## KAPPA FREE LIGHT CHAIN CONCENTRATIONS CORRELATE WITH BRAIN ATROPHY IN MULTIPLE SCLEROSIS

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**Introduction.** Brain atrophy is caused by axonal damage and demyelination in a clinical course of multiple sclerosis (MS) and correlate with progression with MS. Several studies indicate that intrathecal production of immunoglobulin free light chains kappa (k-FLC) in MS is also associated with the disease progression. No studies so far report if FLC production in the cerebrospinal fluid (CSF) correlate with brain atrophy.

Aim. The aim of this study was to assess the correlation between FLC and brain atrophy.

**Materials and methods.** FLC-concentrations were measured using a novel ELISA assay (Polignost Ltd., St. Petersburg, Russia) based on monoclonal anti-k-FLC antibodies directed against cryptic epitopes of FLC molecules. FLC quotient (Q-k) was calculated as a ratio of FLC concentrations in the CSF to serum concentrations to correct for possible breakdown of the blood-brain barrier. Brain atrophy was assessed using fully automated technique called SIENAX (Structural Image Evaluation, Using Normalization, of Atrophy Cross-sectional). Spearman's test was performed to assess correlations.

**Results.** 65 patients (male (n=22), female (n=43)) with MS were included into this study (RRMS (n=57), SPMS (n=2) and PPMS (n=6)). The median (IQR) age and disease duration were as follows: 33 (12) years, 17 (42) months, respectively. The concentrations of k-FLC in the CSF, Q-k showed significant inversed correlation with normalized brain volume (k-FLC: r = -0.2613, p = 0.0355; Q-k: r = -0.3456, p = 0.013) and with normalized gray matter volume (k-FLC: r = -0.2858, p = 0.021; Q-k: r = -0.3367, p = 0.0157).





*Figure 1.* Correlation between k-FLC concentration in the CSF and brain atrophy: A – normalized brain volume and k-FLC<sub>CSF</sub>; B – normalized grey matter volume and k-FLC<sub>CSF</sub>; C – normalized brain volume and Q-kappa; D – normalized grey matter volume and Q-kappa.

k-FLC - concentrations of kappa free light chains of immunoglobulin; CSF - cerebrospinal fluid; Q-kappa - quotient of kappa free light chains of immunoglobulin.

**Conclusion.** The results of the study show the correlation between concentrations of k-FLC in CSF and brain atrophy. K-FLC could be a possible prognostic biomarker for neurodegeneration.

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