Cambridge Biomedical

Arbovirus in CSF

Specimen Type	CSF
Specimen Volume	2.5 mL for the panel.
Collection	Sterile CSF collection tube with no additives. Centrifuge the specimen for 10 minutes at 3000 rpm. Remove CSF supernatant and place in a transfer tube. Refer to stability below.
Minimum Volume	1.0 mL for the panel.
Handling	Ship frozen on dry ice.
Rejection Criteria	Contaminated CSF. More than 3 freeze-thaw cycles. Specimens outside of listed stability.
Stability	Refrigerated for 30 days. Frozen for 30 days. Ambient for 48 hours. Stable up to 3 freeze thaw cycles.
Methodology	IFA/ELISA

Reference Ranges

	Arbovirus CSF IgG Panel	**Arbovirus CSF IgM Panel**
St. Louis Encephalitis Ab, IFA	< 1:1	< 1:1
California Encephalitis Ab, IFA	< 1:1	< 1:1
Eastern Equine Encephalitis Ab, IFA	< 1:1	< 1:1
Western Equine Encephalitis Ab, IFA	< 1:1	< 1:1
West Nile Virus Ab, ELISA	< 1.30	< 0.90

Turnaround Time	Up to 7 business days.

CPT Codes

	Panel	**Single**	**Arbovirus CSF IgG**	**Arbovirus CSF IgM**
St. Louis Encephalitis Ab	X		86653	86653
California Encephalitis Ab	X		86651	86651
Eastern Equine Encephalitis Ab	X		86652	86652
Western Equine Encephalitis Ab	X		86654	86654
West Nile Virus Ab, ELISA	X		86789	86788

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Clinical Significance	Arbovirus is a term that refers to any virus transmitted by an arthropod (arthropod borne virus). Arboviruses include St. Louis Encephalitis (SLE), Western Equine Encephalitis (WEE), Eastern Equine Encephalitis (EEE), and California Encephalitis (CE). These are the major mosquito-borne viruses causing human disease in the United States. Infection by these viruses in humans induces an immune response and specific antibody production against the viral antigens. The majority of human cases are diagnosed by serologic means. Infections caused by arboviruses are mostly asymptomatic. The most common clinically apparent manifestation is a mild undifferentiated febrile illness, usually with headache. Only a minority of infected individuals demonstrate central nervous system involvement, with the exception of a more abrupt onset and shorter, more severe course found with EEE. Initial symptoms include headache, fever, malaise, and vomiting. Convulsions are less common in SLE than in CE, WEE, and EEE. Children and older adults are affected by these diseases more often and more severely. Fatality rates are approximately 10% for WEE and SLE, somewhat lower for CE, and 33% for EEE. California Encephalitis group includes several viruses known to cause human disease in the United States. LaCrosse virus infection occurs in north-central States, primarily in the upper Mississippi River Valley. Eastern equine encephalitis virus (EEE) and western equine encephalitis virus (WEE) are within the Alphavirus group. St. Louis encephalitis virus (SLE) is a member of the Flavivirus group of Arbovirus. The family Flavivirus is a large, closely related group containing 23 members. The family's most notable agents include SLE, dengue fever viruses, Japanese encephalitis virus, yellow fever virus, and the Russian spring-summer encephalitis virus. Serological cross-reaction is common between SLE and other Flaviviruses, however, the extent and degree of cross-reaction varies. In patients infected with these or related viruses, IgG antibody is generally detectable within 1 to 3 weeks of onset, peaking within 1 to 2 months, and declining slowly thereafter. IgM class antibody is also reliably detected within 1 to 3 weeks of onset, peaking and rapidly declining within 3 months. Both IgG and IgM antibody status should be determined at the onset of symptoms. In patients infected with arboviruses, IgG antibody is generally detectable within 1 to 3 weeks of onset, peaking within 1 to 2 months, and declining slowly thereafter. IgM class antibody is also reliably detected within 1 to 3 weeks of onset, peaking and rapidly declining within 3 months. Both IgG and IgM antibody status should be determined at the onset of symptoms. Detection of arbovirus-specific antibodies in the cerebrospinal fluid (CSF) may suggest central nervous system infection. However, because it is difficult to distinguish between intrathecal antibodies and serum antibodies introduced into the CSF sample at the time of lumbar puncture or from a breakdown in the blood-brain barrier, positive results should be interpreted in conjunction with other laboratory and clinical data prior to a diagnosis of central nervous system infection.
Principle	The Arbovirus Immunofluorescent Antibody (IFA) in CSF is a 2-stage "sandwich" assay. In the first stage, the patient's CSF is incubated in dedicated slide wells. Following incubation, the slide is washed to remove unbound material. In the second stage, each antigen well is overlaid with fluorescein-labeled antibody to IgG or IgM, depending on the type of assay. The slide is incubated allowing antigen-antibody complexes to react with the fluorescein-labeled anti-IgG or anti-IgM. After the incubation, the slide is washed, dried, mounted, and examined using fluorescence microscopy. Positive reactions appear as bright apple-green fluorescent cells within the background monolayer of unstained cells. This test is qualitative and reports results either as positive or negative.