Establishment of Neurofilament Light Chain (NfL) SIMOA assay as well as a conversion factor to enable comparison to historical results using Bovine calibrators.

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Objective:
To qualify the SIMOA NfL assay in cerebrospinal fluid (CSF), serum and plasma and to determine if serum and plasma can be used as surrogate matrix for CSF in multiple sclerosis (MS). In addition a correction factor between the recombinant human (rH) NfL calibrator used in the SIMOA assay vs bovine NfL calibrator used in the Uman ELISA was established.

Background:
Neurofilament light (NfL) Chain is a structural protein abundant in large caliber myelinated axons and an established CSF biomarker for neuroaxonal injury. Historically the Uman Dx ELISA kit has been the choice for measurement of NfL; however, the use of this assay has been limited to CSF due to lack of sensitivity of the ELISA platform. The antibodies used in Uman ELISA have recently become available on the sensitive SIMOA platform offering the potential to measure NfL in serum and plasma. The Uman DX ELISA kit as well as some homebrew SIMOA assays use bovine calibrators while the Quanterix kit uses a recombinant human (rH) calibrators.

Design/Methods:
The SIMOA kit was validated in CSF and qualified in both serum and plasma with acceptable precision, sensitivity and detectability. CSF, serum and plasma samples from 112 MS patients (95 RRMS and 17 PPMS) were analyzed using both the native bovine and rH calibrators

Results:
A 5-fold difference between the results from the two calibrators were observed in all three matrices. Good correlation was observed between NfL data in serum and plasma. Low correlation was observed between serum/ plasma with CSF at lower NfL concentrations.

Conclusions:
The Simoa assay was successfully validated in CSF and qualified in plasma and serum, and a correlation factor of 1/5 was established between calibrators. Correlation between plasma/serum and CSF was driven by samples with higher levels of NfL. At lower levels poor correlation was observed.