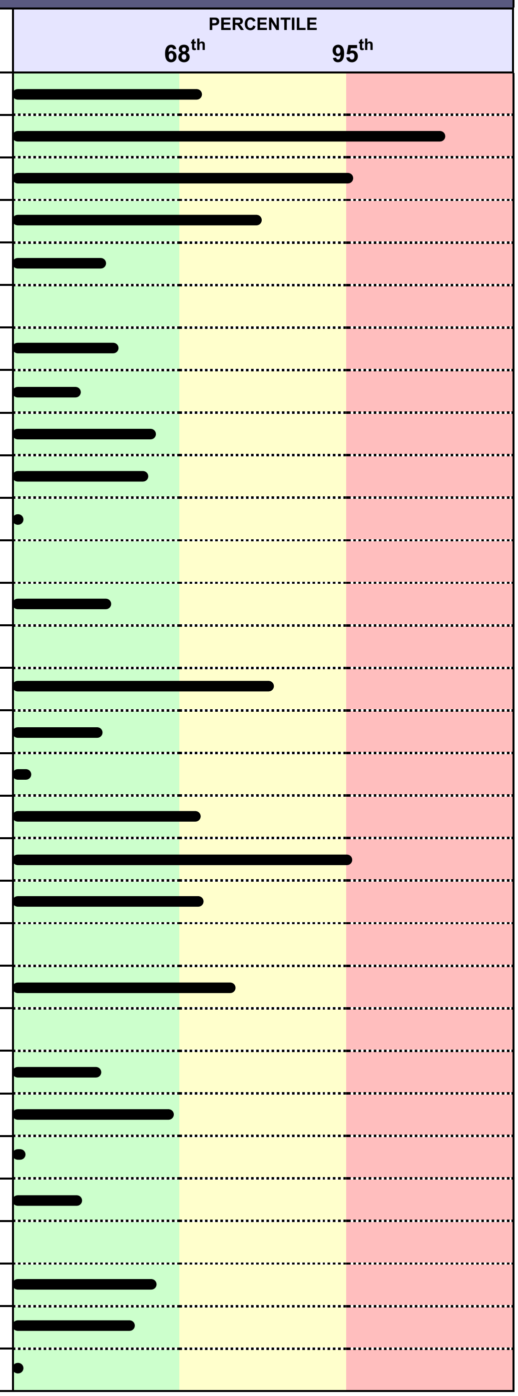
LAB #: Sample Report
PATIENT: Sample Patient
ID:
SEX: Male
AGE: 57

CLIENT #: 12345
DOCTOR: Sample Doctor
Doctor's Data, Inc.
3755 Illinois Ave.
St. Charles, IL 60174 U.S.A.

Toxic Element Exposure Profile; Hair

TOXIC METALS

		RESULT µg/g	REFERENCE INTERVAL
Arsenic	(As)	0.096	< 0.20
Lead	(Pb)	31	< 5.0
Mercury	(Hg)	3.9	< 3.0
Cadmium	(Cd)	0.18	< 0.30
Chromium	(Cr)	0.40	< 0.95
Beryllium	(Be)	< 0.01	< 0.050
Cobalt	(Co)	0.013	< 0.080
Nickel	(Ni)	0.08	< 0.60
Zinc	(Zn)	170	< 270
Copper	(Cu)	24	< 60
Thorium	(Th)	0.001	< 0.005
Thallium	(Tl)	< 0.001	< 0.005
Barium	(Ba)	0.58	< 3.0
Cesium	(Cs)	< 0.002	< 0.010
Manganese	(Mn)	0.95	< 1.3
Selenium	(Se)	0.66	< 2.1
Bismuth	(Bi)	0.11	< 5.0
Vanadium	(V)	0.082	< 0.20
Silver	(Ag)	1.2	< 0.50
Antimony	(Sb)	0.078	< 0.15
Palladium	(Pd)	< 0.004	< 0.010
Aluminum	(Al)	11	< 19
Platinum	(Pt)	< 0.003	< 0.010
Tungsten	(W)	0.003	< 0.015
Tin	(Sn)	0.29	< 0.80
Uranium	(U)	0.002	< 0.20
Gold	(Au)	0.032	< 0.30
Tellurium	(Te)	< 0.05	< 0.050
Germanium	(Ge)	0.035	< 0.045
Titanium	(Ti)	0.44	< 1.0
Gadolinium	(Gd)	0.001	< 0.008



