Measuring Glutamate Levels in the Brains of Fibromyalgia Patients and a Potential Role for Glutamate in the Pathophysiology of Fibromyalgia Symptoms: A Systematic Review.

Pyke T¹, Osmotherly PG, Baines S.

Abstract

OBJECTIVES:

The aim of this study is to systematically review the literature concerning proton magnetic resonance spectroscopy (H-MRS) measured glutamate levels in specific brain regions of fibromyalgia (FM) patients to determine if there is a correlation between raised glutamate levels and the presentation of FM.

METHODS:

The electronic databases - MEDLINE, EMBASE Classic+Embase, PsychINFO, Cochrane Database of Systematic Reviews, Cochrane Database of Abstracts of Reviews of Effect, Cochrane Central Register of Controlled Trials - were searched to find original studies that used H-MRS to measure glutamate concentrations in the brains of FM patients.

RESULTS:

Nine studies with a total of 482 participants were selected for inclusion in the review. Seven of the eight studies that investigated an association between cerebral glutamate levels and FM, showed a positive association. Brain regions identified as having increased glutamate levels include the posterior cingulate gyrus, posterior insula, ventrolateral prefrontal cortex and amygdala. One study reported a decrease in glutamate levels in the hippocampus of FM patients compared to healthy controls (HC). Seven of the eight studies that analysed the correlations between cerebral glutamate levels and FM symptoms, found a significant positive correlation.

DISCUSSION:

While the cause of FM remains inconclusive, there is converging data in favour of a dysregulation of pain processing in the central nervous system of FM patients, particularly associated with an increase in cerebral glutamate levels. Furthermore, there is evidence to support an association between increased glutamate levels and an increase in FM symptoms.