

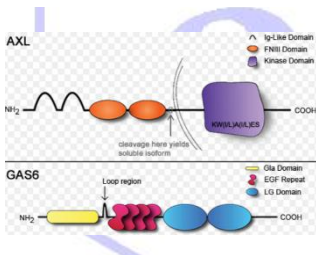
## Zika Virus Vaccine, ELISA Kits, Recombinant Proteins, and Antibodies



**Zika virus** was first isolated in 1947 from a monkey in Zika forest in Uganda. Zika virus has been known to infect humans since and a serological survey in 1952 found 50 people out of 84 had developed antibodies. Zika then spread to many African and Asian countries. Since April 2015, a large, ongoing outbreak of Zika virus that began in Brazil has spread to much of South and Central America and the Caribbean. Only 1 in 5 people (20%) show any symptoms whatsoever, and those usually involve a low-grade fever, sore body, headache, and sometimes a rash. Zika is causing an alarm because of its association with birth defects or microcephaly (small head or incomplete brain development) in newborn babies by mother-to-child transmission, as well as a stronger one with neurologic conditions in infected adults, including cases of **Guillain-Barré syndrome (GBS)**. CDC found Zika in the brains of two babies with microcephaly and evidence of Zika in two pregnancies that ended in miscarriage.



Zika virus (ZIKV) is a member of the virus family Flaviviridae and the genus *Flavivirus* (*flavus* means yellow), transmitted by daytime-active *Aedes* mosquitoes, such as *A. aegypti* and *A. albopictus*. Zika virus is related to the dengue, yellow fever, Japanese encephalitis, and West Nile viruses. Like other flaviviruses, Zika virus is enveloped and icosahedral and has a non-segmented, positive-sense ss-RNA genome. There are two lineages of the Zika virus: The African lineage, and the Asian lineage. Phylogenetic studies indicate that the virus spreading in the Americas is most closely related to the Asian strain. Effective **vaccines** for yellow fever virus, Japanese encephalitis, and tick-borne encephalitis have been developed but there are **no vaccines for Zika virus**.



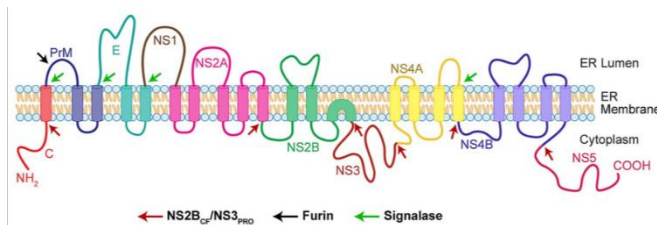
**Axl** (from the Greek word *anexelekto*, or uncontrolled), is a receptor tyrosine kinase with a structure novel among tyrosine kinases. Axl is also known as Tyrosine-protein kinase receptor **UFO** (unidentified function of this protein). Axl protein represents a unique structure of the extracellular region that juxtaposes IgL and FNIII repeats. It transduces signals from the extracellular matrix into the cytoplasm by binding growth factors like vitamin K-dependent protein **growth-arrest-specific gene 6 (GAS6)**; human 721-aa, mouse 674-aa). Gas6 is a gamma-carboxyglutamic acid (Gla) domain-containing protein thought to be involved in the stimulation of cell proliferation. This receptor can also mediate cell aggregation by homophilic binding. The Axl gene is evolutionarily conserved between vertebrate species. AXL (human 894-aa; 1-451-aa Extracellular domain) is highly expressed by human radial glial cells, astrocytes, endothelial cells, and microglia in developing human cortex and by progenitor cells in developing retina.

Expression analyses suggest that AXL may serve as a receptor for Zika virus. Recombinant Axl proteins (human and mouse) as well as monoclonal and polyclonal anti-Axl antibodies are available to understand the importance of Axl association with Zika infection.