SPECIMEN DATA

Comments:

Date Collected: **02/11/2019**
Date Received: **02/19/2019**
Date Completed: **02/25/2019**

Method: **ICP-MS**
<dl: **less than detection limit**
µg/g = ppm

Sample Type: **Head**
Sample Size: **0.197 g**
Hair Color: **Blond**
Treatment:
Shampoo: **Paul Mitchell**

Metals are listed in descending priority order based upon data from the Agency for Toxic Substances and Disease Registry which considers not only the relative toxicity per gram metal, but also the frequency for occurrence of exposure.

HAIR ELEMENTS REPORT
INTRODUCTION

Hair is an excretory tissue that concentrates potentially toxic elements. In general, the amount of an element that is irreversibly incorporated into growing hair is proportional to the level of the element that has been circulating in blood. Therefore, the Hair Toxic Element Profile provides a screening test for EXPOSURE to potentially toxic elements such as methyl mercury, arsenic, lead, and cadmium.

The Hair Toxic Element Exposure Profile considers the relative toxicity per gram element and the relative frequency of occurrence of exposure to the elements. The reported elements are listed in descending order of importance in accordance with guidelines provided by the U.S. Centers for Disease Control and Prevention. Any metal found at levels equal to or exceeding the reference value (95th percentile) will generate interpretive text for that element in the body of the report that follows.

All screening tests have limitations that must be taken into consideration. The correlation between hair element levels and physiological disorders is determined by numerous factors. Individual variability and compensatory mechanisms are major factors that affect the relationship between the distribution of elements in hair and symptoms and pathological conditions. It is also very important to keep in mind that scalp hair is vulnerable to external contamination of elements by exposure to hair treatments and products. Likewise, some hair treatments (e.g. permanent solutions, dyes, and bleach) can strip hair of endogenously acquired elements and result in false low values. Careful consideration of the limitations must be made in the interpretation of results of hair analysis. The data provided should be considered in conjunction with symptomology, occupation, diet analysis and lifestyle, physical examination and the results of other analytical laboratory tests.

Caution: The contents of this report are not intended to be diagnostic and the physician using this information is cautioned against treatment based solely on the results of this screening test.

Lead

Generally, hair is an excellent indicator of the body burden of lead (Pb). However, elevated levels of Pb in head hair are occasionally an artifact of hair darkening agents, or dyes, e.g. lead acetate. Although these agents can cause exogenous contamination, some transdermal absorption can contribute to body burden. When scalp hair is contaminated with such products, hair Pb levels are typically extremely high.

Pb has neurotoxic and nephrotoxic effects and interferes with heme biosynthesis. Pb may also affect the body’s ability to utilize the essential elements calcium, magnesium, and zinc. At moderate levels of body burden, Pb may have adverse effects on memory, cognitive function, nerve conduction, and metabolism of vitamin D. Pb is transported through the placenta to the fetus and is found in human breast milk. Children with hair Pb levels greater than 1 µg/g have been reported to have a higher incidence of hyperactivity than those with less than 1 µg/g. Children with hair Pb levels above 3 µg/g have been reported to have more learning problems than those with less than 3 µg/g. Hair lead levels are commonly elevated is association with ADD/ADHD. Detoxification therapy by means of chelation results in transient increases in hair lead. Eventually, the hair Pb level will normalize after detoxification is complete.

Symptoms associated with excell Pb are somewhat nonspecific, but include: anemia, immune dysregulation, headaches, gastric distress, fatigue, weight loss, cognitive dysfunction, decreased coordination, depression, anxiety, and aberrant behavior.

