

**Hair Element Analysis**

**Accession Number: 222222**

**Provider:**

**Patient:**

**Gender :** M

John Smith

**Date of Birth :** 01-Jul-1982

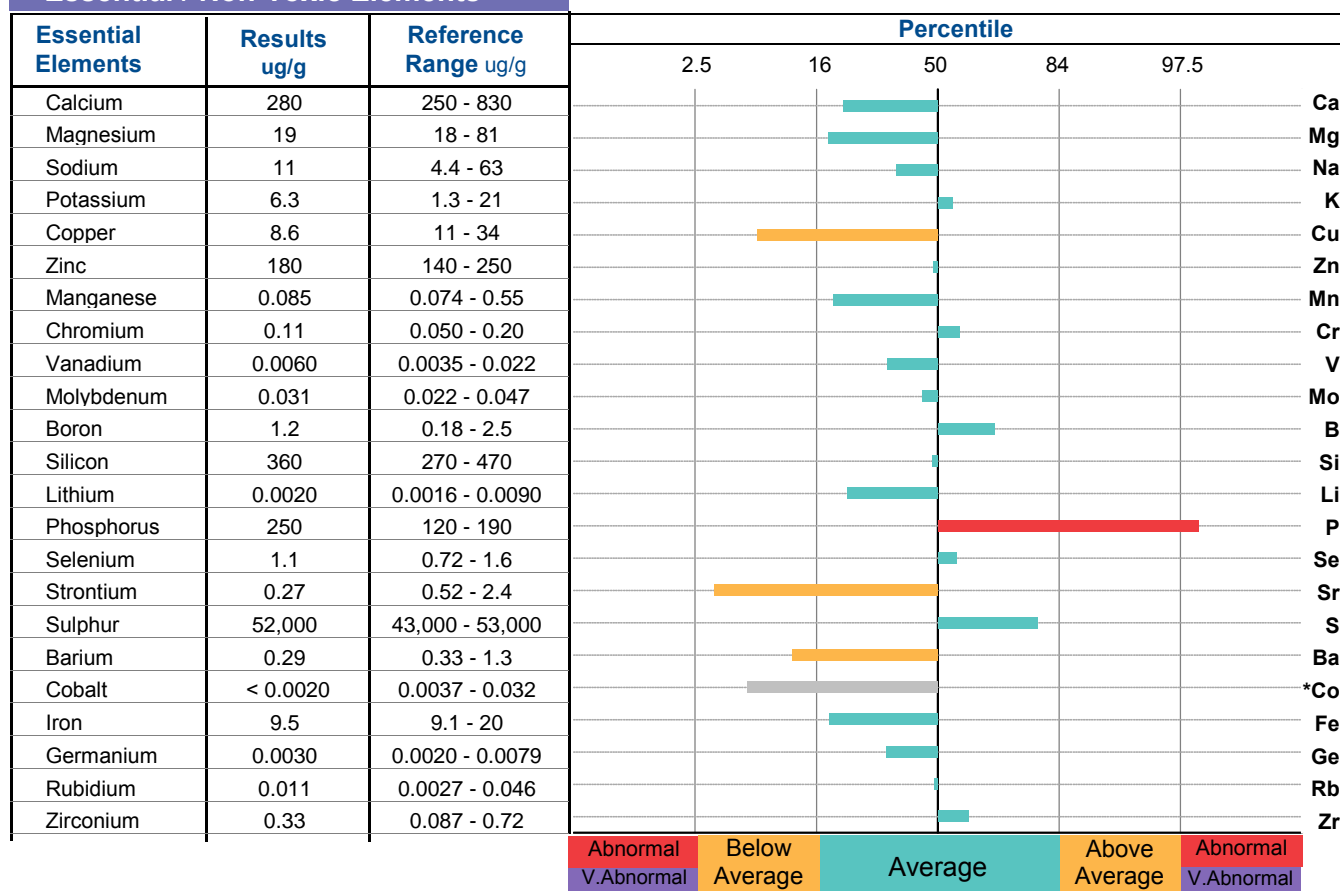
**Age:** 31

Phone:

Phone:

Fax:

