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Relation of Poor Memory to Soluble Tumor Necrosis Factor Receptor Type Two (sTNF-RII)

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Abstract

The association of soluble tumor necrosis factor receptor type two with poor memory in patients with breast cancer and controls found by Patel et al (2015) may confirm the finding of Holmes et al in 2009 that tumor necrosis factor α is linked to cognitive decline.

Keywords

tumor, necrosis, factor, inflammation

Women with breast cancer report cognitive dysfunction, termed "chemo-brain," that has been attributed to chemotherapy. But some women with breast cancer have cognitive dysfunction even before treatment begins. In their report of a study, Patel et al compared cognition in patients with breast cancer and controls. A cytokine, soluble tumor necrosis factor receptor type two (sTNF-RII), was associated with diminished memory in both groups.[1] The cytokines are an integral part of the immune process.

Elevated tumor necrosis factor α (TNF-α) in serum predicts increased rate of cognitive decline and exaggeration of neuropsychiatric symptoms in Alzheimer's disease.[2] Etanercept, a TNF-α inhibitor, has shown promising results as an Alzheimer's treatment.[3] In the study of Patel et al, sTNF-RII was not higher in patients with cancer relative to control participants, suggesting that sTNF-RII may be related to memory impairment irrespective of a cancer diagnosis.

Alzheimer's disease may result from autoimmune inflammation of the brain. Biochemical and neuropathological studies of brains from individuals with Alzheimer's disease provide evidence for activation of autoimmune inflammatory pathways and glial inflammation.[4] Long-term use of anti-inflammatory drugs is linked to reduced risk of developing Alzheimer's disease.[5] Amyloid-β plaques and tau protein tangles, hallmarks of the pathology, are most likely a nonspecific result of the disease process, rather than a cause.[6] The 1.8:1 female to male incidence of Alzheimer's disease also suggests autoimmune inflammation, which is more common in women.[7]

Several well-done studies have not found any impact of anti-inflammatory agents on the course of Alzheimer's disease. But in the case of orally administered nonsteroidal anti-inflammatory drugs (NSAIDs), plasma protein binding limits brain NSAID uptake by severely reducing the free fraction of NSAID in the circulation.[8] Low-dose prednisone also failed as a treatment,[9] probably because the hippocampal atrophy caused by glucocorticoids nullifies their anti-inflammatory effect.[10]

The sTNF-RII is the receptor for TNF-α and their levels closely correlate.[11] Therefore, the association of sTNF-RII with poor memory in patients with breast cancer and controls found by Patel et al[1] may confirm the finding of Holmes et al in 2009[2] that TNF-α is linked to cognitive decline.

Author's Note

Lehrer has filed a patent application on the use of nasal NSAIDs for the treatment of Alzheimer's disease.

Declaration of Conflicting Interests

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