

References

Levy Barry s, Nassetta William J.
Neurological effects of manganese in humans: a review. Int J Occup Environ Health 2003. 9: 153-163.

Bertinet DB, Tinivella M, Balzola FA, et al. Brain manganese desposition and blood levels in patients undergoing home parenteral nutrition. JPEN 2000. 24: 223-227.

Aschner M, Vrana KE, Zheng W.
Manganese uptake and distribution in the central nervous system. Neurotoxicology 1999. 20: 173-180.

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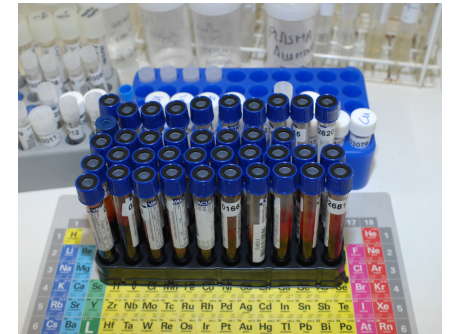
NHS

Black Country Pathology Services



Blood Manganese

Trace Elements Laboratory Clinical Biochemistry



BCPS

NHS Pathology Serving the Black Country

Provided by Sandwell and West Birmingham NHS Trust, The Dudley Group NHS Foundation Trust, The Royal Wolverhampton NHS Trust and Walsall Healthcare NHS Trust.

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Sample Requirements

Minimum of 150 µL of whole blood (EDTA anticoagulant or sodium heparin tube).

- Blood samples are prone to contamination if taken via stainless steel needles, hence, a plastic canula should be used or the first few mls of blood should be discarded
- Some types of EDTA tubes are contaminated with manganese. Please contact the laboratory to discuss before using new tubes.
- Samples should be stored at 4°C prior to dispatch.
- Send samples by first class post at ambient temperature to the address on the back of this leaflet

Reference Ranges

Blood Manganese	(nmol/L)
Children <1 yr	120 - 325
Children >1 yr, adults	73-210
Risk of toxicity	>360

Manganese is measured in whole blood using Inductively Coupled Plasma Mass Spectrometry (ICP-MS).

Biological Role

Manganese is an essential trace element that serves as a catalyst for several enzymes including hydrolases, kinases, decarboxylases and transferases. It is also required for the activity of metalloenzymes: arginase, pyruvate carboxylase and mitochondrial superoxide dismutase.

Sources of manganese include, whole grains, nuts, vegetables and teas. Bioavailability may be affected by the presence of other substances in the diet, for example, tannins, oxalates, phytates and fibre have been found to inhibit absorption. High levels of calcium, phosphorus and iron also decrease the absorption of manganese. However, individuals who are deficient in iron demonstrate an increase in manganese absorption.

Features of manganese deficiency include dermatitis, hypocholesterolaemia and weight loss while manganese toxicity leads to neurological and psychiatric disorders.

Clinical Use

As manganese is present in many foods, manganese deficiency is very rare in clinical practice. Furthermore, although patients on long term parenteral nutrition require manganese replacement, feeds often contain manganese concentrations in excess of requirements. Therefore blood manganese testing is very rarely performed to detect manganese deficiency.

In healthy individuals, the body is protected against manganese toxicity by low gastrointestinal absorption and/or rapid presystemic elimination by the liver. Parenteral nutrition bypasses the homeostatic mechanism regulating manganese absorption and therefore, patients on long term parenteral nutrition are at risk of accumulating manganese, which can be exacerbated in the presence of cholestasis. Regular monitoring (every 3 to 6 months) of blood manganese is recommended by NICE Guidelines 2006 "Nutrition support for adults" in this group.

Turaround

We aim to analyse and report the results within 3 working days from receipt of the specimen.

