TEST

Quantitative bence-jones protein test

A urine test that measures abnormal antibody light chains linked with plasma cell disorders.

WHAT IT MEASURES
Monoclonal antibody light chains passed into urine

SAMPLE
Urine, usually collected over 24 hours

FASTING NEEDED?
No

HOW LONG IT TAKES
Usually 24-hour home collection; single samples take minutes

RESULTS IN
Often several days; laboratory turnaround differs

USED FOR
Diagnosis and monitoring of plasma cell disorders

MAIN LIMITATION
An incomplete urine collection can give a falsely low result

Overview

A quantitative Bence-Jones protein test measures abnormal proteins called monoclonal free light chains in urine. "Quantitative" means the laboratory reports how much protein is present, rather than only whether it was detected.

Antibodies are proteins made by plasma cells, a type of white blood cell. Each antibody contains heavy chains and light chains. The light chains are called kappa or lambda.

Plasma cells normally make a small excess of free light chains. The kidneys filter and usually reabsorb most of them. When one group of plasma cells makes a large amount of a single light-chain type, some may pass into the urine. These are known as Bence-Jones proteins.

The test may involve urine protein electrophoresis, which separates proteins according to their physical properties. Immunofixation may then confirm whether an abnormal protein is kappa or lambda. The exact laboratory method differs.

Why the test is ordered

This test can help investigate or monitor disorders involving abnormal plasma cells. These include multiple myeloma, light-chain myeloma, AL amyloidosis and some related conditions. A result cannot diagnose one of these conditions by itself.

It may be ordered after symptoms or other tests raise concern about an abnormal protein. Examples include unexplained anaemia, kidney problems, high blood calcium, certain bone problems or an abnormal blood protein result. These findings have many possible causes.

If you already have a plasma cell disorder, the test may be used to measure changes over time or assess response to treatment. Comparing results is most useful when the same collection method and laboratory method are used.

Urine testing is now often combined with blood tests, including serum protein electrophoresis, serum immunofixation and a serum free light-chain test. Blood tests may be better at detecting small amounts of free light chains.

Who should have the test

The test is not used as a general screening test for people without a clinical reason for testing. Your healthcare team may request it if other findings suggest that monoclonal proteins should be investigated.

You may also have it if:

The choice of urine and blood tests depends on your symptoms, previous results, kidney function and the condition being considered.

- A blood test has found a monoclonal protein
- Kidney damage could be related to abnormal light chains
- AL amyloidosis is being investigated
- A known plasma cell disorder is being monitored
- A previous urine test detected Bence-Jones protein

How to prepare

Fasting is not usually needed. You can generally eat, drink and take your usual medicines unless your healthcare team or laboratory gives different instructions.

Many quantitative tests require all urine passed during a 24-hour period. The laboratory should

provide a container and written collection instructions. Ask whether the container needs to be kept refrigerated or in a cool place.

Tell the healthcare team if you are menstruating, have visible blood in your urine or think you have a urinary infection. These may add other proteins or blood to the sample and make interpretation harder.

Do not stop medicines or deliberately change how much you drink unless you have been told to do so.

What happens during the test

For a 24-hour collection, you will usually follow these steps:

The first discarded urine sets the starting point. The final urine must be included.

Some laboratories use a single urine sample instead. Follow the instructions supplied with your container because collection methods are not interchangeable.

Tell the laboratory if you miss a sample, spill urine or collect for the wrong length of time. You may need to restart rather than submit an incomplete collection.

- Choose a convenient start time and empty your bladder into the toilet
- Record that time as the start of the collection
- Collect all urine passed during the next 24 hours
- At the same time the following day, collect your final urine
- Store and return the container exactly as instructed

Understanding your results

Reports may state that no monoclonal light chain was detected. If one is present, the report may identify it as kappa or lambda and give an amount per litre or per 24 hours.

There is no single reference range that applies to every laboratory or situation. Reporting thresholds and interpretation vary by laboratory method, age, sex, pregnancy status, medicines, kidney function and clinical context.

A detected Bence-Jones protein means that one type of free light chain is present in the urine. It does not, by itself, show why it is present or whether treatment is needed. Small monoclonal proteins can occur in conditions that do not meet the criteria for active multiple myeloma.