Occupation exposure to Pb occurs in the fields of mining, refineries, and the production of storage batteries, ammunition, solder, building materials, cable sheeting and foils. Other sources of exposure to Pb include: welding, old leaded paint (chips/dust), drinking water, some fertilizers, industrial pollution, lead-glazed pottery, newsprint, and some candles. A recent study indicates that silicofluoridation of water enhances the assimilation of Pb in humans.

Confirmatory tests for Pb excess are: urine elements analysis following provocation with intravenous EDTA, DMPS, or oral DMSA. Whole blood analysis only reflects recent or ongoing exposures and may not correlate with total body burden. Fecal lead analysis provides an excellent indication of dietary exposure and an approximation of assimilation. Increased blood or urine protoporphyrins is a finding consistent with Pb excess, but may occur with other toxic elements as well.

Mercury

Mercury (Hg) is toxic to humans and animals. The accumulation of Hg in the body is generally reflected by the hair Hg levels, but hair Hg levels can occasionally be high in association with the use of certain hair dyes and sprays.

The concentration of Hg in hair is typically 200-300 times greater than that in blood. Organic Hg, such as methylmercury derived from fish, is incorporated into hair at a much higher rate than is inorganic Hg (dental amalgams). Therefore, very elevated levels of hair Hg are most often associated with high end fish consumption or occupational exposure. As a result of DDI experience in a large multi-center trial of Hg detoxification, it is apparent that hair Hg may be deceptively low or even nondetectable in some individuals who do not have adequate endogenous detoxification capacity. Apparently, such individuals are unable to efficiently mobilize/excrete Hg.

Individuals vary greatly in sensitivity and tolerance to Hg exposure. At hair levels below 3 µg/g, Hg can suppress biological selenium function and may cause or contribute to immune dysregulation. Hallmark symptoms of excess Hg include: loss of appetite, decreased senses of touch, hearing, and vision, fatigue, depression, emotional instability, peripheral numbness and tremors, poor memory and cognitive dysfunction, and neuromuscular disorders. Hair Hg has been reported to correlate with fish consumption and acute myocardial infarction. On average each 1 µg/g of hair Hg was found to correlate with a 9% increase in AMI risk (Circulation 1995; 91:645-655).

Sources of Hg include dental amalgams, fish, contaminated water supplies, some hemorrhoidal preparations, some vaccines, skin lightening agents, instruments (thermometers, electrodes, batteries), combustion of fossil fuels and hospital wastes, some fertilizers, and the paper/pulp and gold industries. After dental amalgams are installed or removed a transient (several months) increase in hair Hg is often observed. Also, "baseline" hair Hg levels for individuals with dental amalgams are higher (about 1 to 2 µg/g) than are baseline levels for those without (below 1 µg/g).

Confirmatory tests for elevated Hg are measurement of Hg in packed red blood cells as an indication of recent/ongoing exposure (does not correlate with whole body accumulation), fecal mercury levels, and measurement of urine Hg following use of a dithiol chelating or mobilizing agent such as DMPS/DMSA (an indication of total body burden). Greater than 90% of Hg is naturally excreted into the feces via the biliary route.

Silver

Hair Silver (Ag) levels have been found to reflect environmental exposure to the element. However, hair is commonly contaminated with Ag from hair treatments and swimming pools or hot tubs.

Ag is not an essential element and is of relatively low toxicity. However, some Ag salts are very toxic.

Sources of Ag include seafood, metal and chemical processing industries, photographic processes, jewelry making (especially soldering), effluents from coal fired power plants and colloidal silver products.

The bacteriostatic properties of Ag have been long recognized and Ag has been used extensively for medicinal purposes; particularly in the treatment of burns. There is much controversy over the long term safety of consumption of colloidal silver. Very high intake of colloidal silver has been reported to give rise to tumors in the liver and spleen of laboratory animals (Metals in Clinical and Analytical Chemistry, eds. Seiler, Segel and Segel, 1994). However, these data may not have relevance to the effects of chronic, low level consumption by humans.

Dithiol chelators effectively bind Ag and DMPS increased survival in rats that received injections of silver nitrate. However, there are currently no labs that can accurately measure Ag in urine due to technical difficulties.