

NEWS UPDATES



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Mineral Concentrations in Hair and Nail Samples of Patients with Stomach Cancer

The authors state that an increase or decrease of certain trace minerals may be related to the risk and development of chronic disease such as cancer. Trace elements were analyzed in hair and nail samples of seventy-three cancer patients and a group of eighty-three controls. They found that copper, potassium, lithium, phosphorus and selenium were significantly higher in hair and nail samples in the affected group compared to controls. Magnesium and strontium levels were markedly lower in the cancer group and iron levels were found to be significantly higher. The mean levels of iron, selenium and phosphorus increased with advanced cancer stages in nail samples. Their results show that the increase in trace elements could be a potential diagnostic marker to help predict cancer progression and its etiology. *Janabai, G, et al. Investigation of Trace Elements in the Hair and Nail of Patients with Stomach Cancer. Indian j Clin Biochem. 33,4 2018.*

Hair and blood minerals in Children Living Near Smelters

Children living in a polluted area near a copper smelter in Russia were tested for whole blood elements and hair elements. The data was compared to children not exposed to a polluted environment. Significantly elevated levels of arsenic, lead and iron were found in both blood and hair samples of exposed children compared to the control group. Further, hair copper and phosphorus was highest in children living in the polluted area along with reduced levels of magnesium and calcium. The authors propose that adverse health effects in individuals living near the copper smelters may be associated not only with toxic metal exposure but also with altered mineral homeostasis. *Skalny, AV, et al. Whole blood and hair trace elements and minerals in children living in metal-polluted area near copper smelter in Karabash Chelyabinsk region, Russia. Environ Sci Pollut Res Int. 25,3, 2018.*

Germanium poisoning: clinical symptoms and renal damage caused by long-term intake of germanium

Abstract: We report five patients who have taken inorganic germanium preparations over a prolonged period. In all cases, the renal function deteriorated with no proteinuria or hematuria. Histological examination of the kidney's showed widespread tubular degeneration and interstitial fibrosis with minor glomerular abnormalities. Most patients had gastrointestinal symptoms such as vomiting, anorexia and weight loss; one patient had peripheral neuropathy and myopathy. A considerable amount of germanium was detected in the hair or nails of these patients. These cases clearly show that abuse of inorganic germanium compounds can induce renal damage with various extrarenal manifestations. *Obara K, et al. Jpn J Med, 67, 72, vol. 30, 1991.*

Molybdenum: an essential trace element

Abstract: Molybdenum is found in most foods, with legumes, dairy products, and meats being the richest sources. This metal is considered essential because it is part of a complex called molybdenum cofactor that is required for the three mammalian enzymes xanthine oxidase (XO), aldehyde oxidase (AO), and sulfite oxidase (SO). XO participates in the metabolism of purines, AAO catalyzes the conversion of aldehydes to acids, and SO is involved in the metabolism of sulfur-containing amino acids. Molybdenum deficiency is not found in free-living humans, but deficiency is reported in a patient receiving prolonged total parenteral nutrition with clinical signs characterized by tachycardia, headache, mental disturbances, and coma. The biochemical abnormalities in this acquired molybdenum deficiency include very low levels of uric acid in serum and urine (low XO activity) and low inorganic sulfate levels in urine (low SO activity). Inborn errors of isolated deficiencies of XO, SO, and molybdenum cofactor are described. Although XO deficiency is relatively benign, patients with isolated deficiencies of SO or molybdenum cofactor exhibit mental retardation, neurologic problems, and ocular lens dislocation. These abnormalities seem to be caused by the toxicity of sulfite and/or inadequate amounts of inorganic sulfate available for the formation of sulfated compounds present in the brain. XO and AO may also participate in the inactivation of some toxic substances, inasmuch as studies suggest that molybdenum deficiency is a factor in the higher incidence of esophageal cancer in populations consuming food grown in molybdenum-poor soil. *Sardesai, Nutr Clin Pract, 277,281, vol. 8, 1993*

Molybdenum cofactor deficiency

Abstract: We describe a new case of molybdenum cofactor deficiency, an under recognized inborn error of metabolism that results in neonatal seizures and neurologic abnormalities. Characteristic biochemical defects in affected individuals include hypouricemia, elevated urine sulfate (detectable by dipstick), and elevated S-sulfocysteine (detectable by anion exchange chromatography). This disorder should be considered in the differential diagnosis of neonatal seizures. *Arnold, et al. J Pediatr, 595, 598, vol. 123, 1993.*

