

Cerebrospinal fluid glutamate levels in chronic migraine

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FROM ABSTRACT:

Both preclinical and clinical data link glutamate to the migraine pathophysiology.

Altered plasma, platelets and cerebrospinal (CSF) glutamate levels have been reported in migraine patients.

It has been recently shown that chronic migraine has comorbidity with fibromyalgia.

The objective of this study was to study cerebrospinal fluid glutamate levels in chronic migraine patients with and without fibromyalgia. We studied 20 chronic migraine patients, with and without fibromyalgia, compared to age-sex matched controls.

CSF glutamate levels were measured.

CSF glutamate demonstrated significantly higher levels in patients with fibromyalgia compared to those without fibromyalgia.

Patients overall had higher CSF glutamate levels than controls.

Mean pain score correlated with glutamate levels in chronic migraine patients.

Tender points, the hallmark of fibromyalgia, can be considered as pressure allodynia, and is probably mediated by central sensitization, with increase in CSF glutamate levels.

We postulate chronic migraine patients with fibromyalgia, in addition to have more disabling headaches, suffer from a more severe central sensitization process.

Headache intensity correlate with glutamate levels in chronic migraine patients.

THESE AUTHORS ALSO NOTE:

"Glutamate is a major excitatory neurotransmitter in the central nervous system, widely involved in migraine mechanisms."

"Glutamate is implicated in cortical spreading depression, trigeminovascular activation, and central sensitization."

Glutamate is linked to the pathophysiology of migraine.

23% of the general population has chronic migraine (CM).

CM is one of the most debilitating and difficult to treat headaches.

CM is comorbid with fibromyalgia in many patients, and these patients have more debilitating headaches.

Migraine patients and patients with chronic daily headaches have higher CSF and plasma glutamate in levels.

Central sensitization is implicated in both chronic migraine pathophysiology and in fibromyalgia.

In this study CSF glutamate levels were measured following a lumbar puncture.

CSF glutamate levels were significantly higher in CM than controls

Mean pain score correlated with CSF glutamate levels.

"CM patients with fibromyalgia had significantly higher CSF glutamate levels than patients without fibromyalgia."

DISCUSSION:

"Our study shows increased glutamate levels in the CSF of chronic migraine patients compared to controls."

"More important is the new finding of even higher levels of glutamate in chronic migraine patients with fibromyalgia compared to those without fibromyalgia."

Migraine headache sufferers have substantially higher plasma glutamate and aspartate levels than do control patients.

[Ferrari MD, Odink J, Bos KD, Malessy MJ, Bruyn GW. Neuroexcitatory plasma amino acids are elevated in migraine. Neurology 1990; 40: 15826].

"During migraine attacks, glutamate (and to a lesser extent aspartate) levels were even further increased."

There is also a significant increase in CSF glutamate levels in chronic daily headache patients compared to controls.

"Head pain in migraine arises within the trigeminal system."

[Very Important For Chiropractors]

“Central trigeminal neurons that receive convergent input from external stimuli [like afferent input from the upper cervical spine] may be sensitized.”

“Central sensitization may account for the severe pain of migraine headache, in this study we showed pain intensity correlated with CSF glutamate levels, providing evidence that glutamate levels, central sensitization and pain intensity are linked.”

These authors suggest that acute migraine drugs increase CSF glutamate levels, increasing chances of chronic migraine suffering. **[WOW!]**

It is “hypothesized that migraine is associated with a state of central neuronal hyperexcitability, involving overactivity of the excitatory amino acids, glutamate, and possibly aspartate.”

This theory may also be applied in the comorbidity between migraine and fibromyalgia.

[Magnesium blocks the glutamate receptor, reducing the excitotoxicity of glutamate]. [This is an important management tip].

“A low brain magnesium and consequent reduced gating of glutamatergic receptors could be another possible link between migraine, fibromyalgia and the mechanisms of glutamate hyperactivity, neuronal hyperexcitability, and susceptibility to glutamate-dependent spreading depression.”

