

Blood neurofilament light chain as a biomarker of MS disease activity and treatment response

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Study objective and summary result

This study examined whether blood neurofilament light chain (NfL) levels can serve as a biomarker of disease activity and treatment response in patients with multiple sclerosis (MS), and it found that blood NfL levels can serve as a biomarker of disease activity and treatment responses in patients with MS.

What is known and what this paper adds

Elevated CSF and blood NfL levels correlate with more relapses, greater disability severity, and greater brain volume loss in patients with MS. This study provides further evidence for the utility of blood NfL levels as a marker of disease activity and treatment response.

Participants and setting

This study examined samples and data from 589 patients with relapsing-remitting MS who participated in clinical trials comparing fingolimod to placebo treatment (FREEDOMS; NCT00289978) or interferon β -1a (TRANSFORMS; NCT00340834).

Design, size, and duration

The FREEDOMS and TRANSFORMS trials collected blood samples at baseline and follow-up timepoints. Blood NfL levels were quantified with a highly sensitive immunoassay (SIMOA) by personnel blinded to clinical data and treatment assignments. Cox proportional hazard, negative binomial and multiple linear regression models were used to determine whether baseline blood NfL levels were associated with baseline and follow-up clinical and MRI variables, and a mixed model was used to assess the effects of fingolimod treatment on blood NfL levels.

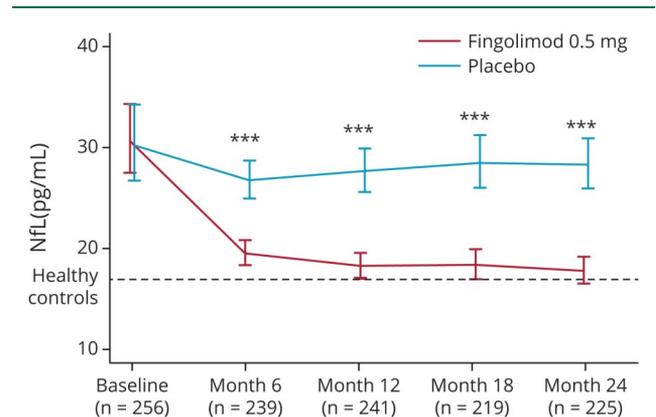
Primary outcome measures

The primary outcomes were disease activity measures association with blood NfL levels and the effects of fingolimod treatment on blood NfL levels.

Main results and the role of chance

Higher baseline blood NfL levels were associated with more new or enlarging T2 lesions ($p = 0.0006$), more relapses ($p <$

Figure Effects of fingolimod, relative to placebo treatment, on blood NfL levels



n = number of evaluable patients. *** $p < 0.0001$.

0.0001), and greater brain volumes losses ($p < 0.0001$). Fingolimod treatment reduced blood NfL levels ($p < 0.001$).

Bias, confounding, and other reasons for caution

Blood samples were only available for ~25% of participants in the FREEDOMS and TRANSFORMS trials.

Generalizability to other populations

The international nature of the FREEDOMS and TRANSFORMS trials favors the generalizability of this study's results.

Study funding/potential competing interests

This study was funded by Novartis and the Swiss National Science Foundation. Some authors report receiving personal fees, committee appointments, and funding from various foundations, government agencies, and healthcare companies, including Novartis. Some authors are employed by Novartis or companies closely associated with Novartis. Go to Neurology.org/N for full disclosures.

A draft of the short-form article was written by M. Dalefield, a writer with Editage, a division of Cactus Communications. The authors of the full-length article and the journal editors edited and approved the final version.

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