Albumin, serum/plasma

Albumin is the most abundant protein in serum or plasma, accounting for 60% of the total protein content and has an important role in modulating osmotic pressure (fluid shifts between the vascular and tissue compartments). Albumin acts as a transporter for many hormones (e.g. thyroxine), elements (notably calcium and zinc) and drugs in the circulation which are not readily water-soluble. In extreme fasting, it can also act as a reservoir of protein for the body.

Albumin is included in bone and hepatic profiles.

General information

Collection container:

Adults – serum (with gel separator, 4.9mL brown top Sarstedt tube)

Paediatrics – lithium heparin plasma (1.2mL orange top Sarstedt tube)

Type and volume of sample:

The tubes should be thoroughly mixed before transport to the lab. 1mL whole blood is required as a minimum volume.

Specimen transport/special precautions: N/A

Laboratory information

Method: Albumin is measured using the bromocresol purple (BCP) colourimetric end point assay on automated instruments. This method has been standardized against the ERM-DA470k/IFCC reference preparation.

Biological reference range or cut off:

up to 1 mth	25 - 35 g/L
1 - 6 mths	28 - 40 g/L
6 mths - 17yrs	30 - 45 g/L
>17yrs	34 – 48 g/L

Albumin can be measured in a range of other fluids though you should note that in this case these reference ranges do NOT apply. See separate entry for urine albumin creatinine ratio {LINK}.

Turnaround times: Same day as sample receipt

Clinical information

Factors known to significantly affect the results: Avoid prolonged stasis during sample collection as the albumin concentration (and other analytes) may be artifactually increased.

In very rare cases, gammopathy, in particular type IgM (Waldenström's macroglobulinemia), may cause unreliable results.

Albumin levels will be decreased if the sample is contaminated by collecting from a drip arm.

Clinical decision points: Plasma [albumin] depends on its rate of hepatic synthesis, its rate of clearance and its volume of distribution. It is not a specific indicator of any one of these (though rapid (hours)) changes are most likely to be due to a change in its volume of distribution, either because of an increased plasma water content or net movement into the interstitial space).

Albumin is used in a simple calculation of globulins, giving an indication of whether an immune response has occurred:

[Total protein] – [albumin] = calculated globulins (g/L).

Dehydration or administration of high concentration albumin solutions, with the sample collected soon after infusion, are the only clinical causes of raised levels.

Its relatively long half-life may cause its concentration to remain normal in the early stages of even severe acute liver disease. A falling concentration in chronic liver disease suggests a clinically significant deterioration in liver function 'decompensation').

Albumin concentration is a poor guide to nutritional status. In simple starvation, the catabolic rate of albumin falls, and this and contraction of extracellular fluid (ECF) volume may cause its concentration to remain normal. Low concentrations, except in severely starved patients, suggest increased catabolism (e.g. due to sepsis) or increased loss due to protein-losing enteropathy, nephrotic syndrome or burns.

Ascites, oedema and sepsis all result in low concentrations of albumin due to increased ECF volume and redistribution in the acute phase inflammatory response.

In the rare, inherited condition, analbuminaemia, plasma albumin is typically 250 mg/L or less. Patients experience sporadic, mild, oedema but are otherwise well.

In bisalbuminaemia, also a rare, inherited condition, [albumin] is normal but two species of albumin are present and appear as separate bands on zone electrophoresis of serum.

References:

http://www.acb.org.uk/Nat%20Lab%20Med%20Hbk/Albumin.pdf

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