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بسم الله الرحمن الرحيم

مركز الشبكات وتكنولوجيا المعلومات

قسم التوثيق الإلكتروني

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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

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Biochemical studies on the relation between thyroxin hormone and selenium .

By

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ABSTRACT

Thirty rats were fed for six weeks on a selenium-deficient basal diet (0.007 mg Se / kg diet) containing different concentrations of methionine (0.03 , 0.1 , 0.2 , 0.3 or 0.4 %) . Another twenty rats were fed on a methionine-deficient basal diet (0.03 %) containing two concentrations of selenium (0.5 and 1.5 mg Se / kg diet) as sodium selenite or L-selenomethionine. The last experiment was repeated using a basal diet containing high level of methionine (0.4 %).

In the diet deficient in both selenium and methionine, the following results were obtained : The selenium concentrations were decreased in blood, kidney, liver and brain . Decrease in deiodinase activity were in kidney , liver and brain . Serum T_4 level was greatly increased, while serum T_3 was not changed . The activities of glutathione peroxidase were greatly decreased in blood, liver, kidney and brain, respectively. There are actually increased levels of serum malondialdehyde and conjugated dienes . Addition of normal (0.5 mg / kg) and high (1.5 mg / kg) levels of either selenite or selenomethionine resulted in the following results : Selenite and selenomethionine greatly increased the selenium contents many times according to the concentration of dietary selenium and the kind or organ. Deiodinase activity was significantly increased . The serum levels of T_4 were highly decreased, while serum T_3 levels were significantly increased. Selenium as selenite ion had a more potent effect on stimulation of deiodinase activity followed by lowering serum T_4 concentration than that found in selenium as selenomethionine. Many-fold increases in the activities of glutathione peroxidase were found. Serum malondialdialdehyde and conjugated dienes were significantly decreased and that was more pronounced at higher levels of selenite only . At high-methionine diet (0.4 %), increasing the dietary selenium concentration, in both selenite and selenomethionine forms, led to the following results : The selenium concentrations in tested organs were greatly increased, but these values were less than that found in methionine-deficient. The highest values of deiodinase activities in liver, kidney and brain were obtained and selenite ion was more effective than selenomethionine. As general results, the serum levels of T_4 were decreased , while serum T_3 was increased . The activities of glutathione peroxidase were enhanced in the tested organs especially in the presence of selenite ion. Serum malondialdehyde and conjugated dienes were significantly decreased. The elevation of dietary methionine slightly or nor decreased serum concentration of malondialdehyde, but it significantly decreased conjugated dienes, at constant level of selenite ion only.

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INTRODUCTION

1.INTRODUCTION

Selenium (Se) is an ultramicro essential trace element nutrient and both inorganic (selenite and selnate) and organic (selenocysteine and selenomethionine) forms of Se can be used as nutritional source. It is known to function as the active center of selenoprotein for redcx enzymes such as , glutathione peroxidase (GSH-Px). 5`-iodothyronine deiodinase ( ID ) contains single selenium atom at its active site, type I 5`-iodothyronine deiodinase catalyzes the deiodination of thyroxine (T_4) to form tri-iodothyronine (T_3) (***Groff and Gropper*, *2000***). This reaction is very important for the generation of a T_3, a primary hormonal regulator of metabolism as well as normal growth development. Thioredoxine reductase (TR) is also a selenium-containing enzyme (***Suzuki and Ogra, 2002***).

The selenium content of food varies depending on the selenium content of the soil where the animal was raised or the plant was grown. The distribution of selenium in the food chain was found to be as follow; high-selenium foods such as sea foods , organs meat (kidney and heart) and muscle meats ; medium-selenium foods such as nuts, garlic, onion, sunflower seeds and cereal grains ; low-selenium foods such as vegetables, fruits, drinking water and eggs (***Heinerman, 1998***).

A variety of different reactive species are generated daily in the body, often from multiple sites. In general, the reactive oxygen species are formed with exposure to substances such as smog, ozone, chemicals, drugs, radiation, high oxygen and during normal physiological processes (***Robertson et al., 1991)***. The free radicals attack the biological system, taking electrons from cell constituents including nucleic acids, proteins and polyunsaturated fatty acids (