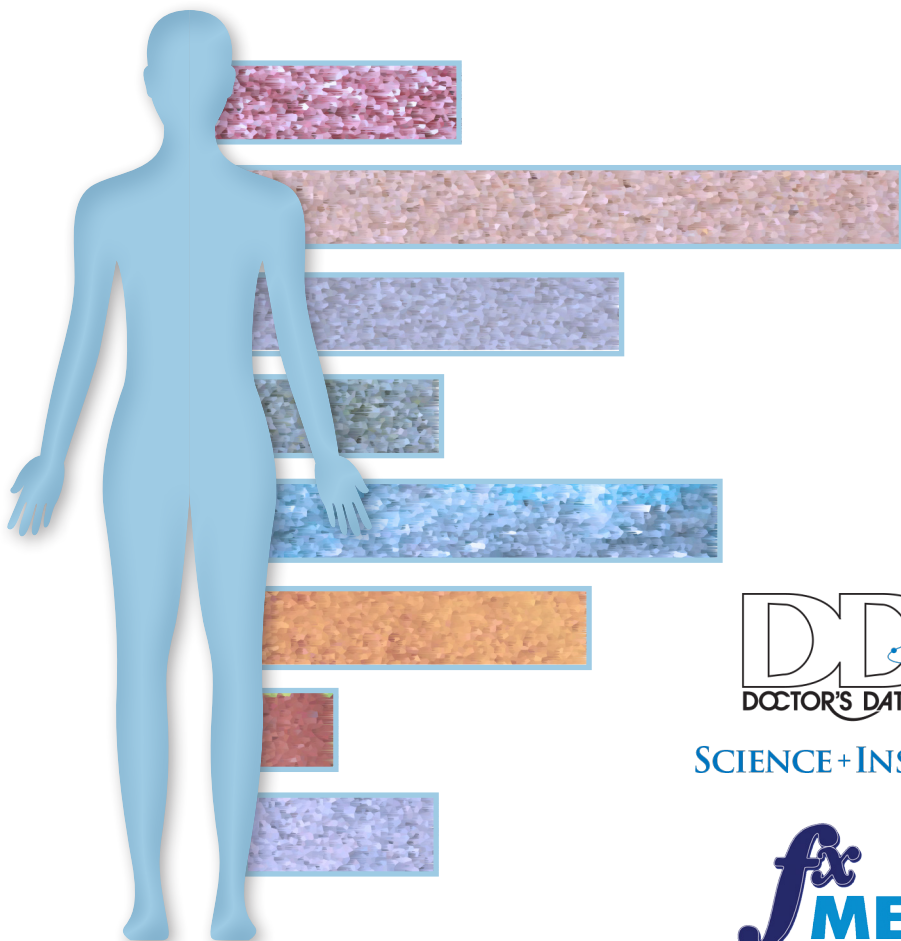


Hair Testing

Key Minerals and Harmful Metals



SCIENCE+INSIGHT



First in Nutritional and Environmental Medicine

Non-invasive Assessment of Toxic and Essential Elements

Elements are the basic building blocks of all chemical compounds, and human exposure to them occurs both from natural and man-made sources.

Many elements are considered nutrients and are essential for the proper functioning of the body. These are generally divided between macrominerals such as calcium, magnesium, potassium, sodium and zinc, and trace minerals including selenium, iodine, boron and molybdenum. Conversely, there are a number of elements that are toxic to the human body, interfere with its functioning and undermine health—such as mercury, lead, cadmium, aluminum, and arsenic.



Toxic Element Exposure



Essential Elements



Deficiencies of essential trace elements or excessive amounts of heavy metals in the human body can cause significant health effects.



Doctor's Data has always employed industry leading techniques as a specialist and pioneer in essential and toxic elemental testing. Doctor's Data has been validated as a supplier of trace element results for the certification of a hair reference material to the European Commission Joint Research Centre.



Hair Elements analysis provides information regarding recent and ongoing exposure to potentially toxic metals, especially methylmercury and arsenic, and time-averaged status of specific nutrient elements.



Since 1972, Doctor's Data, Inc. has performed over four million hair elements tests for physicians and other health care providers, accumulating what is probably the largest database regarding this procedure.

