Quanterix®

Fact Sheet

Simoa® sTREM2

What is sTREM2?

Soluble Triggering Receptor Expressed on Myeloid Cells 2 (sTREM2) is a soluble isoform of the transmembrane protein TREM2, a member of the immunoglobulin superfamily expressed predominantly on myeloid cells. With a molecular weight of approximately 25 kDa, sTREM2 is derived from the extracellular domain of the full-length TREM2 through proteolytic cleavage. Under normal physiological conditions, TREM2 plays a central role in myeloid cell activation and survival. Expressed on macrophages across various tissues, TREM2 has been implicated in several physiological and pathological processes. sTREM2 has emerged as an exploratory biomarker in neuroinflammatory and neurogenerative disorders, offering valuable insights into the level of microglial activation. Elevated levels of sTREM2 have been detected in the plasma and cerebrospinal fluid (CSF) during the early stages of Alzheimer's Disease (AD). sTREM2 has also been implicated in a spectrum of conditions including Parkinson's disease, Frontotemporal dementia, amyotrophic lateral sclerosis, multiple sclerosis, cancer, atherosclerosis, obesity, and other conditions marked by microglial activation. Elevated levels of sTREM2 in plasma and CSF have been associated with disease progression and severity, suggesting its potential as a possible biomarker.

How to Measure sTREM2?

The Simoa® sTREM2 assay is a high sensitivity digital immunoassay for the quantitative determination of sTREM2 in human EDTA-plasma and CSF.

What is the Simoa® Difference?

Simoa® is a powerful digital immunoassay technology that is up to 1000 times more sensitive than standard sandwich-based immunoassay techniques. Traditional ELISA measurements are limited to pg/ml levels of detection. Quanterix Simoa® can achieve sensitivity as low as femtogram (fg/ml) levels, delivering the gold standard for early, ultra-sensitive detection and quantification of proteins far below the typical lower limit of quantification (LLOQ).

Simoa® is based upon the isolation of individual immunocomplexes on paramagnetic beads using standard ELISA reagents. The main difference between Simoa® and conventional immunoassays lies in the ability to trap single molecules in femtoliter-sized wells, allowing for a "digital" readout of each individual bead to determine if it is bound to the target analyte or not.
Neurological disorders continue to be among the most challenging to diagnose early and treat. Unlike 'visible' illnesses, neuronal injury and neurodegeneration can be overlooked or mistaken for other conditions. The subtlety of symptoms and the subjective nature of today's assessments also make it difficult to identify these diseases early. Currently, no definitive tests exist for the early detection of neurodegenerative diseases such as AD, PD, and MS. Clinicians can only conclusively diagnose them once symptoms start to present. As a result, many patients may wait years for a diagnosis or a clear treatment pathway.

sTREM2 has emerged in recent years as a microglial biomarker with the potential to aid in improving early diagnosis and patient care for neuroinflammation and neurodegeneration. Thousands of studies have validated the use of Simoa® immunoassays to detect and measure biomarkers that hold promise as tools for early detection, prognosis, and monitoring treatment for a range of neurodegenerative conditions.