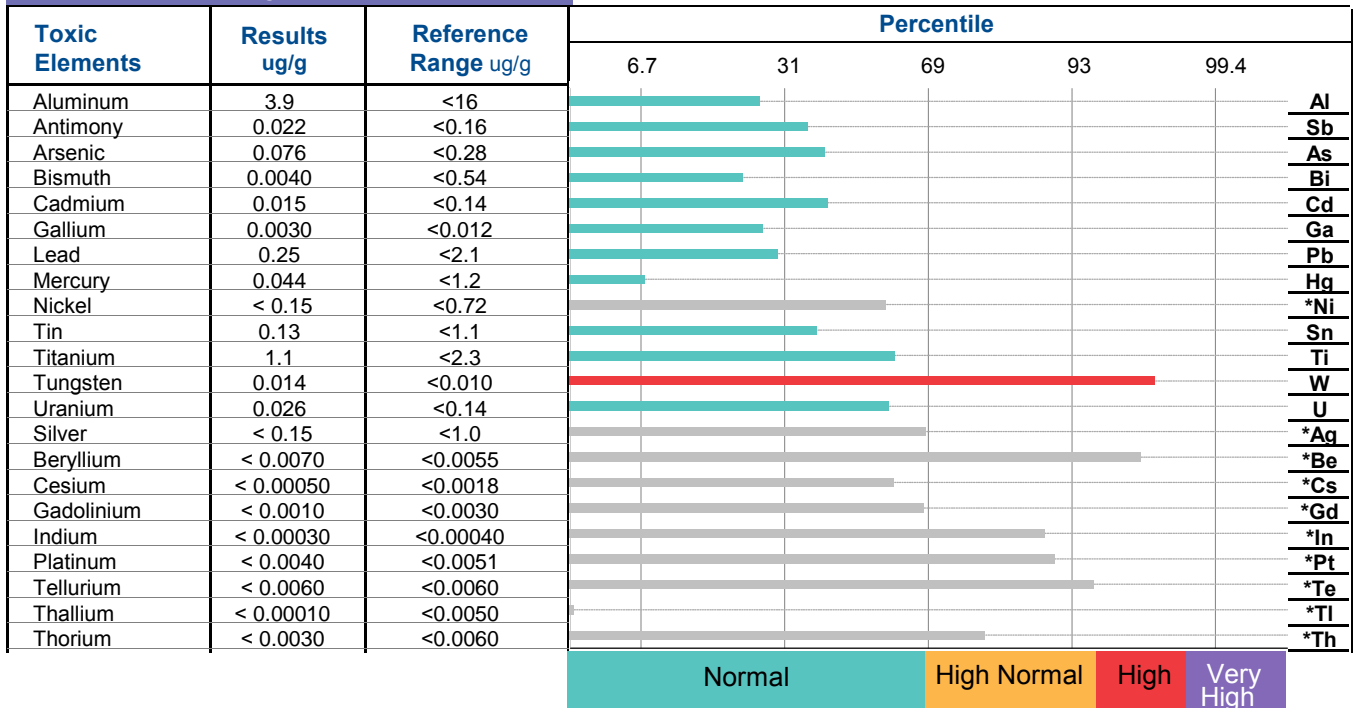
**Essential / Non-Toxic Elements**



\* Result lies below detection limit (DL is at left end of bar).

