



# Elements Testing

## Toxic & Essential Elements

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*Discover True Clinical Utility with the  
Industry's Best Testing*



# Why Test Elements?

**Environmental pollutants are all around us – in the air we breathe, in the water we drink, in the food we eat and in materials we touch.**

These pollutants can significantly increase our risk of developing conditions like dementia, infertility, diabetes and cancer. They are also known to cause damage to the liver, kidneys and brain, as well as the cardiovascular, nervous and endocrine systems.

In excess, and when persistent, they can affect the synthesis and actions of hormones essential for managing our general health. One gland profoundly affected by pollutants is the thyroid.

Thyroid health can be undermined by nutritional deficiencies, particularly of iodine and selenium, or overexposure to bromine, arsenic, cadmium and mercury. It's important to measure thyroid markers like TSH, fT3, fT4 and TPO, as well as these elements, when assessing the health of a patient whom you suspect has impaired thyroid function.

“ *Essential elements are only healthy when they are within appropriate ranges.* ”

**Essential elements, overall, are only healthy when they are within optimal ranges. Levels too low or too high can have detrimental effects on health. Therefore, it's important to know if essential or toxic elements are outside their expected ranges.**

Testing a panel like the Comprehensive Toxic & Essential Elements Profile offers the top four most toxic heavy metals and reveals levels of the nutritional elements iodine, selenium, zinc, copper and magnesium.



## **MOST FOCUSED**

Assess the four heavy metals considered most hazardous by the CDC, with a selection of nutritional elements that affect overall health



## **MOST CONVENIENT**

Discreet dried urine collection eliminates the hassle of jug urine collection & dried blood spot collection eliminates a trip to the phlebotomist



## **MOST MEANINGFUL REPORT**

ZRT's test report includes levels and personalized comments that provide insight into a patient's individual condition

## **ELEMENTS TESTING BENEFITS PATIENTS WHO:**



Smoke tobacco products



Have thyroid-related health issues



Are exposed to heavy metals through hobbies, work or dentistry



Present with health issues that could result from nutritional deficiencies or imbalances in essential elements



Live in older homes or areas where metals may be present in drinking water



Have had exposure to MRI contrast agents

# Does Sample Type Matter?

Heavy metals and essential elements are absorbed, circulated and excreted by our body in different ways, so it makes sense to choose the appropriate body fluid for testing. ZRT tests using the most scientifically appropriate medium – either dried urine or dried blood spot, or both – for our elements profiles.

## Examples of Elements Tested Only in Dried Urine

- ▶ Arsenic is rapidly cleared from the bloodstream after exposure, so urine is the most appropriate medium for arsenic testing.
- ▶ Urine iodine is the best indicator of recent dietary intake, as >90% is eliminated in urine.
- ▶ Gadolinium levels in urine reflect exposure from a recent MRI, as well as from cumulative exposure to multiple MRIs done years ago.

## Examples of Elements Tested Only in Blood Spot

- ▶ Whole blood is the only appropriate medium to assess lead exposure, because lead forms a tight complex with hemoglobin in red blood cells.
- ▶ Magnesium is tested in blood spot because it represents the intracellular magnesium level.
- ▶ Blood spot copper and zinc reflect overall nutritional status as well as detecting toxicity from excessive levels.

## Elements Tested in Both Dried Urine and Blood Spot

- ▶ Urinary cadmium is the best measure of long-term exposure, while blood spot assesses recent exposure.
- ▶ Urinary mercury is the best indicator of inorganic and elemental mercury exposure (e.g., from dental amalgams or skin-lightening creams), since these forms of mercury accumulate in the kidneys. Blood spot reflects organic mercury exposure (usually from sea foods), as it is bound to hemoglobin in red blood cells.
- ▶ Recent dietary intake of selenium is indicated by urinary levels, while blood spot reflects long-term selenium intake.

### ELEMENTS INCLUDED IN EACH PROFILE:

	Iodine	Bromine	Selenium	Lithium	Magnesium	Copper	Zinc	Arsenic	Cadmium	Lead	Mercury	Gadolinium	Thallium	Uranium
Iodine Panel														
Toxic & Essential Elements   Urine														
Toxic & Essential Elements   Blood														
Comprehensive Toxic & Essential Elements														
Rare Elements Profile														

 Blood Spot  
 Dried Urine



YOUR LAB *of CHOICE*

# Elements you should know...

<b>Iodine</b> 53 <b>I</b> 126.90	<b>Selenium</b> 34 <b>Se</b> 78.96
<b>Zinc</b> 30 <b>Zn</b> 65.39	<b>Copper</b> 29 <b>Cu</b> 63.546
<b>Magnesium</b> 12 <b>Mg</b> 24.305	<b>Bromine</b> 35 <b>Br</b> 79.904
<b>Lithium</b> 3 <b>Li</b> 6.941	

**PROBLEMATIC IN DEFICIENCY OR EXCESS**

## Essential Elements

**Iodine** and **selenium** can be beneficial or toxic, depending on their levels. Deficiency or excess can cause thyroid dysfunction and goiter. **Bromine** is in the same chemical family as iodine and excessive amounts will compete with iodine in the thyroid – becoming particularly problematic when iodine levels are low and bromine is high.

**Copper, zinc,** and **lithium** are essential micro-nutrients needed in small quantities, and become toxic at higher levels.

**Magnesium** is an essential element required for over 600 enzymatic reactions involved in cellular metabolism and protein synthesis.

<b>Lead</b> 82 <b>Pb</b> 207.2	<b>Mercury</b> 80 <b>Hg</b> 200.59
<b>Cadmium</b> 48 <b>Cd</b> 112.414	<b>Arsenic</b> 33 <b>As</b> 74.922
<b>Gadolinium</b> 64 <b>Gd</b> 157.23	<b>Thallium</b> 81 <b>Tl</b> 204.38
<b>Uranium</b> 92 <b>U</b> 238.029	

**DANGEROUS IN HIGH LEVELS**

## Heavy Metals

**Arsenic, mercury, cadmium** and **lead** are the four most toxic heavy metals, according to the CDC. High levels lead to an increase in Reactive Oxygen Species (ROS) that damage proteins, lipids and DNA. They also form tight bonds with the essential element selenium, reducing its bio-availability for enzymes essential for thyroid hormone synthesis and activation.

**Gadolinium** is used in contrast media for MRI tests. While most is normally rapidly eliminated in the urine, some is retained in the body and may have harmful effects on the kidneys and possibly the brain. **Thallium** is believed to be more toxic than mercury, cadmium, and lead. Uranium, found in waste from the nuclear industry, has similarities to calcium, which it can replace in bone leading to toxic effects.

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LABORATORY