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## Cerebrospinal fluid analysis of patients with als by x-ray microfluorescence

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### ABSTRACT

**Introduction:** Amyotrophic Lateral Sclerosis (ALS) is the most common motor neuron disease in adults but its etiology remains unknown. Clinically, the patient manifests progressive weakness, paralysis and, usually, evolves to death between 2 to 5 years. The analysis of biological samples provides a powerful strategy to investigate pathological processes and studies indicate an important role of trace elements in ALS. **Objective:** In this work we aimed to investigate the levels of trace elements in CSF samples from patients with ALS. **Methodology:** CSF samples from cases of ALS (10) and control cases (6) were treated for analysis of trace elements by X-ray Microfluorescence with Synchrotron Radiation. The measurements were performed on the XRF beam line at the National Synchrotron Light Laboratory (Campinas, Brazil). The intensity of the X-ray spectrum for each element was obtained with AXIL software (distributed by the International Atomic Energy Agency). The data obtained were statistically analyzed by General Linear Models, in a method based on multivariate analysis. **Results and Discussion:** In this study, the following elements were analyzed: aluminum, bromine, calcium, chlorine, copper, chromium, iron, potassium, phosphorus, nickel, rubidium, silicon, sulfur and zinc. In CSF samples from ALS cases a significant increase of calcium, chlorine and potassium concentration was observed when compared to samples from control cases. **Conclusion:** Excitotoxicity is one of the many factors implicated in the pathogenic process of ALS. The intracellular calcium influx appears to contribute to neurodegeneration in multiple pathways, leading to cell death. Activation of potassium and chlorine channels by increased calcium level has been described and prolonged outflow of both may be involved with apoptosis. Elevated levels of these three elements in the CSF indicate a possible molecular pathway involved in the pathogenic process of the disease.

**Keywords:** Chronic Disease; Neurodegenerative Diseases; Neurology

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