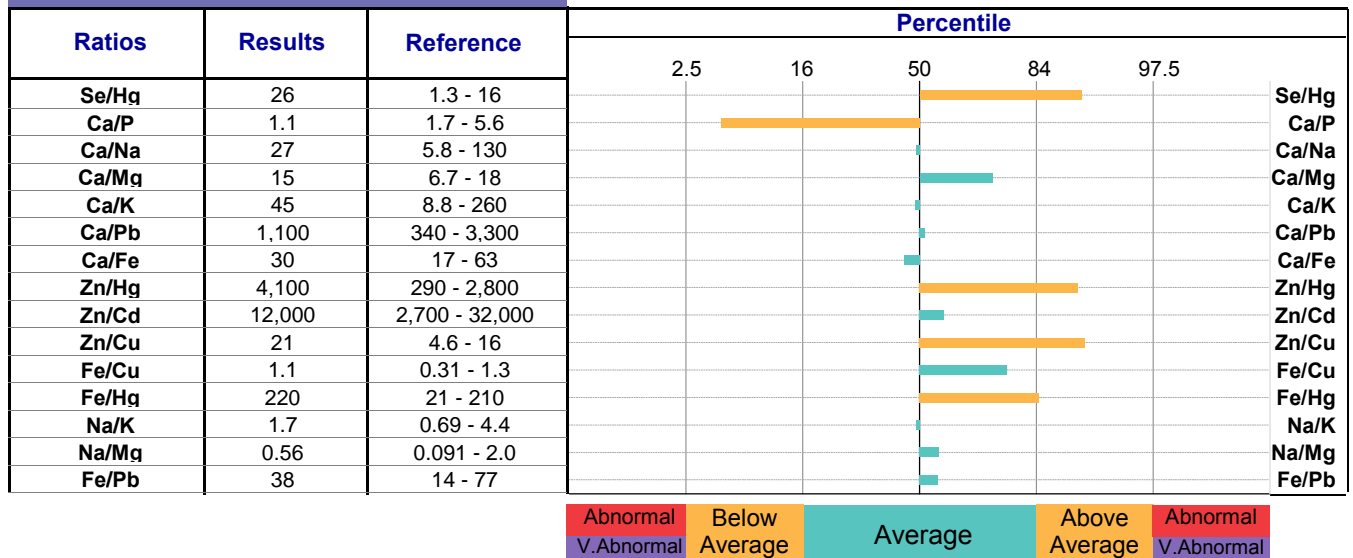
**NOTE:** Our interpretation follows the system developed by Andrew Hall Cutler PhD, which requires consideration of the overall distribution pattern for essential elements as a first step in the interpretation of the results. If the essential element distribution pattern is statistically normal, then both toxic and essential element results can usually be taken at face value. If the essential elements results exhibit a statistically improbable distribution pattern, this suggests heavy metal toxicity or some other interfering process. The interpretation comments starting on page 3 state whether the essential element graph above fits a statistically normal or statistically unlikely distribution pattern.

**Toxic / Potentially Toxic Elements**



\* Result lies below detection limit (DL is at right end of bar)

**Element Ratios**



**DISCLAIMER MANDATED BY THE COLLEGE OF PHYSICIANS AND SURGEONS OF ALBERTA**

This hair analysis method has been reviewed and accepted by the Laboratory Accreditation Committee of the College of Physicians and Surgeons of Alberta. The College considers hair element analysis to be complementary medicine. Analysis of chemical elements in hair has been used in research but is not approved for diagnosis of toxicity or deficiency states. Rocky Mountain Analytical does not diagnose or make treatment recommendations. Data is provided for research and educational purposes only.

**VANADIUM**

There is no result for vanadium available for this patient. None of the other elements are affected. We apologize for any inconvenience this may cause.

**DOES THE LENGTH OF THE HAIR STRANDS MATTER?**

Hair grows about 1 cm per month. We ask patients to give us samples composed of the first cm of hair closest to the scalp, in order to give a picture of what has gone on for the patient in the month or so prior to sampling. If we receive hair samples with strands longer than 1 cm, please be aware that the interpretation will reflect average conditions over an amount of time proportional to the length of the hair! For example, a hair sample consisting of 6 cm strands will give results averaged over roughly 6 months prior to sampling.

**I TREAT MY HAIR (DYE, PERM, BLEACH), BUT DIDN'T NOTE THIS ON THE REQUISITION. DOES THIS MATTER?**

Patients whose hair is coloured, permed or bleached are advised to wait at least four to six weeks after their last hair treatment, and to only submit the first 1 cm of hair closest to the scalp (hair grows about 1 cm per month). This ensures that untreated hair is being analyzed. Dyed, bleached or permed hair may give invalid results.

**DISTRIBUTION PATTERN OF ESSENTIAL ELEMENTS IS NORMAL AND ORDERLY**

The Z-scores for the essential elements meet the criteria for a normal distribution pattern, as outlined by Dr. Andrew Hall Cutler, in his book: *Hair Test Interpretation: Finding Hidden Toxicities*. The "textbook" distribution pattern will be more or less symmetrical, with most of the essential elements lying within one standard deviation of their mean, and with few elements lying more than 2 standard deviations away from their mean. Dr. Cutler considers this to be evidence that transport of the essential chemical elements (and many of the potentially toxic elements) into hair is normal and orderly; the levels of these elements are considered to be reflective of body stores (with some exceptions).

