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Boron supplementation of peri-menopausal women affects boron metabolism and indices associated with macromineral metabolism, hormonal status and immune function^{†‡§}

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Abstract

A double-blind crossover designed experiment was conducted with 43 peri-menopausal women who were experiencing discomforts associated with menopause. They were given sodium borate capsules containing 2.5 mg of boron for 60 days followed (19 women) or preceded (24 women) by 90 days of receiving a placebo capsule containing lactose powder. Blood was collected weekly after a 12-hour overnight fast. Urine voided in 24 hours was collected three times each week. Because boron is well absorbed and excreted in the urine, urinary boron was used to estimate usual oral intake. Urinary boron excretion during the placebo period indicated that the usual boron intake of peri-menopausal women in the eastern North Dakota area of the United States ranges between 0.34 and 2.33 mg/d with a median of 1.15 mg/d. Usual plasma concentrations range between 0.020–0.067 µg/mL with a median of 0.033 µg/mL. The boron supplementation moderately increased the median plasma boron concentration to 0.052 µg/mL with a range of 0.028–0.075 µg/mL. Boron supplementation resulted in more frequent and severe hot flashes and night sweats in 21 women. However, 10 women reported a reduction in discomforts. The remaining 15 women did not respond negatively or positively to the boron supplementation. Boron supplementation significantly increased white blood cell numbers with a decreased percentage of lymphocytes and increased percentage of polymorphonuclear leukocytes. The boron supplementation also affected serum 17β-estradiol, alkaline phosphatase, and thyroxine concentrations, but the effect was influenced by the sequence in which the boron supplement and placebo were given. For example, both serum alkaline phosphatase and triiodothyronine concentrations were noticeably increased by boron supplementation when it followed the placebo period. However, the increase in serum 17β-estradiol concentration with boron supplementation was most marked when the boron was given before the placebo. The findings show that boron is homeostatically controlled and support the hypothesis that boron affects hormone processes, possibly at the cell membrane level, in humans. *J. Trace Elem. Exp. Med.* 12:251–261, 1999. Published 1999 Wiley-Liss, Inc.

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