

# NEWS UPDATES



JANUARY – FEBRUARY 2019

## Hair Minerals and Glucose Metabolism

This study involved over sixty individuals aged 40 to 78 years of age. Half were healthy subjects that served as controls and half were patients with diabetes. Both hair and serum minerals were analyzed as well as serum insulin, HbA1c, glucose, and cholesterol. The patients with diabetes had higher hair iron and lower serum zinc than controls. Insulin levels were positively associated with the hair copper/zinc ratio. *Krol, E, et al. The Relationship between Dietary, Serum and Hair Levels of Minerals (Fe, Zn,Cu) and Glucose Metabolism Indices in Obese Type 2 Diabetic Patients. Biol. Trace Elem. Res. Aug. 8, 2018.*

Comment: This study only analyzed a few minerals. Even though they found that hair minerals reflected a derangement in those minerals tested in the diabetic group other minerals are reflected in HTMA patterns as well. HTMA has been useful in detecting mineral disturbances in diabetic and prediabetes conditions for decades.

<https://traceelements.com/Docs/News%20May-June%2099.pdf><https://traceelements.com/Docs/News%20Jan-Feb%202007.pdf> <https://traceelements.com/Docs/DiabetesMarch-April2013Newsletter.pdf>  
<https://traceelements.com/Docs/News%20Sept-Oct%1988.pdf>

---

## Hair Elements and Glycated Hemoglobin

This research also confirms the relevance of HTMA in assessing mineral imbalances in diabetic conditions. The subjects included patients taking insulin or anti-diabetic agents with a non-diabetic control group. Findings included lower tissue levels of zinc, copper and chromium in the diabetic group and these levels were significantly lower with higher HbA1c levels. Previous studies have reported increased urinary excretion of zinc, copper, chromium, iron and magnesium in diabetic patients. Conclusions indicate that lower hair concentrations of these minerals may be reflective of increased urinary excretion due to diabetic nephropathy. *Hotta, Y, et al. Essential and Non-essential Elements in Scalp Hair of Diabetics: Correlations with Glycated Hemoglobin (HbA1c). Biol. Pharm. Bull. 41,7, 2018.*

---

## Hair Mineral Content in Children with Down's Syndrome

The study consisted of a group of 40 affected children and 40 controls ranging in age from one to two years. Findings concluded that 1 to 2 year old children with Down's syndrome are characterized by significant alterations of mineral and trace elements status. *Grabeklis, AR, et al. Hair Mineral and Trace Element Content in Children with Down's Syndrome. Biol. Trace Elem. Res. Sept. 12, 2018.*

---

## Low HTMA Copper and Fatty Liver

Copper deficiency is known to be related to abnormal lipid metabolism and is needed for proper liver function. Copper deficiency is also associated with non-alcoholic fatty liver degeneration (NAFLD). A study was performed on 751 adults divided into quintiles based upon hair copper concentration. Lower hair copper was correlated with higher body mass index, larger waist circumference, higher blood pressure, and low HDL. Individuals with NAFLD had significantly lower hair copper levels. *Lee, SH, et al. Low hair copper concentration is related to a high risk of nonalcoholic fatty liver disease in adults. J. Trace Elem Med Biol. 50, 2018.*

Comment: Copper is involved in numerous enzyme system and is necessary for normal mitochondrial function. Copper deficiency is also related to neurological disturbances, cardiovascular disease, osteoporosis, bacterial infections, malignancies, aneurysm, stroke, and orthopedic disturbances.

<https://traceelements.com/Docs/The%20Nutritional%20Relationships%20of%20Copper.pdf>

---

## Hair Nickel and Chromium Levels and Orthodontic Appliance

Orthodontic appliances commonly consists of nickel and chromium alloys that are included in fixed orthodontic appliances as well as bands, brackets and wires. Hair samples were analyzed in a group of individuals with orthodontic appliances after one year since placed, and a control group without appliances. Elevated levels of both nickel and chromium were found in the treatment group compared to controls. *Jamshidi, S, et al. Evaluation of scalp hair nickel and chromium level changes in patients with fixed orthodontic appliance: a one-year follow-up study. Acta Odontol Scand. 76,1 2018.*

Comment: Some individuals can be or can become sensitive to metals contained in orthodontic or other metal prosthetics. HTMA can be a useful screening tool to assess an individual's susceptibility to absorption of these alloys.

---

## Hypertension and Hair Mineral Concentrations

Hair minerals can indicate dietary mineral intake levels. Hair samples were obtained from women with high blood pressure and a control group. Calcium, magnesium, strontium and barium were analyzed. Lower levels of these elements was associated with an increased presence of hypertension and reflected the different dietary intake between the two groups tested. *Wang, B, et al. Alkaline-earth elements of scalp hair and presence of hypertension in housewives: A perspective of chronic effect. Chemosphere, 181, 2017.*

