Johnson Chiropractic Neurology & Nutrition

INSOMNIA

Vitamin B3 (niacin)

Increases REM sleep; Improves both quality and quantity of sleep by converting tryptophan to serotonin[4,5]

Vitamin B1 (thiamin)

In clinical trials, supplementation of healthy individuals that had marginal B1 deficiency improved their sleep.[1,2,3]

Folate & Vitamin B6

Both are cofactors for several neurotransmitters in the brain such as serotonin and dopamine, many of which regulate sleep patterns[4,6,7,8,9]

Vitamin A

Studies suggest vitamin A deficiency alters brains waves in non-REM sleep causing sleep to be less restorative.[24,25]

Vitamin B12

Normalizes circadian rhythms (sleep-wake cycles); Therapeutic benefits of B12 supplementation, both oral and intravenous, seen in studies.[10,11,12,13]

Oleic Acid

This fatty acid is a precursor of oleamide, which regulates our drive for sleep and tends to accumulate in the spinal fluid of sleep-deprived animals. Oleic acid also facilitates the absorption of vitamin A.[21,22,23]

Zinc & Copper

Both interact with NMDA (N-methyl-D-aspartate) receptors in the brain that regulate sleep; A higher Zn/Cu ratio is linked to longer sleep duration.[15,19,20]

Magnesium

Improving magnesium status is associated with better quality sleep; Mimics the action of melatonin; Also alleviates insomnia due to restless leg syndrome[14,15,16,17,18]

REFERENCES

[1]Zadeh S, Begum K. Comparison of nutrient intake by sleep status in selected adults in Mysore, India. *Nutr Res Pract* 2011;5:230-235.

[2]Smidt I, Cremin F, Grivetti L et al. Influence of thiamin supplementation on the health and general well-being of an elderly Irish population with marginal thiamin deficiency. *J Gerontol* 1991;46:M16-M22.

[3]Wilkinson T, Hanger H, Elmslie J et al. The response to treatment of subclinical thiamine deficiency in the elderly. *Am J Clin Nutr* 1997;66:925-928.

[4]Head K, Kelly G. Nutrients and botanicals for treatment of stress: adrenal fatigue, neurotransmitter imbalance, anxiety, and restless sleep. *Altern Med Rev* 2009;14:114-140.

[5]Robinson C, Pegram G, Hyde R et al. The effects of nicotinamide upon sleep in humans. *Biol Psychiatry* 1977;12:139-143.

[6]Kelly G. Nutritional and botanical interventions to assist with the adaptation to stress. *Altern Med Rev* 1999;4:249-265.

[7]Kelly G. Folates: supplemental forms and therapeutic applications. *Altern Med Rev* 1998;3:208-220.

[8]Larzelere M, Wiseman P. Anxiety, Depression and Insomnia. *Prim Care* 2002;19:339-360.

[9]Ebben M, Lequerica A, Spielman A. Effects of pyridoxine on dreaming: a preliminary study. *Percept Mot Skills* 2002;95:135-140.

[10]Okawa M, Mishima K, Nanami T et al. Vitamin B12 treatment for sleep-wake rhythm disorders. *Sleep* 1990;13:15-23.

[11]Ohta T, Ando K, Iwata T et al. Treatment of persistent sleep-wake schedule disorders in adolescents with methylcobalamin (vitamin B12). *Sleep* 1991;14:414-418.

[12]Chang H, Sei Hm Morita Y et al. Effects of intravenously administered vitamin B12 on sleep in rat. *Physiol Behav* 1995;57:1019-1024.

[13]Ebihara S, Mano N, Kurono N et al. Vitamin B12 affects non-photic entrainment of circadian locomotor activity rhythms in mice. *Brain Res* 1996;727:31-39.

[14]Durlach J, Pages N, Bac P et al. Biorhythms and possible central regulation of magnesium status, phototherapy, darkness therapy and chronopathological forms of magnesium depletion. *Magnes Res* 2002;15:49-66.

[15]Rondanelli M, Opizzi A, Monteferrario F et al. The effect of melatonin, magnesium, and zinc on primary insomnia in long-term care facility residents in Italy: a double-blind, placebo-controlled clinical trial. *J Am Geriatr Soc* 2011;59:82-90.

[16]Nielson F, Johnson L, Zeng H. Magnesium supplementation improves indicators of low magnesium status and inflammatory stress in adults older than 51 years with poor quality sleep. *Magnes Res* 2010;23:158-168.

[17]Hornyak M, Voderholzer U, Hohagen F et al. Magnesium therapy for periodic leg movements-related insomnia and restless legs syndrome: an open pilot study. *Sleep* 1998;21:501-505.

[18]Popoviciu L, Asgian B, Delast-Popoviciu D et al. Clinical, EEG, electromyographic and polysomnographic studies in restless legs syndrome caused by magnesium deficiency. *Rom J Neurol Psychiatry* 1993;31:55-61.

[19]Song CH, Kim YH, Jung KI. Associations of Zinc and Copper Levels in Serum and Hair with Sleep Duration in Adult Women. Biol Trace Elem Res 2012;Epub ahead of print

[20]Nevsimalova S, Buskova J, Bruha R et al. Sleep disorders in Wilson's disease. *Eur J Neurol* 2011;18:184-190.

[21]Mueller G, Driscoll W. Biosynthesis of oleamide. *Vitam Horm* 2009;81:55-78.

[22]Akanmu M, Adeosun S, Ilesanmi O. Neuropharmalogical effects of oleamide in male and female mice. *Behav Brain Res* 2007;182:88-94.

[23]Raju M, Lakshminarayana R, Krishnakantha T et al. Micellar oleic and eicosapentaenoic acid but not linoleic acid influences the beta-carotene uptake and its cleavage into retinol in rats. *Mol Cell Biochem* 2008;288:7-15.

[24]Sei H. Vitamin A and sleep regulation. *J Med Invest* 2008;55:1-8.

[25]Kitaaoka K, Hattori A, Chikahisa S et al. Vitamin A deficiency induces a decrease in EEG delta power during sleep in mice. *Brain Res* 2007;1150:121-130.