TEST

Plasma amino acids

A plasma amino acids test measures individual amino acids in blood to investigate or monitor metabolic disorders.

WHAT IT MEASURES
Levels of individual amino acids in blood plasma

SAMPLE
Blood

FASTING NEEDED?
Sometimes, usually four to six hours if clinically safe

HOW LONG IT TAKES
Usually less than 10 minutes

RESULTS IN
Usually several days; timing varies by laboratory

USED FOR
Screening follow-up, diagnosis, and treatment monitoring

MAIN LIMITATION
Diet, illness, and sample handling can distort amino acid patterns

Overview

A plasma amino acids test measures the amounts of individual amino acids in the liquid part of your blood. Amino acids are small molecules used to make proteins and support many chemical processes in the body.

The test usually reports many amino acids at once. These may include phenylalanine, tyrosine, leucine, isoleucine, valine, citrulline, arginine, glycine, and others.

The pattern of results can help investigate inherited metabolic disorders. These are genetic conditions that affect how the body processes nutrients or removes waste products. Examples include amino acid disorders, urea cycle disorders, and some organic acid disorders.

This is not usually a routine wellness test. It is often ordered after an abnormal newborn screening result, when symptoms suggest a metabolic problem, or to monitor a condition that has already been diagnosed.

Why the test is ordered

Plasma amino acids may be ordered to help:

Amino acids are often tested alongside other laboratory studies. These may include blood ammonia, glucose, lactate, an acylcarnitine profile, urine organic acids, or urine amino acids.

The test does not usually identify a diagnosis by itself. The relationship between several amino acids may be more informative than one high or low result.

- Investigate an abnormal newborn screening result
- Look for an inherited problem with amino acid metabolism
- Assess a possible urea cycle disorder
- Investigate unexplained illness when a metabolic disorder is possible
- Monitor dietary or medical treatment for a known condition
- Check relatives when a specific inherited disorder runs in the family

Who should have the test

You may be offered this test if a newborn screening result needs prompt follow-up. Newborn screening and plasma amino acid testing are different: screening identifies babies who may need more testing, while quantitative plasma testing measures specific amino acids.

A clinician may also request the test if you or your child has episodes such as poor feeding, repeated vomiting, unusual sleepiness, developmental concerns, unexplained confusion, or illness triggered by fasting. These symptoms have many possible causes, and the test does not confirm that a metabolic disorder is present.

People with a known amino acid or urea cycle disorder may have regular testing. Results can help show whether prescribed nutrition and other treatment are achieving their goals.

It is not generally useful as a broad nutrition test in someone without a specific clinical reason.

How to prepare

Follow the instructions from the laboratory or metabolic team. Preparation is not identical for every situation.

Some laboratories prefer a fasting sample, commonly after about four to six hours without food. Others need the sample collected during usual feeding or during symptoms. Infants,

young children, pregnant people, and anyone who becomes unwell when fasting should not fast unless specifically instructed.

Before the appointment, provide a list of:

Do not stop medicines, supplements, or a prescribed diet to prepare for the test unless the clinical team gives you clear instructions.

- Prescription and non-prescription medicines
- Vitamins, protein powders, and amino acid supplements
- Medical formulas or special diets
- Tube feeds or intravenous nutrition
- Recent illness, prolonged fasting, or strenuous exercise
- A recent blood transfusion

What happens during the test

A healthcare professional takes blood from a vein, usually in your arm or hand. In babies, blood may be collected from a small vein using equipment suited to their size.

The needle may sting briefly. Collecting the sample usually takes less than 10 minutes.

Handling after collection is important. The laboratory generally separates the plasma from the blood cells promptly and keeps it at the required temperature. This reduces changes that can occur while the sample is waiting to be analysed.

Understanding your results

Your report lists the concentration of each measured amino acid. It also gives the laboratory's reference interval, which is the range expected in an appropriate comparison group.

Reference ranges and interpretation vary by laboratory, testing method, age, sex, pregnancy status, medicines, diet, and clinical context. Babies and children need age-appropriate ranges because normal amino acid concentrations change as they grow.

A high or low value does not automatically mean that you have a metabolic disorder. Recent food intake, illness, organ function, treatment, or sample handling may explain an unexpected result.

Clinicians look for recognisable combinations. For example, the meaning of an increased phenylalanine level is influenced by the tyrosine level and the clinical situation. Changes in

citrulline, arginine, glutamine, and other amino acids may be considered together when assessing the urea cycle.

Results from someone with a known disorder are compared with that person's treatment targets and previous measurements, not only with the laboratory reference interval.

What affects the results

Plasma amino acid concentrations can change for reasons unrelated to an inherited disorder.

Food and fasting: A recent meal, particularly a high-protein meal, can increase some amino acids. Prolonged fasting can also alter the pattern because the body begins breaking down stored tissue for energy.

