

# Biolab Medical Unit

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## Urine Iodine

### Indications

Iodine is required in small amounts by humans, the current RDA being 150 micrograms per day; the only known function of iodine in man is as a component of the secretions of the thyroid gland, principally tri-iodothyronine and thyroxine. Iodine is one of the halogen series of elements (along with fluorine, chlorine and bromine); it was formerly used as an antiseptic, but is now regarded as too toxic for that purpose. Tissue saturation of bio-available iodine partly depends on iodine intake, but also intake of the other halogens which compete with iodine for absorption and cellular uptake.

80 – 90% of the total serum iodine is incorporated into thyroxine, which is largely protein bound; the remainder (5 – 15%) of the serum iodine in the form of iodide and it is this fraction that is filtered freely at the glomerulus and passes into the formed urine.

The most common method for correction of iodine deficiency is universal salt iodization – the addition of potassium iodate to salt for human and livestock consumption to give a concentration of 15 ppm of iodine. The principal indicator of effect is the urinary iodine concentration. Measurement of thyroid size has a more limited role because it reflects chronic rather than immediate iodine deficiency. Thyroid stimulating hormone (TSH) levels in neonates are also a useful indicator of iodine deficiency.

### Interpretation

The urine iodine concentration is recommended as the best single indicator of iodine nutrition, with the following stratification of reference values:

Urine iodine $\mu\text{mol/L}$	Urine iodine $\mu\text{g/L}$	Iodine intake	Iodine nutritional status
0–0.15	< 20	Insufficient	Severe deficiency
0.16–0.38	20-49	Insufficient	Moderate deficiency
0.40–0.78	50-99	Insufficient	Mild deficiency
0.79–1.56	100-199	Adequate	Optimal
1.57–2.36	200-299	More than adequate	Risk of iodine-induced hyperthyroidism
$\geq 2.37 \mu\text{mol/L}$	$\geq 300$	Excessive	Risk of hyperthyroidism and autoimmune thyroid disease

Urine creatinine can be co-analysed with iodine to check the completeness of a 24 hour urine collection, or to correct for urine dilution in a shorter collection (6 hours, early morning urine or random urine collection). Corrected for creatinine, the reference interval for urine iodine is 18 – 47 micrograms per gram of creatinine (equivalent to 0.018 – 0.47 mg/24 hours) (142 – 370 nmol/ gm creatinine or 1.26 – 3.27  $\mu\text{mol}/\text{mmol}$  creatinine).

Tissue de-saturation of iodine can be assessed from the increment in iodine excretion (mg/24 hours) over two sequential 24 hour urine collections and the dose of administered iodine (mg); the “fractional retention” of iodine is calculated.

### Synonyms

Urinary iodide, fractional retention of iodine.

**Patient preparation**

The patient should dis-continue nutritional supplements and medication the day before the collection of a basal urine iodine sample (iodine is a component of the material used in pharmaceutical capsules).

**Specimen requirements**

A 24 hour urine collection with an accurate total volume is the preferred sample; alternatively, a 6 hour collection, an early morning urine or a random urine sample can be supplied.

Postal samples should reach Biolab within 48 hours of collection.

**Price:** £28

**Methodology**

Iodine is measured by inductively coupled plasma-mass spectrometry (ICPMS).

**Turn around time**

3-4 working days.

**References**

1. International Council for Control of Iodine Deficiency Disorders, World Health Organization, United Nations Children's Fund,. Assessment of iodine deficiency disorders and monitoring their elimination. Department of Nutrition for Health and Development, World Health Organization, 1211 Geneva 27, Switzerland, WHO/NHD/01.1 Second edition, 2001.