

# Tropical & Vector-Borne Diseases

ANTIGENS & ANTIBODIES FOR COMMERCIAL IMMUNOASSAY DEVELOPMENT



Tropical and vector-borne diseases account for more than 17% of all infectious diseases, causing more than 1 million deaths annually. Recognizing infected patients early in their clinical course is critical to preventing outbreaks. Meridian offers a range of antigens and antibodies suitable for the development of sensitive and specific immunoassays that detect tropical and vector-borne diseases.

## TROPICAL & VECTOR-BORNE DISEASES

- Alphavirus
- *Borrelia burgdorferi* (Lyme)
- *Borrelia garinii*
- Chagas
- Chikungunya
- Dengue
- Ebola
- Japanese Encephalitis Virus
- Lassa Virus - **NEW**
- *Leishmania*
- Leptospirosis
- Malaria
- Marburg Virus
- Mayaro Virus
- Newcastle Disease
- Nipah Virus
- Tick-borne Encephalitis Virus
- West Nile Virus
- Yellow Fever Virus
- Zika Virus

Reagents Suitable for Rapid Assays



### Pairs Table

	CAPTURE	DETECTION		CAPTURE	DETECTION
Dengue Virus NS1	C01914M	C01913M <b>L</b>	Malaria ( <i>P. falciparum</i> HRP-2)	C01584M	C01586M
	C01914M	C01652M <b>L</b>		C01584M	C01585M
	C01652M	C01649M	C01836M	C01837M	
	C01652M	C01650M	Nipah Virus G protein	C01975M <b>R</b>	C01974M
	C01652M	C01651M		ANTIGEN: R01766	
	C01838M	C01961M <b>L</b>	C01912M <b>R</b>	C01906M <b>L</b>	
Ebola NP	C01964M	C01965M	C01912M	C01907M <b>L</b>	
	C01976M	C01978M	C01912M <b>R</b>	C01911M <b>L</b>	
	C01976M	C01979M	C01912M <b>R</b>	C01910M <b>L</b>	
Japanese Encephalitis Virus NS1 (JEV NS1)	C01976M	C01980M	C01912M <b>R</b>	C01909M <b>L</b>	
	C01977M	C01978M	C01906M <b>R</b>	C01911M <b>L</b>	
	C01977M	C01979M	C01906M	C01907M <b>L</b>	
	C01977M	C01980M	Yellow Fever NS1	C01906M <b>R</b>	C01909M <b>L</b>
Malaria (Pan HRP-2)	C01817M	C01816M <b>L</b>		C01906M <b>R</b>	C01910M <b>L</b>
Malaria ( <i>P. falciparum</i> pLDH)	C01833M	C01835M <b>L</b>		C01909M	C01911M <b>L</b>
Malaria (Pan pLDH)	C01834M	C01835M <b>L</b>		C01909M	C01910M <b>L</b>
				C01909M	C01907M <b>L</b>
				C01907M <b>R</b>	C01911M <b>L</b>
				C01907M	C01910M <b>L</b>
				C01910M	C01911M <b>L</b>

R - Reversible | L - Lateral Flow

### Antigen/Antibody Pairs

	ANTIGEN	ANTIBODY
Malaria ( <i>P. falciparum</i> HRP-2)	R01710	C01930M <b>L</b>
	C01914M	C01931M <b>L</b>
	C01838M	C01932M <b>L</b>

# ANTIBODIES

## Alphavirus

C01643M ELISA, IFA

## *Borrelia burgdorferi*

C65551M ELISA, IFA, LF  
C65550M ELISA, IFA, LF  
B65302R ELISA, IFA, IHC(p),  
WB (Rabbit PAb)

