

Accumulations of the neurotoxin glutamate, long suspected of causing neurological disease, have been implicated in neuromyelitis optica (NMO).

Researchers at Mayo Clinic have discovered that neuromyelitis optica antibodies (NMO-IgG) found in the multiple sclerosis variant neuromyelitis optica (Devic's syndrome) autoimmune disease. suite101.com/article.cfm/neuromyelitis_optica lead to a build-up of glutamate.

What is Glutamate?

Neurotransmitters are chemicals that allow nerves to communicate with brain and muscle cells. The neurotransmitter glutamate is essential for normal signal transmission between neurons including the motor neurons, which trigger muscle contraction. It is the premature death of motor neurons that produces the progressive paralysis characteristic of amyotrophic lateral sclerosis (ALS) and other neurological disorders.

Consequences of Excess Glutamate

Glutamate, in excess, is suspected of causing oxidative stress and leading to the destruction of neurons in Parkinson's disease, amyotrophic lateral sclerosis and other autoimmune disorders.

Excess glutamate has also been suspected of destroying myelin and contributing to the disease process in multiple sclerosis.

The Mayo Clinic Study

In Devic's syndrome, NMO antibodies bind to a protein that normally sops up excess glutamate. As a result, this protein is unavailable, and glutamate molecules lodge in the space between brain cells. In their report the Mayo authors suggest that glutamate-induced damage to nerve cells and their insulating myelin coats might be responsible for the neurological symptoms associated with Devic's disease.

Therapeutic Implications

If the Mayo group is able to produce these results in vivo using nerve cell cultures, drugs to block the effects of glutamate could be developed. Therapeutic trials for glutamate blockers, created to treat other neurodegenerative diseases like Lou Gehrig's disease (or ALS), are already underway.

Low Dose Naltrexone and Glutamate

Glutamate excess and its reduction by low dose naltrexone (LDN) is the main hypothesis proposed by the pathologist Yash Agrawal in explaining the beneficial actions of LDN in MS. In his research, Dr. John Hong at the National Institutes of Health, has shown how glutamate contributes to the disease process in Parkinson's Disease. In his studies of low

dose opiate antagonists such as naltrexone, Dr. Hong has shown how these compounds reduce glutamate accumulations and stop disease progression.

The Glutamate Link

In the Mayo Clinic Study, Dr. Vanna Lennon in her team have demonstrated that glutamate accumulates in the brain of patients with neuromyelitis optica. They propose that glutamate is responsible for the myelin destruction in this disorder.

Dr. Hong has previously shown the destructive role of glutamate in Parkinson's disease. Dr. Yash Agrawal has explained how glutamate toxicity causes symptoms in both Lyme disease and multiple sclerosis. Dr. Agrawal explains that the ability of the beta-lactam antibiotic ceftriaxone to reduce glutamate accumulations accounts for its effectiveness in Lyme disease. He proposes that both ceftriaxone and low dose naltrexone, by having the potential to reduce glutamate accumulations, have therapeutic value in Lyme disease, MS, and other neurological disorders.

Thus, while the Mayo researchers propose finding ways to block glutamate, the benefits of low dose naltrexone and beta lactam antibiotics lie in their ability to reduce glutamate accumulations.

Resources:

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Autoimmune Disease May Be Triggered By Neurotransmitter Defect, Medical News Today, Oct 7, 2008, <http://www.medicalnewstoday.com/articles/124477.php>

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