شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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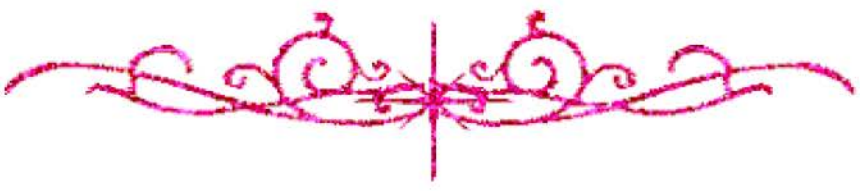

بالرسالة صفحات لم ترد بالأصل

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Protocol

Arabic summary

INTRODUCTION

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The human body requires a variety of minerals in different amounts to perform numerous metabolic tasks. A mixed balanced diet of varied foods and adequate energy values provides our best source of needed minerals for health, with individual supplements according to specific age and growth needs or clinical requirements. Minerals are single inert inorganic elements. Of the 54 known earth elements, 25 have been shown to be essential in humans. Minerals are classified into:

(1)- Major minerals: These comprise minerals that our bodies require more than 100mg/day: calcium, phosphorus, sodium, potassium, magnesium, chlorine and sulfur.

(2)-Trace elements: which are minerals needed in much smaller amounts i.e they are those elements that occur in the body in microgram per gram amounts or less.These comprise iron, iodine, zinc, copper, manganese, chromium, cobalt, selenium, molybdenum and fluoride [(1)]. They constitute less than 1% of all minerals in our body [(2)].

The only property that the trace elements have in common is that they normally occur and function in living tissues in low concentrations. These normal tissue concentrations vary greatly in magnitude and characteristic for each element. They are usually expressed as part per million (ppm) or μg/g [(3)]. A trace element can be considered essential if it meets the following criteria:

(1)- If it is present in all healthy tissues of all living things.

(2)- Its concentration from one animal to the next is fairly constant.

(3)- Its withdrawal from the body induces reproducibly the same physiological and structural abnormalities regardless of the species studied.

(4)- Its addition either reverses or prevents these abnormalities.

(5)- The abnormalities induced by its deficiency are always accompanied by pertinent, specific biochemical changes.

(6)- These biochemical changes can be prevented or cured when the deficiency is prevented or cured [4].

Most of these trace metals had been known as toxins or carcinogens long before their essentiality was established. In addition, their "trace" concentration presented formidable analytical challenges to the rudimentary methodology available at the time, in contrast to elements of toxicologic concern that were found in higher concentrations and could be analyzed with greater confidence [5].

Chromium has been known to be a micronutrient for mammals for 4 decades, but progress in elucidating its role has slowly proceeded [6]. The role of chromium in human diets had been recognized only in the past 20 years [2].

Since the 1950s it has been known that chromium is important for the expression of glucose tolerance and that in chromium deficiency the use of glucose is impaired. Chromium has been recognized as an essential nutrient since the finding of low- molecular- weight chromium as a biological modifier of insulin action and the clinical demonstration of deficiency associated with glucose intolerance that respond to the administration of chromium [7].

Chromium occurs primarily in the trivalent state (III), which is the most stable form, it is an essential trace metal necessary for the formation of glucose tolerance factor and for the metabolism of insulin [8].

The other form of chromium in the environment is the hexavalent state(VI), which is a strong oxidizing agent, capable of directly inducing tissue damage and possessing carcinogenic, mutagenic and teratogenic potencies [9].

When consumed orally, hexavalent chromium has not been reported to cause health effects in animals except at fairly high doses. The lack of oral toxicity at lower doses is believed to be due, in part, to the fact that the reductive conditions of the stomach that convert ingested hexavalent chromium to trivalent chromium prior to systemic absorption. Finley et al [10]. have shown, based on in vitro studies, that the reductive capacity of gastric juices in humans is likely to be on the order of tens of milligrams of hexavalent chromium per day. Indeed, the USEPA declared De Flora et al.'s findings as one of the bases for raising the maximum contaminant level (MCL) of hexavalent chromium in drinking water from 0.05 to 0.10 mg / liter (USEPA, 1991).

Commercial applications of chromium compounds include tanning (chromium III), corrosion inhibition, plating, glassware-cleaning solutions, wood preservatives(chromium VI), manufacture of safety matches, metal finishing (chromiumVI), and production of pigments (chromium III,VI) [11].
The wide range of uses of chromium has led to the exposure of a great number of workers to chromium compounds [12].

Among the health hazards of hexavalent chromium Cr(VI) is that it is considered to be an important, dangerous human lung carcinogen. This is due to its widespread exposure both occupationally and publically [13].
Also it is reported that the proportion of deaths from respiratory cancer has appreciably been raised in areas of high production of dichromates [14].

A health effect survey of populations exposed to chromium slag in soil in Tokyo, Japan extending over 8 years indicated a tendency toward symptoms characterized by headache, chronic fatigue, gastrointestinal tract complaints, positive occult blood tests, minute hematuria and albuminuria suggestive of incipient renal disease, and a tendency toward an increase in contact dermatitis that was seasonally related [15].

Studies performed in El-Mex bay, situated at the west of Alexandria showed that the total mass emission of chromium to the Bay from different environmental effluents is about (504 Kg/day). The flushing of the Bay to the open sea is responsible for the removal of 60% of chromium, also26% are removed through the sedimentation within the Bay. The remaining 14% of chromium are assumed to be accumulated by the Bay organisms [16].

Recently there has been an increasing interest in the potential effect of dietary chromium on the health of fish particularly with respect to their metabolism and growth [17].

Many studies have been performed on aquatic species, and found that hexavalent chromium accumulation occurred by passive diffusion[18]. Consequently, scientists proved that chromium can make fish more susceptible to infection as high concentrations can damage and/or accumulate in various tissues [19].

Although the effect of chromium toxicity on human and animal was a subject of interest for many years, no previous study showed the effect of chromium toxicity on the salivary glands.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

Harold et al (2000)[20] stated that the discovery of the importance of trace elements in nutrition began in the 19th century with the chemical analysis of elements in biological samples and the demonstration that certain elements were essential for growth of microorganisms, e.g., essentiality of zinc for enzymatic activities.

Wardlaw and Insel (1993)[2] mentioned that with the exception of iron and iodide, the importance of trace minerals in humans has been recognized only within the last 30 years.

Barcroft (1973)[21] defined a trace element as one that occurs in not more than one part in twenty thousand of the organism, and is concerned in some way with enzymatic action.

Cantarow and Schepartz (1967)[22] stated that essential physiological functions have been established for certain elements, e.g., copper, cobalt, zinc, iodine, manganese and molybdenum. In view of the fact that their essential activities are exerted by mere traces of these elements, it would appear that their functions are catalytic in nature, i.e., that they act as direct activators of certain enzymes, or, indirectly, as essential components of vitamins or hormones.

Neidermeier and Griggs (1970)[23] classified the trace metals as essential and nonessential. The essential elements are those which are indispensable for at least one vital function and include iron, zinc, copper, manganese, molybdenum, and perhaps chromium and strontium from the group assayed in saliva.