Molybdenum – cofactor deficiency: an easily missed cause of neonatal convulsions

Abstract: Intractable seizures in the neonatal period may be caused by molybdenum-cofactor deficiency, an inborn error which combines the deficiencies of sulphite oxidase and xanthine dehydrogenase. The neurological symptoms of molybdenum cofactor and isolated sulphite oxidase deficiencies are identical. Two new cases are reported, and the literature on neonatal convulsions due for this deficiency is advocated in each case of unexplained refractory neonatal convulsions. Diagnosis may be missed or delayed on standard metabolic screening for several reasons discussed. By simply using a sulphite strip test in a fresh urine sample an indication for the defect can be obtained. Antenatal diagnosis can be performed by assay of sulphite oxidase activity in a chorionic villus sample. *Slot, et al. Neuropediatrics, 139, 142, vol. 24, 1993.*

Hypersensitivity to molybdenum as a possible trigger of ANA-negative systemic lupus erythematosus

Abstract: After implantation of two metal plates a 24 year old woman developed fever of unknown origin and successively more symptoms of an ANA-negative systemic lupus erythematosus (SLE). These symptoms resolved after removal of the plates and recurred during patch testing of the metal components, which showed a reaction to molybdenum. A lymphocyte transformation test indicated a delayed-type hypersensitivity to molybdenum. Subsequent progressive flare ups of SLE appeared without molybdenum reexposure. This is the first report suggesting the existence of a hypersensitivity to molybdenum, which may act as another environmental trigger SLE. *Federmann, et al. Ann Rhuem Dis, 403, 405, vol. 53, 1994.*

Cobalt cardiomyopathy, a report of two cases from mineral assay laboratories and a review of the literature

Abstract: Two young men employed in the mineral assay industry developed non-inflammatory cardiomyopathy. By review of clinical findings, elicitation of occupational and environmental histories, work-site evaluations and ascertainment of tissue cobalt levels, Nevada Public Health authorities confirmed these cases to be due to occupational cobalt exposure. Hair and heart cobalt levels were elevated for the cases, but control samples had no detectable cobalt. Excess ischemic heart disease mortality among cobalt-exposed workers may reflect misdiagnosis of cardiomyopathy. *Jarvis JQ, et al. J Occup Med, 620, 626, vol. 34, 1992.*

Trace element distribution in the hair of some sickle cell anemia patients and controls

Abstract: Hair samples of some young sickle cell anemia (SCA) and control patients in Nigeria were analyzed for 12 elements, viz, Se, Hg, Cr, Fe, Zn, Co, Cu, Br, As, Sb, Na, and Sc, using Instrumental Neutron Activation Analysis (INAA). With the exception of Cu, which was found to be significantly higher in the hair of SCA patients (at the 0.05 level of the t-test), there were generally no significant differences in elemental concentrations within the two groups. A preliminary study of the elemental contents of the fingernails of the same subjects showed a higher abundance of most of the elements in nail than in hair. These preliminary results were compared with similar studies from some other parts of the world. *Oluwole, et al. Biol Trace Elem Res, 479, 484, vol. 26-27, 1990.*

Lithium in scalp hair of adults, students, and violent criminals. Effects of supplementation and evidence for interactions of lithium with vitamin B12 and with other trace elements

Abstract: The lithium content of human hair shows an approximately linear response to extra-dietary lithium supplementation at dosage levels of up to 2000 micrograms/d. From the mean hair lithium concentration of 0.063 micrograms/g in 2648 predominantly American adults, and the reference hair lithium concentrations determined in the present study, the mean lithium intakes were calculated to be 730 micrograms/d. Hair lithium concentrations were extremely low in nearly 20% of the American samples, and in samples collected in Munich, Germany and Vienna, Austria. Hair lithium levels are low in certain pathological conditions, e.g., heart disease, in learning-disabled subjects, and in incarcerated violent criminals. The highest levels were observed in samples of a lithium-treated psychiatric patient. A statistically highly significant direct association was observed between the hair lithium and cobalt concentration, which suggests a role of lithium in the transport and distribution of vitamin B12. Interactions of lithium with other trace elements are also discussed. *Schrauzer GN, et al. Biol Trace Elem Res, 161, 176, vol. 34, 1992.*