### Zika Virus Information & Video

[https://commons.wikimedia.org/w/index.php?title=File%3AZika\\_virus\\_video\\_osmosis.webm](https://commons.wikimedia.org/w/index.php?title=File%3AZika_virus_video_osmosis.webm)  
<http://www.cdc.gov/media/dpk/2016/dpk-zika-virus.html>

**Diagnosis** - Unlike other flaviviruses, not much is commercially available for Zika virus's recombinant proteins, antibodies, and diagnostic ELISA kits. For now, diagnosis confirmed by detecting the viral DNA by PCR. During the **Ebola and MERS** emergence in 2014, ADI was the first company to develop many recombinant proteins and antibodies that were used to develop antibody ELISA kits. These kits played a critical role in testing the Ebola vaccines (Rampling T et al, 2015, A Monovalent Chimpanzee Adenovirus Ebola Vaccine — Preliminary Report, *New Eng. J. Med.* DOI: 10.1056/NEJMoa1411627; Huttner A, 2015, The effect of dose on the safety and immunogenicity of the VSV Ebola candidate vaccine: a randomized double-blind, placebo-controlled phase 1/2 trial, *Lancet* 15, 1156-1166).

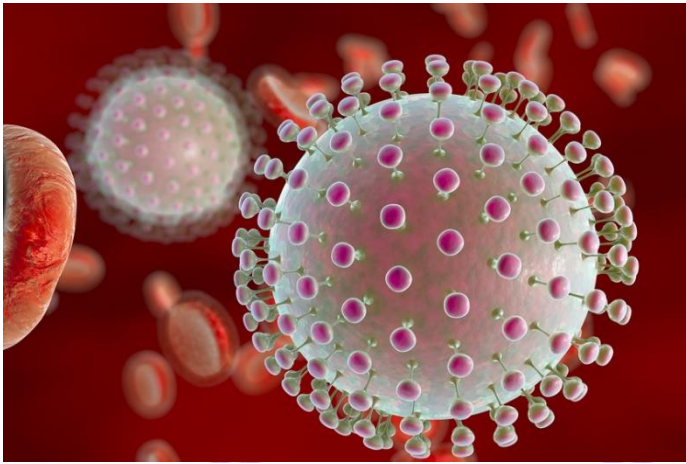


The Zika virus is a positive sense ss-RNA (25-30 nm, ~11kb). Zika virus genome codes for a polyprotein that is subsequently cleaved into capsid (**C**), precursor membrane (**prM**), envelope (**E**), and non-structural proteins (**NS1-5**). The E protein composes the majority of the virion surface and is involved with aspects of replication such as host cell binding and membrane fusion. NS1, NS3, and NS5 are large, highly-conserved proteins while the NS2A, NS2B, NS4A, and NS4B proteins are smaller, hydrophobic proteins. Like other

flaviviruses, both structural and non-structural protein antibodies are detected during Zika virus infection. The member of flaviviruses share 40-60% protein sequence conservation. Vaccines have become available for JEV, YFV, and Dengue. Therefore, it is important to rule out the presence of Zika antibodies due to vaccination and/or infection from related viruses.

**About ADI's Zika Virus ELISA Kits** - We have cloned and expressed several Zika viral proteins (Capsid, Envelope, prM, and NS1) antibodies, and developed ELISA kits for the detection and measurement of Zika related antigens and antibodies. These ELISA kits will help develop and test Zika virus vaccines in animals and humans. ADI's Zika antibody ELISA kits contain highly purified recombinant proteins and antibodies. All reagents and ELISA kits are 'For research use only (RUO), not for diagnosis, cure or prevention of the disease. Additional ELISA kits and antibodies are available for Ebola vaccine vectors (Adenovirus, VSV, and Rabies virus proteins) to determine efficacy of Ebola vaccines.

