infer a causative relationship between prenatal ZIKV infection and microcephaly and other severe brain anomalies.[21] The full teratogenic potential of ZIKV, the absolute and relative risks among infants exposed to ZIKV *in utero*, and factors that may modify these risks remain to be determined.

Material Provided:

Each vial contains approximately 1 mL of cell lysate and supernatant from human embryonic kidney cells (293T; ATCC® CRL-3216™) infected with ZIKV, PRVABC59_BC, barcoded.

Note: If homogeneity is required for your intended use, please purify prior to initiating work.

Packaging/Storage:

NR-51174 was packaged aseptically in screw-capped plastic cryovials. The product is provided frozen and should be stored at -60°C or colder immediately upon arrival. For long-term storage, the vapor phase of a liquid nitrogen freezer is recommended. Freeze-thaw cycles should be avoided.

Growth Conditions:

Host: *Cercopithecus aethiops* kidney epithelial cells (Vero; ATCC® CCL-81™)
Growth Medium: Eagle's Minimum Essential Medium containing Earle's Balanced Salt Solution, non-essential amino acids, 2 mM L-glutamine and 1 mM sodium pyruvate supplemented with 2% fetal bovine serum, or equivalent
Infection: Cells should be 60% to 80% confluent; thaw virus rapidly in a 37°C water bath; adsorb diluted virus to cells for one hour at 37°C.
Incubation: 5 to 8 days at 37°C and 5% CO_2
Cytopathic Effect: Cell rounding and detachment

Citation:

Acknowledgment for publications should read "The following reagent was obtained through BEI Resources, NIAID, NIH: Zika Virus, PRVABC59_BC, Barcoded, NR-51174."

Biosafety Level: 2

Appropriate safety procedures should always be used with this material. Laboratory safety is discussed in the following publication: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, and National Institutes of Health. Biosafety in Microbiological and Biomedical Laboratories. 5th ed. Washington, DC: U.S. Government Printing Office, 2009; see www.cdc.gov/biosafety/publications/bmbl5/index.htm.

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References:

1. Ebel, G. D., Personal Communication.
2. Weger-Lucarelli, J., et al. "Using Barcoded Zika Virus to Assess Virus Population Structure *in vitro* and in *Aedes aegypti* Mosquitoes." Virology 521 (2018): 138-148. PubMed: 29935423.
3. Aliota, M. T., et al. "Molecularly Barcoded Zika Virus Libraries to Probe *in vivo* Evolutionary Dynamics." PLoS Pathog. 14 (2018): e1006964. PubMed: 29590202.
4. Lanciotti, R. S., et al. "Phylogeny of Zika Virus in Western Hemisphere, 2015." Emerg. Infect. Dis. 22 (2016): 933-935. PubMed: 27088323.
5. Grard, G., et al. "Genomics and Evolution of *Aedes*-Borne Flaviviruses." J. Gen. Virol. 91 (2010): 87-94. PubMed: 19741066.
6. Haddow, A. D., et al. "Genetic Characterization of Zika Virus Strains: Geographic Expansion of the Asian Lineage." PLoS Negl. Trop. Dis. 6 (2012): e1477. PubMed: 22389730.
7. Berthet, N., et al. "Molecular Characterization of Three Zika Flaviviruses Obtained from Sylvatic Mosquitoes in the Central African Republic." Vector Borne Zoonotic Dis. 14 (2014): 862-865. PubMed: 25514122.
8. McNamara, F. N. "Zika Virus: A Report on Three Cases of Human Infection During an Epidemic of Jaundice in Nigeria." Trans. R. Soc. Trop. Med. Hyg. 48 (1954): 139-145. PubMed: 13157159.
9. Lanciotti, R. S., et al. "Genetic and Serologic Properties of Zika Virus Associated with an Epidemic, Yap State, Micronesia, 2007." Emerg. Infect. Dis. 14 (2008): 1232-1239. PubMed: 18680646.
10. Cao-Lormeau, V. M., et al. "Zika Virus, French Polynesia, South Pacific, 2013." Emerg. Infect. Dis. 20 (2014): 1085-1086. PubMed: 24856001.
11. Baronti, C., et al. "Complete Coding Sequence of Zika Virus from a French Polynesia Outbreak in 2013." Genome Announc. 2 (2014): e0050014. PubMed: 24903869.
12. Heang, V., et al. "Zika Virus Infection, Cambodia, 2010." Emerg. Infect. Dis. 18 (2012): 349-351. PubMed: 22305269.
13. Pyke, A. T., et al. "Imported Zika Virus Infection from the Cook Islands into Australia, 2014." PLoS Curr. 6 (2014): ecurrents.outbreaks.4635a54dbffba2156fb2fd76dc49f65e. PubMed: 24944843.
14. Dupont-Rouzeyrol, M., et al. "Co-Infection with Zika and Dengue Viruses in 2 Patients, New Caledonia, 2014." Emerg. Infect. Dis. 21 (2015): 381-382. PubMed: 25625687.
15. Tognarelli, J., et al. "A Report on the Outbreak of Zika Virus on Easter Island, South Pacific, 2014." Arch. Virol. 161 (2016): 665-668. PubMed: 26611910.
16. Zanluca, C., et al. "First Report of Autochthonous Transmission of Zika Virus in Brazil." Mem. Inst. Oswaldo Cruz 110 (2015): 569-572. PubMed: 26061233.
17. Campos, G. S., A. C. Bandeira, and S. I. Sardi. "Zika Virus Outbreak, Bahia, Brazil." Emerg. Infect. Dis. 21 (2015): 1885-1886. PubMed: 26401719.
18. Musso, D. "Zika Virus Transmission from French Polynesia to Brazil." Emerg. Infect. Dis. 21 (2015): 1887. PubMed: 26403318.
19. CDC. "CDC Health Advisory: Recognizing, Managing, and Reporting Zika Virus Infections in Travelers Returning from Central America, South America, the Caribbean and Mexico." Atlanta, Georgia: US Department of Health and Human Services, CDC. 2016. https://emergency.cdc.gov/han/han00385.asp.
20. Mlakar, J., et al. "Zika Virus Associated with Microcephaly." New Engl. J. Med. 374 (2016): 951-958. PubMed: 26862926.
21. Rasmussen, S. A., et al. "Zika Virus and Birth Defects – Reviewing the Evidence for Causality." New Engl. J. Med. 374 (2016): 1981-1987. PubMed: 27074377.

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