“Sensitization of both peripheral and central trigeminovascular neurons accounts for the intracranial hypersensitivity observed in migraineurs, i.e. the worsening pain during coughing, bending over, rapid head movement, and the throbbing nature of migraine pain.”

There is a hyperexcitability in the central trigeminal pathway after in migraine.

Fibromyalgia allodynia also has an increase in CSF glutamate levels.

Migraine patients with fibromyalgia have more disabling headaches and suffer from a more severe central sensitization process.

These patients need more aggressive therapy.

BACKGROUND INFORMATION FROM DAN MURPHY

Glutamate (an amino acid) is the brain’s primary excitatory neurotransmitter. However, excess glutamate kills brain neurons and is therefore called an “excitotoxin.” Too much glutamate literally excites brain neurons to death. Glutamate is commonly added to foods because it makes them “exciting” or taste better. Most of us know glutamate by its salt form monosodium glutamate or MSG. There are dozens of

names for glutamate as it is added to foods. A partial list of names seen on food packaging are listed below, from the website www.truthinlabeling.org:

HIDDEN SOURCES OF PROCESSED FREE GLUTAMIC ACID (MSG)

Autolyzed, hydrolyzed, glutamate, glutamic acid, hydrolyzed, autolyzed

NAMES OF INGREDIENTS THAT CONTAIN ENOUGH MSG TO SERVE AS COMMON MSG-REACTION TRIGGERS

The MSG-reaction is a reaction to free glutamic acid that occurs in food as a consequence of manufacture. MSG-sensitive people do not react to protein (which contains bound glutamic acid) or any of the minute amounts of free glutamic acid that might be found in unadulterated, unfermented, food.

These ALWAYS contain MSG

Glutamate	Glutamic acid	Gelatin
Monosodium glutamate	Calcium caseinate	Textured protein
Monopotassium glutamate	Sodium caseinate	Yeast nutrient
Yeast extract	Yeast food	Autolyzed yeast
Hydrolyzed protein (any protein that is hydrolyzed)		Hydrolyzed corn gluten

These OFTEN contain MSG or create MSG during processing

Carrageenan	Maltodextrin	Malt extract
Natural pork flavoring	Citric acid	Malt flavoring
Bouillon and Broth	Natural chicken flavoring	Soy protein isolate
Natural beef flavoring	Ultra-pasteurized Soy sauce	Stock Barley malt
Soy sauce extract	Whey protein concentrate	Pectin
Soy protein	Whey protein	Protease
Soy protein concentrate	Whey protein isolate	Protease enzymes
Anything protein fortified	Flavors(s) & Flavoring(s)	Anything fermented
Anything enzyme modified	Enzymes anything	Seasonings
Natural flavor & flavoring		(the word "seasonings")

The new game is to label hydrolyzed proteins as pea protein, whey protein, corn protein, etc.

If a pea, for example, were whole, it would be identified as a pea.

Calling an ingredient pea protein indicates that the pea has been hydrolyzed, at least in part, and that processed free glutamic acid (MSG) is present.

Relatively new to the list are wheat protein and soy protein.

Disodium guanylate and disodium inosinate are expensive food additives that work synergistically with inexpensive MSG.

Their use suggests that the product has MSG in it. They would probably not be used as food additives if there were no MSG present. **[IMPORTANT]**

MSG reactions have been reported to soaps, shampoos, hair conditioners, and cosmetics, where MSG is hidden in ingredients that include the words "hydrolyzed," "amino acids," and "protein."

Low fat and no fat milk products often include milk solids that contain MSG.

Drinks, candy, and chewing gum are potential sources of hidden MSG and of aspartame and neotame.

Aspartic acid, found in neotame and aspartame (NutraSweet), ordinarily causes MSG type reactions in MSG sensitive people.

Aspartame is found in some medications, including children's medications.

Neotame is relatively new and we have not yet seen it used widely. Check with your pharmacist.

Binders and fillers for medications, nutrients, and supplements, both prescription and non-prescription, enteral feeding materials, and some fluids administered intravenously in hospitals, may contain MSG.