## Zika Virus ELISA Kits, Recombinant proteins and Antibodies



Flaviviruses are known to induce antibodies to several **structural (Envelop, prM, and capsid)** and **non-structural** proteins (**NS1**). In general, IgM antibodies are made soon after the virus exposure and IgG antibodies are persist longer. However, there is very little known about the etiology and utility of the Zika virus antibodies. ADI is making available a number of ELISA kits to help understand the Zika virus infection and test available vaccines or therapeutic interventions.

Zika Virus Vaccine Related ELISA kits (See Details at the website)

(See Details at the website) [http://4adi.com/commerce/catalog/spcategory.jsp?category\\_id=2880](http://4adi.com/commerce/catalog/spcategory.jsp?category_id=2880)

| Product Description   | Species | IgG cat # | IgG1 cat #    | IgG2 cat #     | IgM cat # |
|---|---------|-----------|---------------|----------------|-----------|
| RecombiVirus™ Zika Virus <b>Envelop antibody</b> ELISA kits, Quantitative, 96 tests   | Human   | RV-403100 | RV-403100-HG1 | RV-403100-HG2  | RV-403105 |
|   | Monkey  | RV-403110 |               |                |           |
|   | Mouse   | RV-403120 | RV-403120-MG1 | RV-403120-MG2A | RV-403125 |
|   | Rabbit  | RV-403130 |               |                |           |
| RecombiVirus™ Zika Virus <b>Envelop Domain III</b> ELISA kits, Quantitative, 96 tests | Human   | RV-403150 | RV-403150-HG1 | RV-403150-HG2  | RV-403155 |
|   | Monkey  | RV-403160 |               |                | RV-403165 |
|   | Mouse   | RV-403170 | RV-403170-MG1 | RV-403170-MG2A | RV-403175 |
|   | Rabbit  | RV-403180 |               |                | RV-403185 |
| RecombiVirus™ Zika Virus <b>PrM antibody</b> ELISA kits, Quantitative, 96 tests       | Human   | RV-403200 | RV-403200-HG1 | RV-403200-HG2  | RV-403205 |
|   | Monkey  | RV-403210 |               |                | RV-403215 |
|   | Mouse   | RV-403220 | RV-403220-MG1 | RV-403220-MG2A | RV-403225 |
|   | Rabbit  | RV-403230 |               |                | RV-403235 |
| RecombiVirus™ Zika Virus <b>NS1 antibody</b> ELISA kits, Quantitative, 96 tests       | Human   | RV-403300 | RV-403300-HG1 | RV-403300-HG2  | RV-403305 |
|   | Monkey  | RV-403310 |               |                | RV-403315 |
|   | Mouse   | RV-403320 | RV-403320-MG1 | RV-403320-MG2A | RV-403325 |
|   | Rabbit  | RV-403330 |               |                | RV-403335 |
| RecombiVirus™ Zika Virus <b>Capsid antibody</b> ELISA kits, Quantitative, 96 tests    | Human   | RV-403400 | RV-403400-HG1 | RV-403400-HG2  | RV-403405 |
|   | Monkey  | RV-403410 |               |                | RV-403415 |
|   | Mouse   | RV-403420 | RV-403420-MG1 | RV-403420-MG2A | RV-403425 |
|   | Rabbit  | RV-403430 |               |                | RV-403435 |

**\*\*Notes:** The above ELISA kits contain recombinant protein made and purified from E. coli or sf9 host cells. There is no Zika virus (live or killed). All of the above kits are for in vitro research use only (RUO), not for diagnostic or therapeutic use.

## Zika Virus Vaccine Related Antibodies, Proteins and other Reagents

(See Details at the website) [http://4adi.com/commerce/catalog/spcategory.jsp?category\\_id=2880](http://4adi.com/commerce/catalog/spcategory.jsp?category_id=2880)

