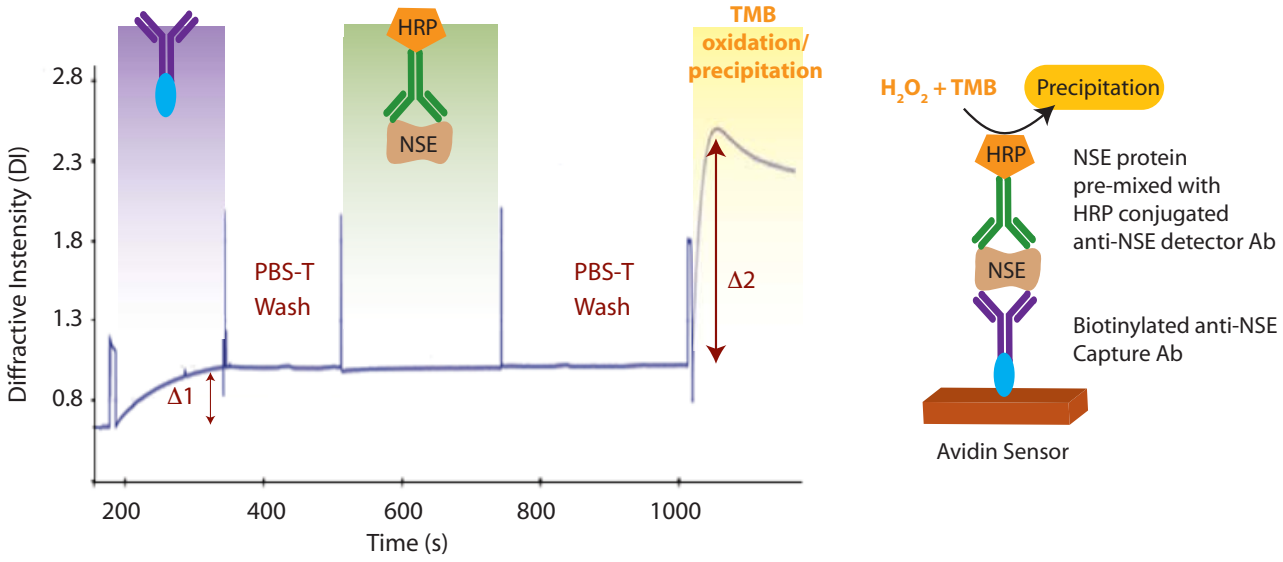
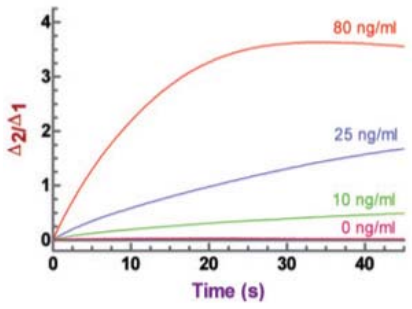
Quantitative Assay for Rapid NSE Detection

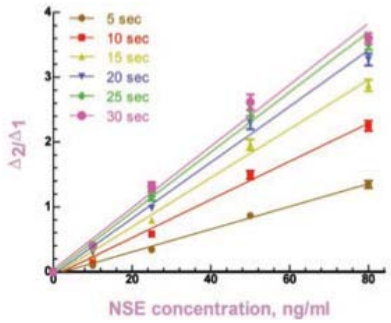
The presence of Neuron-Specific Enolase (NSE) in cerebrospinal fluid and blood is attributed to cell destruction making it a potential biomarker for neuronal damage following traumatic brain injury (TBI) as well as tumor growth and other neurodegenerative diseases. Serum NSE levels can be measured with commercial ELISA kits, however they are time consuming, inconvenient, and not suitable for individual or randomly available samples. Here, we show the transfer of an NSE ELISA to the dotLab® System to demonstrate the platform as rapid, easy to use alternative to ELISA.



In the trace above, biotinylated anti-NSE capture antibody was initially immobilized onto a dot® Avidin Sensor. A pre-mix containing NSE protein with HRP-conjugated anti-NSE detector antibody was then applied to the sensor. After washing with PBS-T, TMB peroxidase substrate was added to produce an enhanced signal.



Overlaid TMB signals for NSE levels used to generate a calibration curve (Δ1 = maximum signal change)



Calibration curves within a range of 10 – 80 ng/mL of NSE and R^2 of 0.98

Highlights:

- Assay time for NSE quantitation reduced to only 20 minutes per sample
- Limit of detection calculated to be 1.9 ng/mL
- Highly reproducible with an average CV of 9.3%
- Capable of direct analysis of human serum without pre-processing
- Dynamic range suitable for NSE biomarker research into traumatic brain injury

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