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Prevention of aged-related memory deficits by vitamin A: impact on the glucocorticoid pathway

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Nowadays, both stress (or an excess of glucocorticoids (GC)-induced and age-induced cognitive dysfunctions are major public health issues. Interestingly, emerging studies bridging the gap between nutrition and mental health have resolutely established that memory abilities can be influenced by vitamin A status during aging. Indeed, a dysfunction of vitamin A signaling pathway has been involved in the appearance of age-related hippocampus-dependent memory deficits. Moreover, we have recently shown that vitamin A supplementation from middle-age enhances some hippocampus-dependent memory processes and improves adult hippocampal neurogenesis in rats but the mechanisms involved are still not well understood. Interestingly, it has recently emerged that vitamin A status modulates the production of GC at peripheral and hippocampal levels, and this antagonistic effect of vitamin A on GC signaling seems to contribute positively to the maintenance of memory and hippocampal plasticity processes. The main objective of this project is to assess the influence of inadequate vitamin A status (vitamin A deficiency model, aging) on GC pathway and more particularly on the regulation of the 11β hydroxysteroid dehydrogenase 1 (11β-HSD1), an enzyme that regenerates active GC within cells, and its consequences on hippocampus-dependent memory and plasticity processes. In this context, a strategy of preventive nutrition during aging would attempt to avoid or delay evolution towards dementia and thus promote the maintenance of a satisfactory cognitive state in elderly subjects. Thus, these recent data on the mode of action of vitamin A are very interesting from the point of view of nutrition/health.

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Changes in eeg and mmse scores associated with transdermal and oral rivastigmine in patients with alzheimer's disease

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Background: Alzheimer's disease (AD) is the most common cause of dementia in older patients. Rivastigmine (RV, Exelon®, Novartis), a reversible cholinesterase inhibitor, has been shown to improve the clinical manifestations of AD by delaying the breakdown of acetylcholine (ACh) released into synaptic clefts. Moreover, there is evidence that ACh modulates EEG alpha frequency.

Objectives: the objectives of this pilot study in patients with AD were to determine the effects of two formulations of RV (transdermal and oral) on Mini-Mental State Examination (MMSE) scores and on alpha frequency in particular the posterior dominant rhythm.

Methods: twenty subjects with AD were randomly assigned to receive either RV transdermal patch (RV-TDP, n=10) or RV capsules (RV-CP, n=10) according to the standard recommended dosage regimen. All patients were driven to the maximum drug dosage. Diagnosis of AD was made according to NINCDS-ADRDA criteria and the Diagnostic and Statistical Manual of Mental Disorders IV. All patients underwent EEG recordings at the beginning and at the end of the 18-month study period using P3, P4, O1 and O2 electrodes each at high (10.5–13.0 Hz) and low (8.0–10.5 Hz) frequency. MMSE scores were determined at the start of the study and at three successive 6-month intervals (T0, T1, T2, and T3).

Results: administration of RV-DP increases the spectral power of alpha waves in the posterior region and is associated with improved cognitive function as evidenced by significant changes in MMSE scores.

Conclusion: RV-DP provides an effective and long-term management option in patients with AD with the potential of improving compliance and tolerability.

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