Involvement of cerebrospinal fluid osteopontin in neuromyelitis optica pathology

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Neuromyelitis optica (NMO) is an inflammatory disease of the central nervous system that predominantly affects the optic nerves and spinal cord. Although NMO has long been considered a subtype of multiple sclerosis (MS), the effects of interferon-β treatment are different between NMO and MS. In addition, recent findings of NMO-IgG in the serum suggest that NMO could be a distinct disease rather than a subtype of MS. However, the underlying molecular mechanism of NMO pathology remains poorly understood.

Here we report that one of the extracellular matrix protein, osteopontin (OPN) may be involved in NMO pathology.

OPN was significantly increased in the cerebrospinal fluid of NMO patients compared with MS patients. In contrast, OPN in the serum of NMO patients was similar level to that of MS patients. Immunohistochemical analyses revealed that OPN was markedly elevated in the cerebral white matter of NMO patients compared to MS and Alzheimer’s disease and produced by astrocytes, neurons, and oligodendroglia as well as infiltrating macrophages. We also demonstrate that the interaction of the cerebrospinal fluid OPN in NMO patients with integrin αvβ3 promoted macrophage chemotaxis by activating phosphoinositide 3-kinase and MEK1/2 signaling pathways.

These results indicate that OPN is a possible biomarker for NMO and therapeutic strategies that target OPN signaling may be useful to treat NMO.

Key words: Neuromyelitis optica, Osteopontin