

# Research Abstracts

## Zinc

### Activities of purine catabolism related enzymes in zinc deficiency: relationship to T-lymphocyte dysfunction and hyperammonemia

The activities of liver, muscle, and red blood cell enzymes involved in the degradation of purine were assayed in zinc deficient (ZD), pair-fed control (PF) and ad libitum-fed control (Ad lib) rats. Diets (1.5 ppm of zinc in ZD diet and 110 ppm in control diet) were fed to rats for 6 weeks after which they were sacrificed and tissues isolated for several assays. Results indicated a significant increase in the concentration of plasma NH<sub>3</sub> (P less than .0005) and uric acid (P less than .05), and a decrease in the concentration of blood urea nitrogen (BUN) (P less than .025) in ZD rats compared to both control groups. The activities of liver and red blood cell (RBC) nucleoside phosphorylase (NPase) were lower (P less than .025) in ZD rats. Activity of 5'adenosine monophosphate deaminase (AMPDA) was higher in liver (P less than .0001) and muscle (P less than .01) in ZD groups vs. controls. Activity of hypoxanthine polyribosyl transferase (HPRT) in liver was higher (P less than .005) in ZD group compared to controls. The present findings could be viewed from two aspects: first, they provide an insight into the specific role of zinc on T-lymphocyte function which is believed to be mediated by the regulatory effect of zinc on the enzyme nucleoside phosphorylase and, second they provide a possible mechanism for hyperammonemia observed in zinc deficient human subjects and experimental animals. Cossack ZT, Prasad AS. *Int J Vitam Nutr Res* 1991;61(1):51-6.

### Zinc may have a physiological role in regulating pituitary prolactin secretion

We studied the in vitro influence of physiologically relevant zinc concentrations on the pituitary synthesis and secretion of prolactin (Prl). Zinc in concentrations between 1 and 10 microM reduced Prl secretion and, to a milder extent, synthesis, but not basal or stimulated growth hormone (GH) or LH release. At a supraphysiological concentration of 100 microM, zinc markedly decreased Prl synthesis and secretion, but increased LH secretion. The ability of a physiological zinc concentration to influence Prl secretion suggests that this trace element may have a role in the in vivo regulation of Prl release. Login IS, Thorner MO, MacLeod RM. *Neuroendocrinology* 1983 Nov;37(5):317-20.

### Therapeutic efficacy of zinc picolinate in patients with taste disorders

We studied the therapeutic efficacy of zinc picolinate in patients with zinc-deficient and idiopathic taste disorders. Efficacy was assessed in a double-blind study. The following findings were obtained: 1. There was a significant difference between the zinc picolinate and placebo groups in the grade of improvement shown by the filter-paper disk method. 2. There was a significant difference between the zinc picolinate and placebo groups in the serum zinc concentration. 3. There was no significant difference between the two groups in the degree of total subjective recovery or the grade of improvement, as shown by in the whole mouth method. 4. We conclude that the administration of zinc picolinate is effective for patients with zinc-deficient and idiopathic taste disorders. Sakai F, Yoshida S, Endo S, Tomita H. *Nippon Jibiinkoka Gakkai Kaiho* 1995 Jul;98(7):1135-9.

### Exercise-induced changes in immune function: effects of zinc supplementation

To examine the effect of zinc (Zn) supplementation on exercise-induced changes in immune function, five male runners were randomly assigned in a double-blind crossover design to take a supplement (S; 25 mg of Zn and 1.5 mg of copper) or placebo (P) twice daily for 6 days. On morning 4 of each phase, 1 h after taking S or P, subjects ran on a treadmill at 70-75% of maximal oxygen uptake until exhaustion (approximately 2 h). Blood samples were obtained before (Pre), immediately after (Post), and 1 (Rec1) and 2 (Rec2) days after the run. [3H]thymidine incorporation by mitogen-treated mononuclear cell cultures was significantly lower (P a 0.05) Post than Pre, Rec1, or Rec2 for both S and P. Respiratory burst activity of isolated neutrophils was enhanced after exercise with P but not with S (P: Pre 12.0 +/- 1.1 vs. Post 17.6 +/- 2.3 nmol O<sub>2</sub>-/10(6) cells; S: Pre 11.7 +/- 0.3 vs. Post 12.1 +/- 1.2 nmol O<sub>2</sub>-/10(6) cells). Thus supplemental Zn blocked the exercise-induced increase in reactive oxygen species. Whether this antioxidant effect of Zn will benefit individuals exposed to chronic physical stress remains to be determined. Singh A, Failla ML, Deuster PA. *J Appl Physiol* 1994 Jun;76(6):2298-303.

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