STRONTIUM, BARIUM and TITANIUM
HTMA and the Lesser Known Trace Minerals

A common question that we are frequently asked is: “Why do we test for the additional elements in a Hair Tissue Mineral Analysis (HTMA)?”

The main reason is due to the fact we recognize that there is an inter-relationship between most, if not all, mineral elements that enter the body. By using analytical pathology assessment in a HTMA, the more reliable data we can provide will ultimately lead to better health appraisals and clinical outcomes. Like all elements, trace minerals enter the body from various sources including: dietary, supplementation, environmental and external pollutants (xenobiotics) and medications. Some serve as essential nutritional minerals for biological function and others are toxic such as heavy metals. Certain lesser known additional elements are also considered toxic while others are biologically inert. In any case, we need to consider that all mineral elements have the potential to have a cause and effect, with respect to maintaining normal homeostatic balance in the body.

A comprehensive analysis in a HTMA test (including the additional elements) gives us an indication of what is happening with all mineral element levels (nutritional, toxic and additional) within the body at an intra-cellular tissue level. We consider that the health of the human body as a whole begins at the cellular level. This assessment may give us some insight as to what mineral imbalances and toxic elements are impacting on our overall health.

In this newsletter we will focus on three of the lesser known additional elements: strontium, barium and titanium. We will discuss their relevance to human biological function, main sources from outside the body, toxicity, absorption, excretion and relevance in HTMA assessment. In following newsletters, we will continue to discuss more information on elements analysed in a HTMA which will include: germanium, bismuth, rubidium, nickel, platinum, thallium, vanadium, tin, tungsten and zirconium.

Strontium

Strontium is a soft, silver-yellow, alkaline earth metal. It is highly reactive to air and water, hence this element always naturally occurs combined with other elements and compounds. It has physical and chemical properties are similar to calcium and barium.1 Strontium commonly occurs in nature, forming about 0.034% of all igneous rock and in the form of the sulfate mineral celestite (SrSO₄) and the carbonate strontianite (SrCO₃).

Sources

Strontium is a naturally occurring element commonly found in many parts of the environment including rocks, soil, dust, coal, air and oil. Naturally occurring strontium is not radioactive and is either referred to as stable strontium or strontium. The stable isotope strontium is not radioactive and is either referred to as stable strontium or strontium. The stable isotope strontium is frequently found in all natural dietary sources of calcium. Grain, leafy vegetables, and dairy products contribute the greatest percentage of dietary strontium to humans. Strontium tends to be most concentrated in the bran of grains and peels of root vegetables. Brazil nuts, sea vegetables and sea water are also rich sources. The range of foods containing strontium varies from very low in corn (0.4ppm) and oranges (0.5ppm) to high in cabbage (45ppm), onions (50ppm) and lettuce (74ppm).2 Drinking water concentrations of strontium are generally low.3

Absorption and Excretion

Strontium is generally poorly absorbed. Ingested strontium that is unabsorbed is eliminated through faeces within the first day or so after exposure. Once it enters the bloodstream, it is distributed throughout the body, where it acts very much like calcium. A large portion of the strontium will accumulate in bone, approximately 99% of strontium in the body is found in the bones. Strontium levels in bones, teeth and the aorta have been shown to increase with age and vary among geographical regions.4

In adults, strontium attaches to bone surface. In children, it may be incorporated into the hard bone mineral growing, and as a result will be stored for a many years. As with calcium and magnesium, strontium

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is deposited in bone tissue and is mobilised from bone tissue to the bloodstream or eliminated via urine (with minimal amounts in faeces and sweat), resulting in decreased blood calcium levels. It may then be captured and reused by bone tissue and is mobilised from bone in response to dietary calcium.

Strontium is a health risk. The International Agency for Research on Cancer (IARC) has classified radioactive strontium as a known carcinogen. Therefore, all radioactive sources should be handled with care to prevent environmental contamination and exposure.

Strontium is not a natural element and has not been found to be necessary for normal biological functions.

In recent years, interest in strontium has grown due to a number of studies using strontium supplements in osteoporosis. Randomized, double-blind studies have indicated that strontium ranelate (a salt of strontium) can increase bone density and reduce the risk of fracture.

Strontium chloride and other water-soluble strontium salts are highly toxic. In cases of exposure to radioactive strontium, special pathology tests can be used to measure radioactive strontium in the blood, faeces, or urine.

Analysis in HTMA

Analysis in HTMA (hair tissue mineral analysis) involves measuring the levels of various minerals in hair. Hair is a useful sample for measuring long-term exposure to chemicals as it accumulates minerals over time.

Radioactive strontium can be measured in hair tissue. Hair analysis can be useful in cases of suspected radioactive exposure, especially in occupational settings.

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  *The above tests can be applied to detect the presence of heavy metals in mediums including saliva, urine, water, dust, soil, food and drink.

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FOR MORE INFORMATION PLEASE CONTACT:

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