A result below the laboratory's detection limit does not completely exclude a plasma cell

disorder. Blood free light-chain testing may detect abnormal production even when urine testing is negative.

Total urine protein is not the same measurement as Bence-Jones protein. Total protein includes albumin and many other proteins.

What affects the results

The most important practical issue is collecting every urine sample during the stated period. Missing even one can make the reported 24-hour amount falsely low. Collecting for too long can make it falsely high.

Other influences include:

Food, coffee and most routine medicines do not directly create monoclonal urine light chains. Age, pregnancy and recent transfusion do not usually cause a Bence-Jones protein, but they may affect the wider clinical interpretation. Tell your healthcare team about medicines, supplements and recent procedures rather than stopping anything yourself.

- Kidney function: Light-chain filtration and reabsorption change with kidney disease, so urine and blood results may not match
- Hydration: Dilute or concentrated urine strongly affects a single-sample concentration; a complete 24-hour amount is less affected
- Exercise: Strenuous activity can temporarily increase other urine proteins and complicate interpretation
- Infection or fever: These can increase non-monoclonal urine proteins without creating a true Bence-Jones protein
- Blood contamination: Menstrual blood, urinary bleeding or a traumatic collection can interfere with protein analysis
- Treatment: Therapy directed at abnormal plasma cells can genuinely lower the measured amount

Accuracy and limitations

A properly collected urine sample can identify and measure many monoclonal light chains. Immunofixation helps confirm that an apparent band is a single kappa or lambda protein rather than a mixture of ordinary proteins.

However, the test can miss low levels. The kidneys may reabsorb light chains, urine

concentration changes over time, and laboratory methods have different detection limits. An incomplete collection adds another chance of a falsely low result.

The test can also appear concerning when there is no active cancer. A genuine monoclonal protein may be associated with a stable precursor condition, and unrelated urine proteins can sometimes make electrophoresis harder to read. Confirmation and clinical assessment reduce the chance of a misleading conclusion.

For initial investigation, blood protein electrophoresis, blood immunofixation and a serum free light-chain test are often more effective as a group. Urine electrophoresis and immunofixation remain useful in selected situations, including suspected AL amyloidosis and measurement of substantial urinary monoclonal protein.

No single blood or urine test should be used alone to rule a plasma cell disorder in or out.

Risks and complications

Providing a urine sample has no direct medical risk. A 24-hour collection can be inconvenient, and spills or missed samples may mean repeating it.

Take care when storing and transporting a large collection container. Follow the laboratory's hygiene and storage instructions.

What happens next

Your healthcare team will interpret the result alongside blood tests, kidney function, blood counts, calcium levels, symptoms and any imaging or bone marrow results. A repeat sample may be requested if the collection was incomplete or the result does not fit other findings.

A small or stable result may lead to routine follow-up. A rising or newly detected result may lead to additional blood or urine tests, but it does not establish a diagnosis by itself.

The laboratory result alone is not usually an emergency. Seek urgent medical advice if you develop much less urine than usual, worsening swelling, repeated vomiting or marked confusion. Seek emergency care for sudden leg weakness or numbness, loss of bladder or bowel control, severe breathing difficulty or chest pain. These symptoms need prompt assessment regardless of the test result.

Common questions

Can I drink coffee before the test?

Usually, yes. Fasting is not required, but avoid deliberately drinking much more or less fluid than normal. Follow any separate fluid restriction prescribed for another condition.

Does the time of day matter?

For a 24-hour collection, the exact starting hour is less important than collecting for the full period. Choose a time when you can record the start and include every sample.

Can I exercise beforehand?

Ordinary activity is generally acceptable. Strenuous exercise can temporarily increase urine protein, so ask whether you should avoid it before or during the collection.

What if I forget to collect one sample?

Tell the laboratory. The measured daily amount could be falsely low, and you may be asked to restart with a new container.

Can I collect urine during my period?

Menstrual blood can contaminate the sample. Ask the laboratory whether to delay collection or use specific precautions.

Does a positive result mean I have multiple myeloma?

No. It shows that a monoclonal light chain was found, but further tests and clinical assessment are needed to determine its cause and importance.

Sources

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