More information

Hair analysis is a low cost and non-invasive method of determining levels of exposure to certain metals, minerals, and elements. With the enormous amounts of toxic metal in the environment and the widespread nutrient mineral insufficiencies of our diet, assessment of element imbalances and excesses has become an increasingly important tool in the assessment of chronic illness.

Why Hair?

With respect to its contained elements, hair is essentially an excretory tissue rather than a functional tissue. As protein is synthesised in the hair follicle, elements are incorporated permanently into the hair with no further exchange with other tissues. Scalp hair is easy to sample, and because it grows an average of one to two cm per month, it contains a time-based record of element metabolism and exposure to toxic elements.

Is Hair Analysis Clinically Useful?

A growing number of peer-reviewed publications support the value of elemental analysis of hair specimens for the detection of exposure to toxic metals. Once metals are incorporated into growing hair there is no back exchange into the body; therefore, the concentration of metals in hair is usually far greater than blood or urine.

For example, elevated levels of arsenic in both hair and urine confirmed arsenic exposure from a pesticide in an individual with peripheral neuropathy and macrocytosis.¹ Hair levels of lead, manganese, cadmium, and other toxic metals have been correlated with psychological conditions and deviant/violent behaviours.² Lead, cadmium and mercury levels in children's hair has been correlated with childhood intelligence. Hair analysis has been utilised to identify historical as opposed to current exposure to lead.³ School children with relatively high levels of lead in their hair had slower reaction-times and less flexibility in changing their focus of attention than children with relatively low concentrations of lead in their hair.⁴

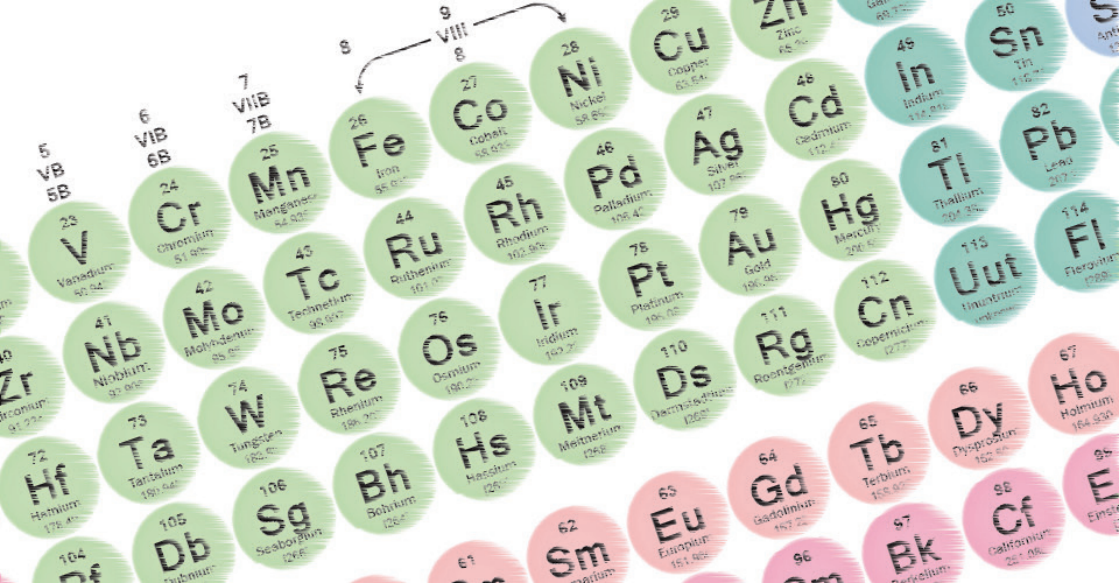
Hair analysis provides important information which, in conjunction with symptoms, medical history and other laboratory results, can warrant further investigation that may identify chronic disorders often associated with abnormal levels of toxic elements.

