

# Now Available...

## Test 436 Heartland virus (Phlebovirus) by Real-Time PCR

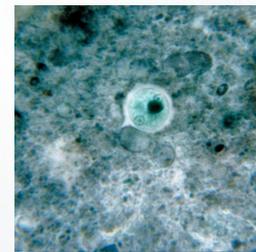
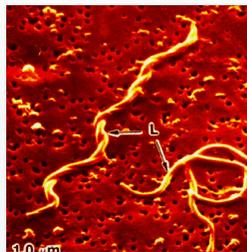
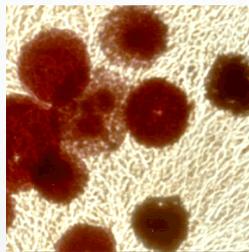
### Acceptable Specimens:



Due to similar clinical presentation, it is important to differentiate between Heartland virus and Human Granulocytic Anaplasmosis (HGE)

### Advantages:

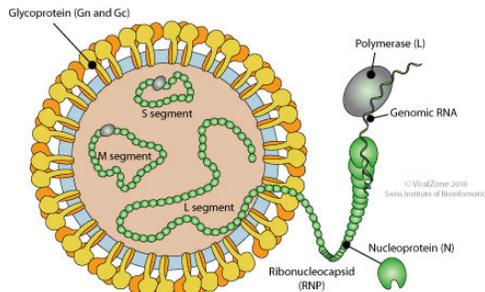
- DNA amplification via Real-Time PCR technology
- High precision robotic accuracy
- High diagnostic sensitivity & specificity
- No refrigeration required before or after collection



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Adapted from Viral Zone 2010

- Currently the modes of transmission and spectrum of clinical presentation for Heartland virus have not been adequately investigated.

## Pathogenesis

- The pathogenesis of this disease has not been adequately investigated or postulated.

## Clinical Significance

- The clinical presentation that was noted in the patients infected in Missouri closely resembled infection with Human Granulocytic Anaplasmosis and STFSV. The patients presented with fever, fatigue, thrombocytopenia, and diarrhea.

## Laboratory Diagnosis

- Detection of Heartland virus is accomplished by reverse transcriptase Real-Time PCR.
- The probe for the assay was selected using extensive *in silico* analysis using primer design software coupled with cross-reference checks against the available nucleotide database of genes and genomes deposited at the National Center for Biotechnology Information (NCBI) database.
- A thorough and proper validation study was performed. Performance specifications addressed were Sensitivity, Specificity, Interference Analysis, Precision, Accuracy, and Blind Challenges.
- In addition to clinical testing of blood, the Heartland virus assay has been added to our current tick testing panel.

## Treatment Considerations

There is no available treatment for Heartland virus. Recognition may be important to differentiate it from infection with Human Granulocytic Anaplasmosis due to the similar clinical presentation. Clinicians should be aware that co-infections can not be ruled out at this time.

## References

1. McMullan, et. al. 2012. A New Phlebovirus Associated with Severe Febrile Illness in Missouri. *New Engl J Med* 367: 834-841.
2. Centers for Disease Control and Prevention (CDC). Novel Phlebovirus (Heartland virus). <http://www.cdc.gov/ncezid/dvbd/heartland/index.html> Date accessed October 22, 2012
3. Xue-Jie Yu, et. al. 2011. Fever with thrombocytopenia associated with a novel Bunyavirus in China. *N Engl J Med* 364:1523-32.
4. Cohen SB, et al. 2009. *Rickettsia parkeri* in *Amblyomma americanum* Ticks, Tennessee and Georgia, USA. *Emerg Infect Dis* 15(9): 1471-73.

- On August 30, 2012, a new tick-borne viral pathogen was reported in the *New England Journal of Medicine* called the Heartland virus (1).
- The Heartland virus is a phlebovirus of the *Bunyaviridae* family. It is a single-stranded, negative-sense RNA virus.
- The Centers for Disease Control has recognized that this virus has caused human disease in the United States (2).
- The genome is comprised of three segments called L, M, and S. The L segment is 6.4 kb in length and encodes a large RNA-dependent RNA polymerase. The M segment is 3.4 kb in length and encodes a polyprotein that is processed into the viral glycoproteins Gn and Gc, which are used for virion entry and assembly. The S segment is 1.7 kb in length and encodes the nucleoprotein that encapsidates the genomic RNA and a nonstructural (NSs) protein through an ambisense coding strategy.
- There are ten known serogroups within the genus *Phleboviridae*. Heartland virus resides within the Uukuniemi serogroup.
- Infection with *Phleboviridae* result in diverse pathologies, many associated with fever such as Rift Valley Fever.
- Heartland virus shares the greatest genomic homology and clinical presentation with the Severe Thrombocytopenia and Fever Syndrome virus (STFSV) found in China.

## Epidemiology

- This is a newly discovered viral disease. There is no available epidemiologic data. A potential vector may be *Amblyomma americanum* (the Lone Star tick).



Figure 1: Green shading indicates approximate distribution of *Amblyomma americanum* ticks. Adapted from Cohen SB, et al (4).