

Ammonia (blood)

Pseudonyms - Azane

Ammonia is a waste product of protein metabolism. Ammonia is broken down in the liver to urea and glutamine, the former of which is cleared by the kidneys. Accumulation of ammonia is toxic, causing respiratory alkalosis and encephalopathy which can result in confusion, coma and in some cases death. All patients with reduced consciousness/reduced GCS **MUST** have an ammonia test performed.

General information

Collection container:

EDTA Plasma (Sarstedt pink top, 1.2mL / 3.4mL)

Type and volume of sample: EDTA Plasma

1.0mL whole blood required (minimum 150uL separated plasma).

Specimen transport/special precautions:

Collect blood from a stasis free vein.

Samples must be delivered to the laboratory on ice/water within 30 minutes of collection.

Laboratory information

Method principle:

Enzymatic method with glutamate dehydrogenase (Roche Cobas platform).

Biological reference interval:

<14 days	10 to 100 $\mu\text{mol/L}$
>14 days	5 to 50 $\mu\text{mol/L}$

Turnaround times:

Urgent	2 hours
Routine	4 hours

Division of Laboratory Medicine

Biochemistry

Clinical information

1. Raised levels of ammonia can occur secondary to liver disorders (e.g. hepatitis and cirrhosis), renal failure and sepsis, in which either hepatic metabolism or renal clearance of urea is impaired. This is the most common cause of raised plasma ammonia levels in adults
2. Other rarer causes include inherited metabolic diseases such as urea cycle disorders and organic acidurias. These typically present in infancy or childhood, though one Urea-cycle defect called OTC is known to present in adult women

<http://www.metbio.net/docs/MetBio-Guideline-AMUP100834-21-07-2010.pdf>

Factors known to significantly affect the results:

1. Samples must be delivered to the laboratory on water/ice and within 30 minutes
 - a. Delay in delivery to the laboratory after blood collection may cause a significant artefactual increase in ammonia concentrations
 - b. Delivery to the laboratory at room temperature after blood collection amplifies the artefactual increase caused by delay
2. Lipaemic samples are unsuitable for analysis
3. Capillary blood specimens are unsuitable for analysis.
4. Haemolysis causes erratic results.
5. Levels may be higher in prematurity
6. Therapeutic concentrations of certain drugs interfere with the assay and lead to falsely elevated results
 - a. Cefoxitin
 - b. acetaminophen (paracetamol)
 - c. ibuprofen.
 - d. Sulfasalazine or Sulfapyridine
 - e. Temozolomide
7. Valproate therapy and some chemotherapeutics are known to cause raised ammonia due to the inhibition or depletion of specific enzymes involved in liver metabolism.

(Last updated September 2020)