



Reference Intervals for plasma elements by ICP MS

Biolab is now processing all the samples submitted for plasma element analysis by inductively coupled plasma-mass spectrometry (ICP-MS), using only blood collected into a trace element-free potassium EDTA tube. These elements include calcium and iron, as well as chromium, copper, magnesium, manganese, selenium, sodium and zinc. We are considering expanding the list to include plasma aluminium, cobalt, molybdenum, nickel and vanadium.

Atomic absorption spectrometry (AAS) was the mainstay of elemental analysis for some 30 years, but is now being replaced in all sectors by ICP-MS, which is much more sensitive and specific. This is because ICP-MS measures the actual mass of the atoms, rather than an effect of the atoms on light rays, which is a comparatively indirect approach. Most hospital laboratories use even less specific and sensitive methods than AAS for measuring plasma elements because such techniques fit in with the requirements of their large analysers.

The Biolab reference intervals for plasma elements have been updated with the current improvement in technique. These ranges will be re-assessed in due course when enough data has been accumulated.

PLASMA ELEMENTS REFERENCE INTERVALS (ICP-MS derived)

(based on plasma prepared from whole blood collected into a trace element-free potassium EDTA tube)

ELEMENT	REFERENCE INTERVALS	COMMENTS
CALCIUM	2.10 – 2.60 mmol/L	unchanged
CHROMIUM (Cr)	6.2 – 33.4 nmol/L	higher limit increased in value
COPPER (Cu)	12.5 – 25.0 µmol/L	unchanged
IRON (Fe) (male)	14.3 – 38.0 µmol/L	higher limit increased in value
IRON (Fe) (female)	10.7 – 32.0 µmol/L	unchanged
MAGNESIUM (Mg)	0.70 – 1.20 mmol/L	unchanged
MANGANESE (Mn)	9.0 – 40.0 nmol/L	higher limit increased in value
SELENIUM (Se)	1.00 – 1.90 µmol/L	Se levels in the population appear to be on the increase
SODIUM (Na)	134 – 152 mmol/L	unchanged
ZINC (Zn)	11.5 – 20.0 µmol/L	unchanged

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