## Chikungunya Virus

C01640M ELISA, IFA, LF  
C01641M ELISA, IFA, LF  
C01642M ELISA, IFA, LF

## Chikungunya Virus, Envelope Protein

C01891M ELISA, LF  
C01892M ELISA, LF  
C01893M ELISA, LF  
C01894M ELISA, LF  
C01895M ELISA, LF

## Dengue Virus

C03045M (Types 1, 2, 3, 4) ELISA,  
IFA, DB  
C01551M (Type 2 EP) IFA

## Dengue Virus NS1

C01649M ELISA, IFA, pair  
C01650M ELISA, IFA, pair  
C01651M ELISA, IFA, pair  
C01652M ELISA, IFA, LF, pair  
C01838M ELISA, LF  
C01896M ELISA, LF  
C01899M ELISA, IFA  
C01913M ELISA, IFA, LF, pair  
C01914M ELISA, IFA, LF, pair  
C01898M ELISA, IFA  
C01961M ELISA, LF, pair

## Ebola Virus

C01762M ELISA, LF  
C86037M ELISA, WB, LF  
C86180M ELISA, WB, LF  
C01968M (VP40), ELISA, WB  
C01969M (VP40), ELISA, WB  
C01970M (VP40), ELISA, WB  
C01971M (VP40), ELISA, WB  
C01972M (VP40), ELISA, WB  
C01973M (VP40), ELISA, WB  
C01964M (NP), ELISA, LF, WB, pair  
C01965M (NP), ELISA, LF, WB, pair  
C01966M (NP), ELISA, WB  
C01967M (NP), ELISA, WB

## Japanese Encephalitis Virus (JEV)

C01550M ELISA, IFA

## Japanese Encephalitis Virus NS1 (JEV NS1)

C01976M ELISA, pair  
C01977M ELISA, pair  
C01978M ELISA, pair  
C01979M ELISA, pair  
C01980M ELISA, pair

## *Leptospira biflexa*

B65401R ELISA, IFA (Rabbit PAb)

## Malaria (Pan)

C66509M (pLDH) ELISA, LF  
C01835M (pan pLDH) ELISA, LF, pair  
C01834M (pan pLDH) ELISA, LF, pair

## *Plasmodium falciparum* (Malaria)

C01584M (HRP-2) ELISA, LF, pair  
C01585M (HRP-2) ELISA, LF, pair  
C01586M (HRP-2) ELISA, LF, pair  
C01816M (HRP-2) ELISA, LF, pair  
C01817M (HRP-2) ELISA, LF, pair  
C01836M (HRP-2) ELISA, LF, pair  
C01837M (HRP-2) ELISA, LF, pair  
C01833M (pLDH) ELISA, LF, pair  
C86943M (MSP-1) ELISA, WB  
C01930M (HRP-2) ELISA, LF, pair

## *Plasmodium vivax* (Malaria)

C86328M (CSP) ELISA, WB  
C86634M (MSP1) ELISA, WB  
C86636M (MSP1) ELISA, WB

## Marburg Virus

C01424M ELISA, WB  
C01425M ELISA, WB  
C01426M ELISA, WB  
C86103M ELISA, WB

## Newcastle Disease Virus

C01629M (Ribonucleoprotein) ELISA,  
IFA, IHC  
C86012M (HN Glycoprotein) ELISA, HIA  
C86014M (HN Glycoprotein) ELISA, HIA

## Nipah Virus G Protein

C01974M ELISA, pair  
C01975M ELISA, pair

## West Nile Virus, Envelope Protein

C01538M ELISA, IFA  
C01541M ELISA, IFA  
C01542M ELISA, IFA

## Yellow Fever Virus NS1

C01906M ELISA, LF, pair  
C01907M ELISA, LF, pair  
C01908M ELISA, LF  
C01909M ELISA, LF, pair  
C01910M ELISA, LF, pair  
C01911M ELISA, LF, pair  
C01912M ELISA, LF, pair

## Zika Virus, Envelope Protein

C01860M ELISA, LF  
C01861M ELISA, LF  
C01862M ELISA, LF  
C01863M ELISA, LF  
C01937M ELISA, IFA

## Zika Virus, NS1 Protein

C01864M ELISA, LF  
C01865M ELISA, LF  
C01866M ELISA, LF  
C01867M ELISA, LF, pair  
C01868M ELISA, LF, pair  
C01869M ELISA, LF  
C01870M ELISA, LF  
C01887M ELISA, IFA, LF, pair  
C01888M ELISA, IFA, LF, pair  
C01889M ELISA, IFA, LF, pair  
C01890M ELISA, IFA, LF, pair  
C01885G ELISA, PAb (Goat), Total IgG  
C01886G ELISA, PAb (Goat), Affinity  
Purified