**ESSENTIAL ELEMENT DISTRIBUTION PATTERN EXHIBITS A BIAS TOWARD THE LEFT**

In addition to whatever else might be going on, the essential elements are exhibiting a "left bias" with 15 to 17 essential elements whose results lie below their mean (15 to 17 green, red, yellow or purple bars going left). This is still a statistically normal pattern but it is unusual enough to comment upon. It may be due to a globally reduced intake of essential elements due to dietary choices, which might be more likely to occur in children or the elderly. It may reflect a reduced ability to digest and assimilate nutrients due to decreased gastric acidity, decreased pancreatic enzyme output or decreased ability of the gut wall to absorb nutrients due to inflammation, atrophy or surgery. Some practitioners experienced with hair testing are of the opinion that this can reflect some toxic influence, such as a heavy metal beginning to disrupt the element transport mechanisms into hair. It may also be a genetic tendency.

**EXPECTED NUMBER OF YELLOW BARS**

There are 4 essential elements having a Z score between 1 and 2 standard deviations away from the mean (4 yellow bars). As a general rule, a profile which exhibits normal element transport will have up to six essential elements with yellow bars.

**ESSENTIAL ELEMENTS WHICH HAVE A GREY BAR ARE BELOW DETECTION LIMIT**

Occasionally, one or more of the bars for the essential elements will be grey. A grey bar for an essential element indicates that the measured result is below the detection limit for that element. The actual result for an essential element with a grey bar will lie somewhere to the left of the end of that bar, indicating that the true result is at least as low as indicated, but could be lower.

**SOME ELEMENTS WITH YELLOW BARS HAVE NO ASSOCIATED COMMENT**

If no comment appears for any given essential element that has a yellow bar (above or below the mean), it is usually not an oversight. In most cases it means that the finding is not clinically significant.

**COBALT LOWER THAN NORMAL (YELLOW, RED OR PURPLE BAR POINTING LEFT)**

The cobalt level is low, but it is not known to what degree hair cobalt reflects body stores. Inorganic cobalt (non-B12 bound cobalt) cannot be utilized for B12 synthesis by humans; therefore, low hair cobalt should not be interpreted as an indicator of Vitamin B-12 deficiency. This is especially true when the essential element distribution pattern is abnormal. Good food sources of cobalt include meat, eggs, fish, oysters, nuts, green leafy vegetables (such as broccoli and spinach), and cereals (such as oats).

**COPPER LOWER THAN NORMAL (YELLOW, RED OR PURPLE BAR POINTING LEFT)**

Copper is lower than normal (bar for copper points left). A yellow bar is lower than average; a red bar is low; a purple bar is markedly low. When element transport is normal, hair copper is thought to be reflective of copper stores elsewhere in the body. (Note that individuals with rare copper storage diseases such as Wilson's disease and Menke's disease, hair copper can be low in the face of elevated body copper levels.) Copper deficiency can present with anemia, poor wound healing, decreased pigmentation of hair and skin, and low levels of catecholamine neurotransmitters (leading to decreased energy and depressed mood). Food sources of copper include whole grain cereals, legumes, oysters, liver, cherries, dark chocolate, nuts, prunes, eggs.

**A GREEN BAR FOR IRON DOES NOT AUTOMATICALLY IMPLY NORMAL IRON STORES IN THE BODY**

The iron level is normal (within the middle 68 percent of the reference population); this does not mean body stores of iron are normal, as it is generally accepted that hair iron does not correlate to other measures of bodily iron. Serum iron markers may be abnormal in the face of normal hair iron levels.

**PHOSPHORUS HIGH OR MARKEDLY HIGH (RED OR PURPLE BAR POINTING RIGHT)**

Hair phosphorus is thought to be representative of body levels and dietary intake when element transport is normal. Dairy products, organ meats, sardines, Brewer's Yeast, nuts, whole grains and legumes are all higher in phosphorus, but consumption of excessive amounts of these foods would still only lead to increased phosphorus in the face of renal disease. Elevated hair phosphorus might prompt an evaluation of renal function.