| Type                  | Catalog#   | Product Description   | Product Type    |
|-----------------------|--|---|-----------------|
| Zika Env              | ZENV15-R-10  | Recomb. ( <b>E. coli</b> ) Zika Virus <b>Envelop Protein</b> (African, full length, >95%, his tag) for ELISA/Western                | Rec. protein    |
|                       | ZENV16-R-10  | Recomb. (Sf9) Zika Virus Envelop Protein (African, full length, ~50 Kda, >95%, his tag) for ELISA                                   | Rec. protein    |
|                       | ZENV17-R-10  | Recomb. (HEK) Zika Virus Envelop Protein domain III (Brazil, ~13 kda >95%, his tag, low endotoxin) for ELISA                        | Rec. protein    |
|                       | ZENV11-S   | Rabbit Anti-Zika Virus <b>Envelop Protein</b> (African) antiserum   | Antibodies      |
|                       | ZENV11-C   | Recomb. ( <b>E. coli</b> ) Zika Virus <b>Envelop Protein</b> (African, control for Western  | Western control |
|                       | ZENV12-M   | Mouse Monoclonal Anti-Zika Virus Envelope Protein (African) IgG #1  | Antibodies      |
|                       | ZENV12-BTN   | Mouse Monoclonal Anti-Zika Virus Envelope Protein (African) IgG #1- <b>Biotinylated</b>   | Antibodies      |
|                       | ZENV13-M   | Mouse Monoclonal Anti-Zika Envelope Protein (African) IgG #2  | Antibodies      |
|                       | ZENV13-BTN   | Mouse Monoclonal Anti-Zika Envelope Protein (African) IgG #2- <b>Biotinylated</b>   | Antibodies      |
| Zika Eng (domain III) | ZEND19-BTN   | Recomb. ( <b>HEK</b> ) Zika Envelop Protein <b>domain III-Biotinylated</b> (Brazil, ~13 kda >95%, his tag, low endotoxin) for ELISA | Rec. protein    |
|                       | ZEND20-A   | Rabbit Anti-Zika Envelop <b>DIII</b> IgG, pure  | Antibodies      |
|                       | ZEND20-BTN   | Rabbit Anti-Zika Envelop <b>DIII</b> IgG-biotinylated   | Antibodies      |
|                       | ZEND21-M   | Mouse Monoclonal Anti-Zika Envelop <b>DIII</b> IgG, pure  | Antibodies      |
|                       | ZEND21-BTN   | Mouse Monoclonal Anti-Zika Envelop <b>DIII</b> IgG-biotinylated   | Antibodies      |
| Zika prM              | ZPRM15-R-10  | Zika Virus <b>prM Protein</b> (African, >95%, synthetic, no tag) for ELISA/Western  | Rec. protein    |
|                       | ZPRM11-S   | Rabbit Anti-Zika Virus <b>prM Protein</b> (African, >95%) antiserum   | Antibodies      |
|                       | ZPRM11-C   | Zika Virus <b>prM Protein</b> (African) control for Western blot  | Western control |
| Zika Capsid           | ZCAP17-P   | Zika Virus Capsid immunodominant region (African, >95%, no tag) for ELISA   | Peptides        |
|                       | ZCAP17-S   | Rabbit Anti-Zika Virus <b>Capsid immunodominant peptide</b> (African) antiserum   | Antibodies      |
| Zika NS1              | ZNS115-R-10  | Recomb. ( <b>E. coli</b> ) Zika <b>NS1 Protein</b> (African, full length, >95%, his tag) for ELISA/Western                          | Rec. protein    |
|                       | ZNS117-R-10  | Recomb. ( <b>Sf9</b> ) Zika <b>NS1 Protein</b> (African, full length, >95%, his tag) for ELISA                                      | Rec. protein    |
|                       | ZNS117-R-BTN   | Recomb. ( <b>Sf9</b> ) Zika Virus <b>NS1 Protein-Biotinylated</b> (African, full length, >95%, his tag) for ELISA                   | Rec. protein    |