According to the manufacturer, Varivax–Merck chicken pox vaccine (Varicella Virus Live), contains L-monosodium glutamate and hydrolyzed gelatin both of which contain processed free glutamic acid (MSG) which causes brain lesions in young laboratory animals, and causes endocrine disturbances like OBESITY and REPRODUCTIVE disorders later in life.

It would appear that most, if not all, live virus vaccines contain MSG. **[WOW!]**

Reactions to MSG are dose related, i.e., some people react to even very small amounts. MSG-induced reactions may occur immediately after ingestion or after as much as 48 hours.

Note: There are additional ingredients that appear to cause MSG reactions in ACUTELY sensitive people. A list is available by request.

Remember: By FDA definition, all MSG is "naturally occurring." "Natural" doesn't mean "safe." "Natural" only means that the ingredient started out in nature.

Aspartate acid, or aspartate (another amino acid) is the brain's second prevalent excitatory neurotransmitter. Aspartate poses the same deleterious toxicity to brain neurons as does glutamate, and is therefore also labeled as an excitotoxin. Most of human exposure to aspartate is through the artificial sweetener aspartame. Aspartame is composed of the amino acids phenylalanine and aspartate. In the body, and sometimes in the food product when heated, the bond between phenylalanine and aspartate is broken, releasing the excitatory neurotransmitter and excitotoxin aspartate. Importantly and sadly, according to neurosurgeon Russell Blaylock's 2002 book Health and Nutrition Secrets that Can Save Your Life, phenylalanine and aspartate are not linked through a standard peptide bond, but rather are linked with methyl alcohol (a deadly toxin itself). Consequently, ingestion of aspartame exposes our bodies to both aspartate and to methanol.

Apparently, both glutamate and aspartate enter the brain through holes in the blood brain barrier at the hypothalamus, called the "circumventricular organs." They then become factors in creating an array of symptoms, including chronic migraines (as noted in this article), and also accelerate neurodegenerative diseases.

For more information on these topics, I would recommend the following books:

Excitotoxins Books

Excitotoxins, The Taste That Kills by Russell Blaylock (University of Mississippi neurosurgeon), Health Press, 1997

In Bad Taste, The MSG Symptom Complex, by George Schwartz, Health Press, 1999

The Crazy Makers, How the Food Industry Is Destroying Our Brains and Harming Our Children, by Carol Simontacchi, Tarcher Putnam, 2000

Food Allergies by William Walsh, Wiley, 2000

Fast Food Nation by Eric Schlosser, Houghton Mifflin, 2001

Health and Nutrition Secrets that Can Save Your Life by Russell Blaylock's, Health Press, 2002

KEY POINTS FROM DAN MURPHY

- 1) Elevated CSF glutamate and aspartate are linked to chronic migraine pathophysiology and to fibromyalgia.
- 2) An acute increase in glutamate and aspartate levels can trigger a migraine attack.
- 3) Increase in CSF glutamate levels is also seen in chronic daily headache patients.

- 4) The head pain in migraine arises within the trigeminal system, which receives afferent input from the upper cervical spine. **This is very important for upper cervical chiropractic.**
- 5) Acute migraine drugs increase CSF glutamate levels, increasing chances of chronic migraine suffering. **[Amazing]**
- 6) Magnesium blocks the glutamate receptor, reducing the excitotoxicity of glutamate. This is an important management tip. [Try 600 mg / day.]

COMMENT BY DAN MURPHY

This article would suggest management for chronic migraine, for chronic daily headache, and for fibromyalgia would include avoiding dietary glutamate and aspartame, taking supplemental magnesium, and upper cervical chiropractic.

Remember Article 11-03

Relief of Fibromyalgia Symptoms Following Discontinuation of Dietary Excitotoxins; The Annals of Pharmacotherapy: Vol. 35, No. 6, pp. 702–706. June 2001

In this study they cured a small group of chronic fibromyalgia patients by removing glutamate and aspartame from their diet for 4 months.