**STRONTIUM BELOW NORMAL (YELLOW, RED OR PURPLE BAR POINTING LEFT)**

Strontium is low. Hair strontium is thought to reflect body strontium when element transport is normal. Since strontium is important for maintenance of bone density and healthy dentition, a low strontium level might come under scrutiny when osteopenia, osteoporosis or dental caries are of concern. Foods that contain significantly high concentrations of strontium are grains (especially the bran), Brazil nuts, lettuce, cabbage, onions and dairy products. Children are more likely to have low strontium intake than adults.

**YELLOW OR RED BARS FOR TOXIC/POTENTIALLY TOXIC ELEMENTS**

For some of the elements normally present in hair at very low levels, only the upper part of the statistical distribution could be accurately determined. It was possible to accurately determine the 95th percentile threshold for all elements (i.e. that concentration below which 95% of the results fall). By convention, reference ranges are usually set at the 95th percentile, so we are always able to determine whether an element is within its reference range. When a toxic/potentially toxic element has a yellow or red bar, this does not necessarily mean that this is a worrisome result; it only means that the result lies toward the high end of the observed range of values in clinically normal individuals.

**GREY BARS FOR TOXIC/POTENTIALLY TOXIC ELEMENTS**

A grey bar for a toxic/potentially toxic element indicates that the measured result is below the detection limit for that element. The "actual" result for an element with a grey bar will lie somewhere along the bar, but in most cases, the actual result will be quite a bit lower (farther to the left) than indicated by the length of the bar.

**ESSENTIAL ELEMENT DISTRIBUTION PATTERN EXHIBITS A BIAS TOWARD THE LEFT**

As noted above, the essential elements are exhibiting a "left bias" with 15 to 17 essential elements whose results lie below their mean (15 to 17 grey, green, red, yellow or purple bars going left). Recognize that the same tendency may also affect the toxic elements; the levels of some of these elements in the hair may be under-represented relative to levels in the blood and other tissues.

**TUNGSTEN HIGHER THAN AVERAGE (YELLOW BAR)**

When essential element transport is normal and orderly, the tungsten level in hair is thought to adequately reflect body burden. Excess tungsten can interfere with the action of molybdenum and deplete bodily stores. (Molybdenum is a cofactor for enzymes which metabolize sulfites, alcohol, purines and xanthines.) Excess tungsten can therefore manifest as molybdenum deficiency (sulphite sensitivity, increased sensitivity to alcohol, and sensitivity to high-purine foods such as sardines, organ meats, salmon, tuna, herring, anchovies and game meat). In the absence of these types of sensitivities, and if there is no obvious exposure vector for tungsten (TIG welding fumes, machining with tungsten carbide tools, electrolysis of hair\*), yellow zone or even low red zone tungsten is probably not clinically significant; it simply means that the measured result lies toward the top end of the distribution of results in clinically normal individuals.

\* An overlooked exposure vector is electrolysis of unwanted hair; the electrolysis needles may be made of tungsten, as tungsten is able to hold an extremely sharp point, and is electrically conductive.

**GENERAL COMMENT ABOUT ELEMENT RATIOS**

Some hair testing laboratories make extensive use of the ratios of various elements in their interpretations. There is controversy regarding the validity of element ratios derived from samples which are subjected to a wash procedure in the laboratory. RMA uses a wash procedure prior to analysis. A selection of the more common ratios are included in this report for the convenience of those practitioners used to working with ratios; however, the commentary provided for these ratios is not extensive. In some instances, a ratio might be prominently abnormal (red or purple bar) but there is no accompanying commentary. This means the Medical Director is not aware of any clinical significance for that particular abnormality. There might be deep meaning to the finding that we are not aware of. Note that even if essential element transport is abnormal, the ratios are still deemed to be valid in most cases.

**LOW RATIO: Ca/P (YELLOW, RED OR PURPLE BAR POINTING LEFT)**

Some practitioners familiar with hair testing feel that a low ratio of calcium to phosphorus (Ca/P) may indicate a need for digestive enzymes.



George Gillson, MD PhD  
Medical Director

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