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## Altered ionized magnesium levels in mild-to-moderate Alzheimer's disease.

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#### Abstract

Magnesium deficiency is present in several chronic, age-related diseases, including cardiovascular, metabolic and neurodegenerative diseases. Alzheimer's disease (AD) is the most common cause of dementia. The aim of the present study was to study magnesium homeostasis in patients with mild to moderate AD. One hundred and one elderly ( $\geq 65$  years) patients were consecutively recruited (mean age:  $73.4 \pm 0.8$  years; M/F: 42/59). In all patients, a comprehensive geriatric assessment was performed including cognitive and functional status. Admission criteria for the AD group (diagnosed according to the DSM-IV and the NINCDS-ADRDA criteria) included: mild to moderate cognitive impairment (MMSE score: 11-24/30, corrected for age and education). Blood samples were analyzed for serum total magnesium (Mg-tot) and serum ionized magnesium (Mg-ion). AD patients had significantly lower MMSE scores ( $20.5 \pm 0.7$  vs  $27.9 \pm 0.2$ ;  $p < 0.001$ ), and for the physical function tests. Mg-ion was significantly lower in the AD group as compared to age-matched control adults without AD ( $0.50 \pm 0.01$  mmol/L vs  $0.53 \pm 0.01$  mmol/L;  $p < 0.01$ ). No significant differences were found in Mg-tot between the two groups ( $1.91 \pm 0.03$  mEq/L vs  $1.95 \pm 0.03$  mEq/L;  $p = \text{NS}$ ). For all subjects, Mg-ion levels were significantly and directly related only to cognitive function (Mg-ion/MMSE  $r = 0.24$   $p < 0.05$ ), while no significant correlations were found in this group of patients between magnesium and ADL or IADL. Our results show the presence of subclinical alterations in Mg-ion in patients with mild to moderate AD.

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