# ANTIGENS

## ***Borrelia afzelii***

R14210, Native	ELISA, WB
R01576, <i>E.coli</i>	(Osp-C) ELISA, WB
R01609, <i>E.coli</i>	(VlsE) ELISA, WB
R01707, <i>E.coli</i>	(p41), ELISA, WB

## ***Borrelia burgdorferi***

R8A131, <i>E.coli</i>	(Osp-A) ELISA, LF
R8A123, <i>E.coli</i>	(Osp-C) ELISA, LF
R01523, <i>E.coli</i>	(VlsE) ELISA, WB
R01526, <i>E.coli</i>	(p14 Flagellin), ELISA, LF, WB

## ***Borrelia garinii***

R01521, <i>E.coli</i>	(p14 Flagellin) ELISA, LF, WB, DB
R01610, <i>E.coli</i>	(VlsE) ELISA, LF, CLIA, WB

## **Chagas (*Trypanosoma cruzi*)**

R01589, <i>E.coli</i>	(FRA) ELISA, LF, WB
R01587, <i>E.coli</i>	(1F8) ELISA, LF, WB

R01436, <i>E.coli</i>	(1F8) ELISA, LF
R01364, <i>E.coli</i>	(PEP-2, TcD, TcE and SAPA) ELISA, LF

R01684, <i>E.coli</i>	(Chimeric) ELISA, LF
R01685, <i>E.coli</i>	(Chimeric) ELISA, LF

## **Chikungunya Virus**

R01653, Insect	(W.T. gp E1) ELISA, LF, WB
R01654, Insect	(mutant gp E1) ELISA, LF, WB

R01702, Insect	(E2) ELISA, LF, WB
R01703, <i>E.coli</i>	(Capsid) ELISA, LF, WB
R01704, <i>E.coli</i>	(Capsid) ELISA, LF, WB
R01711, Insect	(E1-E2) ELISA, LF
R01768, Insect	(E1, E2, E3) ELISA

## **Dengue Virus Type 1**

R01687, Native	ELISA, LF
R01656, Drosophila	(NS1) ELISA, LF
R01659, Drosophila	(Envelope) ELISA, LF

## **Dengue Virus Type 2**

R02220, Native	ELISA, LF
R01432, <i>E.coli</i>	(NS1) ELISA, LF
R01657, Drosophila	(NS1) ELISA, LF, WB
R01660, Drosophila	(Envelope) ELISA, LF
R01431, <i>E.coli</i>	(Envelope) ELISA, LF
R01767, Insect	(prM Envelope) ELISA

## **Dengue Virus Type 3**

R01688, Native	ELISA, LF
R01661, Drosophila	(Envelope) ELISA, LF
R01658, Drosophila	(NS1) ELISA, LF

## **Dengue Virus Type 4**

R01689, Native	ELISA, LF
R01662, Drosophila	(Envelope) ELISA, LF
R01591, <i>E.coli</i>	(NS1) ELISA, LF, WB
R01663, Drosophila	(NS1) ELISA, LF

## **Ebola Virus**

R01577, <i>E.coli</i>	(Sudan NP) ELISA, WB, LF
R01578, <i>E.coli</i>	(Zaire NP) ELISA, WB, LF

## **Lassa Virus** NEW!

R01787, Insect	(GP1 protein, Recomb)
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## **Leishmania**

R01513, <i>E.coli</i>	( <i>L. donovani</i> KMP-11) ELISA, WB
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## **Mayaro Virus**

R01779, Insect	(E1 Recomb) ELISA
R01780, Insect	(E3, E2 Recomb) ELISA
R01781, Insect	(E3, E2, E1 Recomb) ELISA