1. Heaven R, Duncan M, Vukelja S. Arsenic intoxication presenting with macrocytosis and peripheral neuropathy, without anemia. *Acta Haematol* 1994; 92: 142-143

2. Rose J. Brain biochemistry, neurotoxicity, and criminal violence. In: Rose J, ed. *Environmental Toxicology*. New York, NY

3. Marlow M, Vukelja S. Correlations of metal interactions as measured in hair on childhood intelligence. 1998; 1: 195-203

4. Minder B, Das-Smaal, EA, Brand EF et al. Exposure to lead and specific attentional problems in school children. *J Learn Disabil* 1994; 27: 393-399



Toxic Burden:

A hair test estimates recent exposure to toxic elements. Environmental pollution is a growing problem which makes all of us vulnerable to toxic metals in our air, water, food and dental restoration. We are all exposed to toxic elements such as cigarette smoke (cadmium), antiperspirants and antacids (aluminum), tap water in some areas (lead), tooth fillings, fish (mercury), and pesticides (arsenic), etc. Toxic elements accumulate with excessive or continual exposure, or if the liver and detoxification pathways are not functioning well, further accumulation of toxic elements will occur.

Symptoms Linked To Toxic Element Exposure:

- **ARSENIC:** Fatigue, headaches, dermatitis, increased salivation, muscular weakness, loss of hair and nails, pigmentation of skin, anaemia, skin rashes.
- **CADMIUM:** Loss of sense of smell, anaemia, dry scaly skin, hair loss, cancer, hypertension, kidney problems.
- **LEAD:** **Children** - delayed mental development, hyperactivity, delayed learning, behavioural problems.
Children and adults - fatigue, anaemia, metallic taste, loss of appetite, weight loss and headaches, insomnia, nervousness, decreased nerve conduction, possibly motor neuron disorders.
- **MERCURY:** Reduced sense of taste, touch, vision and hearing, metallic taste with increased salivation, fatigue, anorexia, irritability and excitability, psychoses, mania, anaemia, paresthesias (numbness of tingling of peripheral nerves - hands/feet) tremors, lack of coordination, cardiovascular disease, hypertension with renal dysfunction.

Sample Collection

Hair collection protocols recommend clean hair that has not been dyed, permed, bleached, or straightened for three months and that only the newest hair growth be sampled. This procedure is designed to prevent major sources of contamination.

Colour treated hair is not acceptable, in this case use 6-8 week of regrowth ensuring no colour is attached to the sample - or alternatively, pubic hair (do not mix the two)! Pubic hair testing is as accurate and reliable as hair taken from the scalp. Complete specimen collection instructions are included with the test kit.

Advantages of Doctors Data for Hair Analysis

Doctor's Data are pioneers of Elemental Hair Analysis, being the world's first commercial laboratory to offer Hair Analysis in 1969. They have accumulated the world's largest database regarding hair element tests - (over 4 million since 1972).

Doctors Data use a 'Lab Wash' process to remove external contaminants from the sample before testing - this is crucial for accurate and metabolically reflective results.

Appropriate methodology, calibrated reference ranges, and extensive reference data allow for the most accurate reflection and interpretation of body mineral status via hair.

Use of High Accuracy Technology:

For the analysis of hair samples, Doctor's Data uses 'High Resolution Inductively Coupled Mass Spectroscopy' (HR ICP-MS) which has been cited as the most sensitive and comprehensive technique available for multi-element analysis of trace elements.

- This method allows extremely precise measurements of mineral nutrients, trace elements and toxic minerals.
- Typical detection of limits for HR ICP-MS are parts per trillion compared to parts per billion via ICP-MS.
- Clear reporting via colour coding provide rapid and easy interpretation of test results.
- Expert commentary includes evidence-based recommendations.



Hair Elements Analysis

TOXIC ELEMENTS TESTED	MINERAL ELEMENTS TESTED
Aluminium	Calcium
Antimony	Magnesium
Arsenic	Sodium
Beryllium	Potassium
Bismuth	Copper
Cadmium	Zinc
Lead	Manganese
Mercury	Chromium
Platinum	Vanadium
Thallium	Molybdenum
Thorium	Boron
Uranium	Iodine
Nickel	Lithium
Silver	Phosphorus
Tin	Selenium
Titanium	Strontium
	Sulfur
	Barium
	Cobalt
	Iron
	Germanium
	Rubidium
	Zirconium

Doctors Data is a U.S.-based clinical laboratory providing innovative, accurate speciality testing since 1972



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Doctors Data Hair Analysis is available in New Zealand via FxMed

Please contact FxMed's Technical Support Team on techsupport@fxmed.co.nz for further technical assistance or Customer Services on support@fxmed.co.nz to order a test kit.

Ph. 0800 439 633 • Fax. 0800 439 630 • www.fxmed.co.nz