

Abstract

Neurofilaments are the key structural component of the cytoskeleton of neurons, where they are essential for many functions. They consist of 3 subunits: light chain (NFL); medium chain (NfM) and heavy chain (NfH). Except neurofilament proteins there is also α -internexin in the central nervous system (CNS) or peripherin in the peripheral NS. Due to various pathophysiological processes, neurofilament proteins are released into the extracellular space, where they can interact with the components of the immune system. While the involvement of the immune system in the pathogenesis of neurodegenerative diseases is obvious, less knowledge about the antibody response to the neurofilament proteins is available. It is eligible to expand our knowledge in this area. Determination of free antibodies against neurofilaments together with their immune complexes with corresponding antigen provides us more detailed insight into the antibody immune response against neurofilaments. We have optimized the ELISA methods to determine free antibodies against light and heavy chain of neurofilaments together with their corresponding immunocomplexes in both serum and cerebrospinal fluid. Implementation of these methods is precondition for analysis of those parameters in serum and cerebrospinal fluid of patients with neurodegenerative diseases. Antibodies against a heavy neurofilament chain were studied in patients with Alzheimer's disease. Our results did not show a significant difference in the avidity of these antibodies between the control group and the patients with Alzheimer's disease. Analysis of free antibodies against heavy neurofilament chain together with corresponding immunocomplexes showed close relationship between these two parameters in cerebrospinal fluid and a significant reduction in levels of both parameters in patients with mild cognitive disorder compared to the elderly cognitively normal people. Free antibodies showed also significant decrease when compared with Alzheimer's disease patients. Further analysis of antibodies against neurofilaments and their immunocomplexes in larger cohorts of patients with neurodegenerative diseases could give us a valuable additional knowledge about releasing of neurofilaments and antibody response against them.

Key words: neurofilament proteins, antibodies, immune complexes, neurodegenerative diseases, ELISA, serum, cerebrospinal fluid