## **Nipah Virus**

R01766, Insect	(G protein) ELISA, pair
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## ***Plasmodium falciparum* (Malaria)**

R01478, <i>E.coli</i>	(HRP-2) ELISA, LF
R01596, <i>E.coli</i>	(HRP-2) ELISA, LF, WB
R01597, <i>E.coli</i>	(pLDH) LF
R01595, <i>E.coli</i>	(pAldolase) LF
R01603, <i>E.coli</i>	(MSP1) ELISA, LF
R01604, <i>E.coli</i>	(MSP1) ELISA, LF
R01710, <i>E.coli</i>	(HRP-2) ELISA, LF, pair

## ***Plasmodium vivax* (Malaria)**

R01439, <i>E.coli</i>	(MSP1) ELISA, LF
R01440, <i>E.coli</i>	(CSP) ELISA, LF
R01598, <i>E.coli</i>	(pLDH) ELISA, LF, WB
R01601, <i>E.coli</i>	(MSP1) ELISA, LF
R01602, <i>E.coli</i>	(MSP1) ELISA, LF

## **Tick-borne Encephalitis Virus**

R18082, <i>E.coli</i>	(Glycoprotein E) ELISA, WB
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## **West Nile Virus**

R8A104, <i>E.coli</i>	ELISA, LF, WB
R8A560, <i>E.coli</i>	(Pre-M) ELISA, LF, WB

## **Yellow Fever**

R01706, Insect	(NS1) ELISA, LF, WB
R01709, Insect	(Envelope) ELISA, LF

## **Zika Virus**

R01635, Insect	(Envelope) ELISA, CLIA, LF
R01636, Insect	(NS1) ELISA, CLIA, LF
9050, Insect	Zero-X-React™ (Modified Envelope) ELISA, LF



## TROUBLESHOOTING & USAGE TIPS

The *Flavivirus* genera (e.g. Dengue, Zika, Japanese Encephalitis Virus, West Nile, etc) share epitopes which induce the development of cross-reactive antibodies. This leads to great difficulty in differentially diagnosing flaviviral infections, especially where flaviviruses co-circulate such as in tropical climates.

**Envelope (E) Protein:** The dominant protein present on a surface of the flavivirus virion and is a major target for neutralizing antibodies. It contains highly conserved regions therefore antibodies directed to the envelope protein tend to be cross-reactive.

**NS1 Protein:** A glycosylated, membrane-associated, secreted glycoprotein with replication and immune evasion functions. NS1 antigens can be detected very early in infection (as early as 1 day post infection). In addition NS1 is serotype-specific, and for viruses such as Dengue where more than one serotype circulates, NS1 antigens enable virus serotyping by ELISA.

### Methods to increase IgG and IgM sensitivity

1. **IgM-Capture Assays:** Use anti-human IgM Fab fragment antibody as the capture (as opposed to a full-length anti-human IgM antibody). More Fab fragment antibodies are able to bind to the surface area of the solid substrate increasing the number of binding sites available for total IgM antibody that can be captured.
2. **Lateral Flow Assays:** Employ the bridging method in which colloidal gold-labelled disease specific antibody (e.g. MAb or PAb to Dengue NS1) is pre-mixed with recombinant antigen (e.g. Dengue NS1) and biotinylated anti-human IgM. Conjugating colloidal gold directly to the antigen can inhibit its ability to bind to captured IgM. Furthermore, using a gold-conjugated PAb, which has a broad reactivity, can further increase assay sensitivity. A PAb can bind to different antigen epitopes therefore enabling more than one PAb to bind to the same antigen simultaneously to generate a stronger signal.

### Reducing cross-reactivity between flaviviruses in EIA assays

To improve assay specificity, it is necessary to remove any cross-reacting antibodies that could bind to the antigen and cause a false result. Defined epitope blocking ELISAs have successfully been used to increase the specificity and for differentiating flaviviral infections through targeting epitopes on NS1 or E protein. By including low concentrations of unconjugated antigens representing the potential cross-reactive species, it is possible to block their binding to the target antigen.

