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CuD cardiomyopathy as demonstrated by the reversal of depressed cardiac hemodynamic and contractile function, the restored responsiveness to β -adrenergic stimulation and the correction of the altered gene expressions. (Supported in by NIH grants HL63760 and HL59225 and USDA grant 2002-35200-11573.)

3.03

SELENIUM SUPPLEMENTATION AND BLOOD HEMORHEOLOGICAL CHANGE

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To investigate the effect of selenium supplementation on the blood fluidity, eleven healthy adults were administered 200 microgram of selenium per day during one week. Before and after the supplementation, blood fluidity of the subjects was measured with MC-FAN (microchannel array-flow analyzer). The blood fluidity was indicated by the passage time of the 100 microliter of heparinized whole blood through the narrow (id=7 micrometer) microchannel array. Before the supplementation the mean passage time was 44.0 (SD=5.7) seconds. And the time significantly ($p < 0.05$) shortened to 37.5 (SD=2.8) seconds after the supplementation. Serum selenium concentration and the activity of serum glutathione peroxidase, a selenoenzyme, tended to be increased during the supplementation. The factor analysis of the passage time and biochemical indices of the subjects showed that the blood fluidity change was related to the metabolic modification of lipoproteins during the supplementation. The results suggest that the selenium supplementation improves the blood fluidity through the modification of lipoprotein metabolism.

3.04

TRACE ELEMENT LEVELS AND REDOX MARKERS IN HUMAN ATHEROSCLEROSIS: RELATIONSHIP WITH APO E POLYMORPHISM

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Oxidation of LDL in the vessel wall plays an important role in the development of atherosclerotic lesions mediated by several mechanisms. Measurement of antioxidant/oxidant-related parameters and trace element levels in serum in parallel with the allelic profile of apo E may be useful in assessing the risk of atherogenesis in humans. Blood activities of antioxidant enzymes, SOD and GPx, total thiols, caeruloplasmin, α -tocopherol as well as products of oxidative damage, MDA and protein carbonyls were evaluated in patients with diagnostic atherosclerosis in parallel with matched healthy subjects. The elemental levels were assessed in plasma and blood cell fractions. The allelic frequencies of apo E were similar to those referred in the literature. Significantly decreased K, Fe and Zn levels were found in plasma of the atherosclerotic group. A tendency for a disruption in antioxidant enzyme status was observed in patients, although

serum caeruloplasmin and α -tocopherol contents were unchanged. Plasma protein carbonyls levels were decreased in patients. This study could contribute for a better understanding of the relationship between genetic and redox balance markers, which is of utmost importance for the prevention of atherosclerosis.

Category 4: Trace Elements and Diabetes Mellitus, Metabolic Syndrome X, and Obesity

4.01

STRESS INDUCED CHANGES IN TISSUE CHROMIUM, COPPER, AND ZINC ARE NOT CORRELATED WITH CHANGES IN INSULIN RELATED VARIABLES FOLLOWING THERMIC AGGRESSION

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The functions of Cr, Cu and Zn are linked to those of insulin and factors that alter insulin often lead to changes in these trace metals. The objective of the present study was to determine the effects of thermic aggression on Cr, Cu, Zn and insulin related variables. A third-degree burn injury involving 20% of total body surface was applied to 45 male Wistar rats, divided into 9 groups. Study conformed to the guidelines established by the NIH and the experiments were reviewed and approved by the French Army Ethical Committee. There was a significant rise in corticosterone reaching a maximum the first day of injury that was accompanied by significant increases in circulating insulin and glucagon that were maximal after two days. Changes in IGF-1 were not significant. For Cr, the most sensitive indicator of burn injury was a rapid decline in quadriceps Cr with no significant changes for Cu and Zn. For Zn, the largest effects were observed in the liver with a biphasic increase that was maximal within the first day of injury that decreased in the next three days but then increased and was still increasing after 10 days. Changes in tissue, plasma and urinary Cu concentrations were not significant. Trace metal concentrations in the brain were not altered by thermic aggression. These data demonstrate independent changes in the tissue concentrations of Cr and Zn that cannot be directly associated with the changes in insulin related variables.

4.02

EFFECT OF ZINC AND POLYPHENOLS TREATED DIABETIC RATS

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In this study, we investigated the in vivo effect of zinc (Zn) and polyphenols on plasma antioxidant capacity of streptozotocin (STZ) – treated diabetic rats, a model of diabetes characterized by a major oxidative injury. Animals were divided into four groups (eight in each group). One includes normal rats – control group (C). Other animals were injected intraperitoneal with STZ (55 mg/kg body weight). Diabetic rats were randomized according to glycemia to: untreated diabetic (D); diabetic treated with polyphenols-rich extract of grape seeds (D + P) and diabetic treated with Zn (D + Zn). The P and Zn were administered by gavage for 12 weeks. Plasma antioxidant capacity was determined by the total antioxidant status method of Randox. Untreated diabetic rats had a significantly