|                       | ZNS118-R-10  | Recomb. ( <b>HEK</b> ) Zika Virus <b>NS1 Protein</b> (Brazil, full length, >95%, his tag) for ELISA/Western                         | Rec. protein    |
|                       | ZNS118-R-BTN   | Recomb. ( <b>HEK</b> ) Zika Virus <b>NS1 Protein-Biotinylated</b> (Brazil, full length, >95%, his tag) for ELISA/Western            | Rec. protein    |
|                       | ZNS111-S   | Rabbit Anti-Zika Virus ( <b>E. coli</b> ) <b>NS1 Protein</b> (African) antiserum  | Antibodies      |
|                       | ZNS111-C   | Recomb. ( <b>E. coli</b> ) Zika Virus <b>NS1 Protein</b> control for Western blot   | Western control |
|                       | ZNS112-M   | Mouse Monoclonal Anti-Zika Virus NS1 Protein (African) #1, aff pure   | Antibodies      |
|                       | ZNS112-BTN   | Mouse Monoclonal Anti-Zika Virus NS1 Protein (African) #1- <b>Biotinylated</b>  | Antibodies      |
|                       | ZNS113-M   | Mouse Monoclonal Anti-Zika Virus NS1 Protein (African) #2, aff pure   | Antibodies      |
| ZNS113-BTN            | Mouse Monoclonal Anti-Zika Virus NS1 Protein (African) #2- <b>Biotinylated</b> | Antibodies  |                 |
| AXL (Zika receptor)   | AXL15-R-10   | Recomb. (HEK) <b>Mouse Axl Protein</b> (1-443aa, >98%, his-tag, low endotoxin)  | Rec. protein    |
|                       | AXL15-R-BTN  | Recomb. (HEK) <b>Mouse Axl Protein-Biotinylated</b> (1-443aa, >98%, his-tag, low endotoxin)   | Rec. protein    |
|                       | AXL16-R-10   | Recomb. (HEK) <b>Human Axl Protein</b> (1-449aa, >98%, his-tag, low endotoxin)  | Rec. protein    |
|                       | AXL16-R-BTN  | Recomb. (HEK) <b>Human Axl Protein -Biotinylated</b> (1-449aa, >98%, his-tag, low endotoxin)  | Rec. protein    |
|                       | AXL11-A  | <b>Rabbit</b> Anti-Mouse AXL protein IgG, aff pure  | Antibodies      |
|                       | AXL11-BTN  | <b>Rabbit</b> Anti-Mouse AXL protein IgG- <b>Biotinylated</b>   | Antibodies      |
|                       | AXL12-A  | <b>Rabbit</b> Anti-Human AXL protein IgG, aff pure  | Antibodies      |
|                       | AXL12-BTN  | <b>Rabbit</b> Anti-Human AXL protein IgG- <b>Biotinylated</b>   | Antibodies      |
|                       | AXL13-M  | <b>Mouse</b> Monoclonal Anti-Human AXL protein IgG, aff pure  | Antibodies      |
|                       | AXL13-BTN  | <b>Mouse</b> Monoclonal Anti-Human AXL protein IgG- <b>Biotinylated</b>   | Antibodies      |
|                       | AB-23085-A   | <b>Rabbit</b> Anti-Human AXL ( <b>phosphoY821</b> ) IgG (aff pure)  | Antibodies      |
| AB-23085-P            | Human AXL ( <b>phosphoY821</b> ) peptide                                       | Peptide   |                 |
| AB-23085-CP           | Human AXL ( <b>non-phospho</b> ) control peptide                               | Peptide   |                 |
| GAS6                  | GAS65-R-10   | Recomb. (HEK) Mouse GAS6 protein (1-674aa, >95%, his-tag)   | Rec. protein    |
|                       | GAS65-R-BTN  | Recomb. (HEK) Mouse GAS6 Protein- <b>Biotinylated</b> (1-674aa, >95%, his-tag)  | Rec. protein    |

ADI also have recombinant proteins ELISA kits for [West Nile Virus](#), [Dengue Viruses](#), [Japanese Encephalitis Virus \(JEV\)](#),  
Zika\_Vaccines\_ELISA\_Flr 160612A