TEST

Leucine aminopeptidase - urine

A urine test measuring an enzyme that may increase with kidney tubule injury

WHAT IT MEASURES
Urinary activity of an enzyme that removes leucine from proteins

SAMPLE
Usually all urine collected over 24 hours

FASTING NEEDED?
No

HOW LONG IT TAKES
24 hours for collection

RESULTS IN
Often several days; timing differs by laboratory

USED FOR
Assessing possible kidney tubule injury in selected cases

MAIN LIMITATION
Collection errors and unrelated conditions can raise the result

Overview

A urine leucine aminopeptidase test measures the activity of an enzyme in your urine. Enzymes are proteins that help chemical reactions happen. Leucine aminopeptidase removes the amino acid leucine from certain proteins and peptides.

This enzyme is found in several tissues. In the kidneys, it is concentrated along the surface of cells in the proximal tubules. These are small structures that return water, salts, glucose, and other useful substances from urine to the blood.

When tubular cells are stressed or damaged, more enzyme may enter the urine. The test has therefore been used as a marker of kidney tubule injury. It is not a routine kidney test and is now offered by relatively few laboratories.

The test does not identify the cause of an abnormal result. It is usually considered alongside more established tests, such as blood creatinine, estimated glomerular filtration rate, urinalysis, and urine protein or albumin measurements.

Why the test is ordered

A clinician may order this test when looking for evidence of injury affecting the kidney tubules. It may also be used in specialist care or research to follow changes over time.

Possible reasons include:

This is not generally used as a stand-alone screening test. An increased result does not prove that permanent kidney damage has occurred.

- Investigating suspected proximal tubule dysfunction
- Assessing possible kidney effects from an illness, medicine, or chemical exposure
- Monitoring a known kidney problem when this enzyme has previously been measured
- Adding information when other urine and blood tests do not give a clear answer

Who should have the test

You may be offered this test if a kidney specialist or another clinician needs more information about how your kidney tubules are functioning. It may be considered when routine kidney tests and your clinical history suggest a tubular problem.

It is not normally needed during a standard health check. Most people being assessed for kidney disease will first have blood creatinine, an estimated filtration rate, urinalysis, and a urine albumin-to-creatinine or protein-to-creatinine ratio.

Children, pregnant people, and people with complex kidney conditions may have results interpreted differently. The laboratory and clinical team should use a range appropriate to the method and situation.

How to prepare

Fasting is not usually required. Eat and drink normally unless you have separate instructions for another test being collected at the same time.

Confirm whether the laboratory needs a single urine sample or a timed collection. A 24-hour collection is commonly used. The laboratory should provide a container and explain whether it needs refrigeration or contains a preservative.

Tell the clinician who ordered the test about prescription medicines, over-the-counter products, and supplements. Some medicines can affect the kidneys or the interpretation of urine results. Do not stop a medicine unless you have been specifically told to do so.

Avoid unusually strenuous exercise before or during the collection if possible. Hard exercise can temporarily change several urine measurements. If exercise is part of your usual routine, ask whether you should continue it.

What happens during the test

For a 24-hour collection, you usually begin in the morning. Empty your bladder into the toilet and record that time. After that, collect all urine passed during the next 24 hours, including the first urine passed at the recorded time the following morning.

Follow the laboratory's storage instructions. Many collections need to be kept cool. Keep the container away from children, food, and direct sunlight.

If you miss a sample, spill urine, collect for too long, or stop early, tell the laboratory. You may need to repeat the collection because the total result may no longer be reliable.

Some laboratories use a single urine sample instead. In that case, the enzyme result may be compared with urine creatinine to account partly for how concentrated the urine is.

Understanding your results

Results may be reported as enzyme activity per litre, activity over 24 hours, or a ratio to urine creatinine. These formats are not interchangeable.

There is no single reference range suitable for every laboratory. Ranges and interpretation vary with the testing method, age, sex, pregnancy status, medicines, kidney function, and clinical context. Use the range printed on your own report.

