CE

Gold Dot NR2 Peptide Test Kit

For in vitro quantitative determination of NR2 peptide fragment of NMDA receptor in plasma

Intended Use

The Gold Dot NR2 Peptide test is a magnetic particle-based enzyme-linked immunosorbent assay (ELISA) intended for the quantitative determination of NR2 peptide fragment of NMDA receptors in plasma. The test is intended to be used in conjunction with clinical evaluation and radiological methods for diagnosis of ischemic stroke and transient ischemic attack (TIA). The Gold Dot NR2 Peptide test correlates with acute TIA and ischemic strokes affecting areas of cerebral cortex. The test allows differentiation between acute cerebral ischemic event and hemorrhagic stroke and stroke mimics.[1-5]

Summary and Explanation

Thrombotic or embolic processes restrict neuronal oxygen and glucose supply, leading to cerebral ischemia. Excessive release of glutamate due to cerebral ischemia causes overactivation of NMDA receptors. These major excitatory neuroreceptors regulate neuronal electrical signals and microvessel function. Abundant amounts of NMDA receptors (especially NR2 subunit) are cleaved by serine proteases, resulting in NR2 peptide fragments. These fragments pass through the compromised blood brain barrier and enter the bloodstream, where they may be detected. The NR2 peptides are detectable within 1-72 hours of neurotoxicity and denote acute cerebral ischemia and TIA.
The NR2 peptide concentrations in plasma of normal adults is <0.5 ng/mL. The performance characteristics of NR2 peptide assay for cortical ischemic event depend on the time from onset.

Principle of the Test

Concentrations of NR2 peptide are determined immunochemically in a blood assay. The affinity purified specific antibodies to NR2 subunit of NMDA receptor are immobilized on magnetic particles. Immobilized NR2 antibodies react with the sample containing NR2 peptides and HRP-conjugated affinity purified specific antibodies against NR2 peptide.

//-NR2 Antibodies → Plasma NR2 peptide ← NR2 Antibodies-HRP

The immunocomplex is formed for **30 minutes** and quantitatively determined using HRP-TMB detection reaction. An acidic stopping solution is then added. The color converts from blue to yellow. The intensity of the color is directly proportional to the concentration of NR2 peptide in the sample. A dose response curve of the absorbance measured at 450 nm or using dual wave measurement at 450 nm and 630 nm vs concentration is generated. NR2 peptide concentrations in the plasma samples are determined directly from this calibration curve.

Diagnostic Values of Gold Dot NR2 Peptide Assay

Clinical setting	Cut off, µg/L	Hours from onset	Sensitivity %	Specificity %	Positive likelihood ratio
Surgery	0.5	1-6	88	95	18.5
Neurology Clinic	0.9	2-12	99	90	9.7
Emergency Department	1.5	12-24	83	84	5.2

Gold Dot NR2 Peptide Strengths

- NR2 peptide is an independent brain-borne marker that rules in cerebral ischemic event and rules out hemorrhage
- NR2 peptide is a marker of neurotoxicity and a key marker of hypoxic-ischemic lesions
- NR2 peptide is released from the brain into the bloodstream within minutes of neurotoxicity and remains detectable in blood up to 3 days
- NR2 peptide is sensitive to the effect of microemboli and alteration of blood flow
- NR2 peptide concentration correlates with the size of ischemic stroke (for strokes with areas from 2 cc to

Gold Dot NR2 Peptide Limitations

- NR2 peptide test has low sensitivity to white matter strokes

Advantages

- Color-coded reagents
- The reagents in one kit are sufficient for 89 assays
- For in vitro diagnostic use in CE marking countries
- 30-minute procedure

References

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3. Dambinova SA. Biomarkers for transient ischemic attack (TIA) and ischemic stroke. *Clin Lab Int.* 2008; 32(7):7-10.
4. Weissman JD, Khunteev GA, Olson D, Izykenova G, Dambinova S. NR2 peptide levels correlate with acute cortical stroke volume and may detect reversible ischemia. *Stroke*. 2007; 38:494. Abstract P39.
5. Glynn T, Tews M, Izykenova G, Hughes M, Khunteev G, Dambinova S. The clinical utility of serum NR2 peptide assay in the diagnosis of patients presenting to the emergency department with acute cerebrovascular ischemic events. *Ann Emerg Med*. 2007;50:S35. Abstract 107.

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