West Nile Virus Diagnostic Microsphere Immunoassay

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Technology description

The current recommended assays for the identification of West Nile Virus infection of humans are the IgM antibody capture enzyme linked immunosorbent assay (ELISA) and the IgG ELISA. Many laboratories in the US are performing these assays according to protocols recommended by the Centers of Disease Control and Prevention (CDC). This combination of assays is highly sensitive and specific, but requires several days to weeks, and specialized facilities to perform the complete panel of tests. Our nonstructural protein assays can be completed in one day, and give presumptive evidence of current West Nile virus infection. Our three-layer sandwich immunoassay (antigen bead +human antibody + reporter fluorescent antibody) with two key reagents provides three different kinds of results with three variations of one assay including total antibodies (IgG+IgA+IgM) to two recombinant West Nile nonstructural proteins.
A newer, faster method has been developed to detect antibodies to two West Nile Virus nonstructural proteins utilizing a bead-based, flow cytometric immunoassay with multiplex capacity. Utilizing our new method, antibodies elicited by West Nile virus infection can be detected in recombinant West Nile Virus nonstructural proteins by microsphere immunoassays. It's sensitive, cost effective, high-throughput and capable of discriminating current West Nile infection or recent past flavivirus infections with flavivirus vaccines such as the Yellow Fever vaccine or Japanese encephalitis vaccine. Making this even more desirable is that it provides serologic data that would otherwise require a panel of ELISA tests and a plaque reduction neutralization test. Quantitative results are achieved in < 3 hours using 10-20 μl of serum or cerebrospinal fluid (CSF). Validation results are proven in sera from humans, horses, and birds.

Application area

Development of commercial immunoassays for current or recent past West Nile viral infection
Development of commercial serological tests for West Nile infection of horses, with capacity to discriminate active infection in the presence of preexisting antibodies from receipt of vaccine

Advantages

Significantly reduce the time it takes to diagnose a flavivirus infection Replaces current use of IgM MAC-ELISA's and IgG ELISA plus plaque reduction neutralization (PRN) test with a single, equally sensitive, faster test. Volume of CSF fluid needed is less (10-20 μl) Less technician time Less costly Can be multiplexed with other infectious disease analytes Reagents are highly purified in native conformation so "non-specific binding" is minimal to non-existent.

Institution

Health Research Inc

Inventors

Susan J. Wong