Supplements and medical nutrition: Protein powders, amino acid supplements, prescribed metabolic formulas, tube feeding, and intravenous nutrition can substantially affect results.

Illness: Fever, infection, vomiting, dehydration, surgery, or other physical stress can change how the body uses protein. A sample taken during illness may differ from one taken when you are well. Sometimes this is useful because certain disorders are easiest to detect during an episode.

Exercise: Strenuous or prolonged exercise can temporarily change amino acid metabolism. Avoid unusually intense activity beforehand unless you have been told otherwise.

Kidney and liver function: The kidneys remove or reclaim amino acids, while the liver processes many of them. Reduced kidney or liver function can therefore produce abnormal results without a primary amino acid disorder.

Age and pregnancy: Amino acid levels change during infancy and childhood. Pregnancy also alters normal metabolism and may require different interpretation.

Medicines: Some medicines alter nutrition, liver function, kidney function, or protein metabolism. Others may interfere with particular laboratory methods. The laboratory needs an accurate medicine list to assess this.

Recent transfusion: A transfusion may temporarily affect plasma composition or make results harder to interpret in a seriously ill person. Mention when it occurred.

Sample handling: Delayed separation from blood cells, incorrect storage temperature, or haemolysis-damage to blood cells during collection-can change certain amino acid levels. The laboratory may reject a sample if it cannot provide a reliable result.

Accuracy and limitations

Modern laboratory methods can measure many amino acids accurately when the sample is collected and handled correctly. However, the test's ability to find a disorder differs by condition and by whether the person is well, unwell, fasting, or receiving treatment. There is no single meaningful detection rate for the whole panel.

The test may appear abnormal when no inherited disorder is present. Common reasons include diet, intravenous nutrition, illness, immature metabolism in a newborn, kidney or liver problems, medicines, and poor sample handling.

It can also miss a disorder. Some abnormalities are mild or intermittent, disappear between episodes, or are partly corrected by a restricted diet or other treatment. Not every metabolic condition produces an abnormal plasma amino acid pattern.

Different tests may be better for particular questions. Urine amino acids can help assess amino acid loss through the kidneys, including some transport disorders. Urine organic acids and blood acylcarnitines examine other metabolic pathways. Ammonia testing is important when a urea cycle problem is suspected. Genetic or enzyme testing may be needed to confirm a diagnosis.

Risks and complications

The risks are those of a routine blood draw. You may have brief pain, a small bruise, or feel faint; serious complications are uncommon.

What happens next

A result that fits the expected pattern may need no further testing, or it may be reviewed with other results and your symptoms.

An unexpected result is often checked with a repeat sample collected under controlled conditions. Additional blood, urine, or genetic tests may be arranged. Follow-up after an abnormal newborn screen is usually time-sensitive even when a baby appears well, so attend the planned appointment promptly.

Routine questions about preparation, reference ranges, or mildly unexpected results can usually wait for the clinician who ordered the test.

Seek urgent medical care if you or your child has repeated vomiting, cannot feed, becomes unusually sleepy or confused, or is rapidly getting worse. Call emergency services for a seizure,

severe breathing difficulty, collapse, or inability to wake. These warnings relate to the person's condition, not to the blood test itself.

Common questions

Can I drink coffee before a plasma amino acids test?

If you were told to fast, avoid coffee, milk, juice, and other drinks containing nutrients. Plain water is usually acceptable, but follow the laboratory's instructions.

Does the time of day matter?

Food intake and the length of fasting usually matter more than the clock time. For monitoring, collecting samples at a similar time and under similar feeding conditions can make comparisons more useful.

Can I exercise beforehand?

Avoid unusually strenuous exercise before the test if possible. Normal daily activity is unlikely to be important, but prolonged or intense exercise can change some amino acid levels.

Can my baby fast for this test?

Do not withhold feeds from a baby unless the metabolic or paediatric team has given specific instructions. The timing of the sample may be planned around normal feeds instead.

Should I stop protein supplements or medicines?

Not unless you have been specifically told to do so. Record what you took, the amount, and when you last took it so the result can be interpreted correctly.

Why does the test need to be repeated?

A repeat sample can check whether an unexpected pattern persists and whether food, illness, treatment, or sample handling affected the first result.

Sources

- ARUP Consult: Amino Acid Disorders , laboratory guidance on test selection and interpretation
- Mayo Clinic Laboratories: Amino Acids, Quantitative, Plasma , test catalogue and specimen guidance

- MedlinePlus Medical Encyclopedia: Amino Acids Plasma , patient information from the U.S. National Library of Medicine
- GeneReviews: Urea Cycle Disorders Overview , clinical review hosted by the National Center for Biotechnology Information
- American College of Medical Genetics and Genomics: ACT Sheets and Algorithms , follow-up resources for abnormal newborn screening results