A result within the laboratory range means the test did not detect increased enzyme activity by that method. It does not rule out every kidney or tubular disorder.

A high result may reflect increased release of the enzyme from kidney tubular cells. However, it does not show why this happened, how much kidney function is affected, or whether the change is temporary.

A low result usually has little meaning by itself. The test is mainly used to look for increased enzyme activity.

Trends can sometimes be more useful than one result, but repeat tests must use comparable collection methods and preferably the same laboratory.

What affects the results

The most important issue is urine collection. Missing even one sample during a 24-hour collection can make the total falsely low. Collecting beyond 24 hours, including urine from before the start time, or combining two collections can make it falsely high.

Other influences include:

A recent transfusion is not known to be a major direct influence on this urine enzyme test. However, the illness that led to the transfusion may affect kidney function and interpretation.

These factors do not necessarily mean the laboratory made an error. They can change the sample or the amount of enzyme entering the urine.

- Improper storage or delayed delivery, which can change enzyme activity
- Very dilute or concentrated urine, especially with a single sample
- Vigorous recent exercise
- Fever, urinary inflammation, or another short-term illness
- Menstrual blood or stool contaminating the container
- Reduced kidney function, which changes how urinary markers are interpreted
- Pregnancy and age-related differences
- Medicines or exposures that affect kidney tubular cells
- A recent major illness, operation, or contrast-based imaging procedure

Accuracy and limitations

Urine leucine aminopeptidase is not specific to one disease. A raised result can occur with different forms of tubular stress, inflammation, or kidney injury. This means the test can say that a problem may be present when there is no lasting or clinically important kidney damage.

The test can also miss a problem. Mild, early, intermittent, or localised tubular injury may not release enough enzyme to produce an abnormal result. Poor collection or loss of enzyme activity during storage can also cause a falsely reassuring result.

There are no widely applicable figures showing how often this test correctly detects every type of tubular injury. Results differ by laboratory method, patient group, and the condition being investigated.

Other tests are often more useful. Blood creatinine and estimated filtration rate assess overall kidney filtration. Urinalysis can detect blood, protein, glucose, and signs of inflammation. Urine

albumin or protein testing is better established for many kidney conditions. Imaging, specialised blood or urine tests, and occasionally a kidney biopsy may be used when the cause remains uncertain.

Risks and complications

Collecting urine has no direct physical risk. The main problems are inconvenience, spills, contamination, and the possibility of needing to repeat an incomplete collection.

What happens next

A result within range may require no further action, or it may be reviewed with other kidney tests. This depends on why the test was ordered.

An abnormal result is usually followed up routinely rather than treated as an emergency by itself. The next step may be to repeat the urine collection, check blood creatinine and electrolytes, perform a urinalysis, review medicines, or arrange specialist assessment.

Seek prompt medical advice if you develop a major decrease in urine, visible blood in the urine, new swelling, persistent vomiting, or worsening weakness. Seek emergency help for severe difficulty breathing, chest pain, collapse, or sudden confusion. These symptoms need assessment regardless of the leucine aminopeptidase result.

Common questions

Can I drink coffee before the test?

Usually, yes. Fasting is not normally needed. Avoid drinking much more or less than usual because extreme fluid intake can change urine concentration.

Does the time of day matter?

For a 24-hour collection, the exact start time matters less than collecting every sample for the full 24 hours. Record the start and finish times carefully.

Can I exercise beforehand?

Normal daily activity is generally acceptable. Avoid unusually hard exercise shortly before or during the collection unless the laboratory says otherwise, because it can temporarily change urine findings.

What if I forget to collect one sample?

Tell the laboratory. A missed sample can make the 24-hour total falsely low, so you may need to start again with a new container.

Can I take my usual medicines?

Usually, yes, but provide a complete medicine and supplement list. Do not stop prescribed treatment unless the clinician who ordered the test gives you specific instructions.

Why is this test not available everywhere?

It is an older, specialised marker with limited ability to identify the exact cause of kidney injury. Many laboratories now use more established blood and urine tests first.

Sources

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