TEST

Myoglobin urine test

A myoglobin urine test checks urine for a muscle protein released after muscle damage.

WHAT IT MEASURES
Myoglobin, a protein released from injured muscle

SAMPLE
Urine

FASTING NEEDED?
No

HOW LONG IT TAKES
About 5 to 10 minutes

RESULTS IN
Same day to several days, depending on laboratory

USED FOR
Evaluating muscle breakdown and related kidney risk

MAIN LIMITATION
Myoglobin clears quickly, so delayed samples can miss muscle injury

Overview

A myoglobin urine test checks for myoglobin in a urine sample. Myoglobin is a protein that helps muscle cells store oxygen. It can enter the blood and urine when skeletal muscle or heart muscle is damaged.

A large release of myoglobin can occur with substantial skeletal muscle breakdown, called rhabdomyolysis . Myoglobin may make urine look red, brown, or tea-colored. It can also contribute to kidney injury, especially when muscle breakdown is severe.

Urine myoglobin testing is now often used alongside other tests rather than by itself. A blood test for creatine kinase, or CK, usually stays abnormal longer and is generally more useful for detecting skeletal muscle breakdown. Kidney function, electrolytes, symptoms, and the cause of the injury also matter.

Why the test is ordered

The test may be ordered when your symptoms or recent history suggest muscle injury.

Examples include:

It may also help explain a urine dipstick result that is positive for "blood" when few or no red blood cells are seen under a microscope. A dipstick reacts to the oxygen-carrying pigment in red blood cells, but it can also react to myoglobin. It cannot reliably tell the two apart.

- Severe muscle pain, swelling, tenderness, or weakness
- Red, brown, or tea-colored urine
- A crush injury or prolonged pressure on muscles
- Heat illness or extreme physical exertion
- A seizure or prolonged loss of consciousness
- A medicine or substance that may injure muscle
- Possible complications after surgery or another serious illness

Who should have the test

This test is most useful when recent muscle damage is suspected and urine can be collected soon after the event. It is not a routine screening test for people without symptoms or a relevant injury.

A healthcare professional may choose other tests instead, particularly a blood CK test. Urine myoglobin can disappear relatively quickly, so a normal result does not reliably exclude muscle breakdown if testing was delayed.

People with possible rhabdomyolysis usually need more than a urine test. Blood tests may be needed to check kidney function and levels of potassium, calcium, phosphate, and other substances affected by muscle breakdown.

How to prepare

Fasting is not usually needed. You can generally eat and drink as normal unless you are also having another test that requires preparation.

Tell the healthcare team about recent strenuous exercise, injuries, seizures, surgery, injections into muscle, and any periods when you could not move normally. Also provide a current list of prescription medicines, non-prescription medicines, supplements, and recreational substances. Do not stop a prescribed medicine unless you have been told to do so.

You may be asked to provide a clean-catch sample. Cleaning the genital area and collecting

urine after the flow has started can reduce contamination from skin, vaginal discharge, or menstrual blood.

What happens during the test

You will urinate into a clean specimen container. A random sample is usually enough, meaning it can be collected at any time rather than over a full day.

Follow the collection instructions carefully. Avoid touching the inside of the container or lid. After collecting the sample, close the lid securely and return it as directed.

The laboratory may test specifically for myoglobin. In some situations, testing begins with a urine dipstick and microscopic examination. These are related tests, but a positive dipstick alone does not prove that myoglobin is present.

Understanding your results

Results may be reported as myoglobin "detected" or "not detected." Some laboratories report a measured concentration instead. Reference ranges and interpretation vary by laboratory, age, sex, pregnancy status, medicines, kidney function, and clinical context.

Normally, urine contains little or no detectable myoglobin. A detected or raised result means myoglobin has entered the urine, usually because muscle cells released it. The result does not identify the cause or show by itself how serious the injury is.

A normal result does not always rule out muscle breakdown. Myoglobin enters and leaves the blood quickly, and its appearance in urine depends on timing, kidney filtration, and urine concentration.

Your result is usually interpreted with:

- Blood CK, which remains raised longer after muscle injury
- Creatinine and other measures of kidney function
- Potassium and other electrolytes
- Urinalysis and urine microscopy
- Your symptoms, examination, and recent events

What affects the results

Timing is especially important. Myoglobin may rise early after muscle injury but clear quickly. A sample collected too early, after the myoglobin has already cleared, or after treatment with fluids may contain little myoglobin despite genuine muscle damage.

Hydration affects how concentrated the urine is. Drinking a large amount of fluid or receiving intravenous fluids can dilute myoglobin. Dehydration can make urine more concentrated.

Kidney function also affects the result. Myoglobin must pass through the kidneys to reach the urine. Reduced kidney filtration can change how much appears in a sample, so the urine result may not match the amount of muscle injury.

Recent intense exercise, seizures, muscle injections, surgery, trauma, or prolonged pressure on a limb can raise myoglobin without an underlying muscle disease. These are real biological increases rather than laboratory errors.

Menstrual blood or bleeding from the urinary tract can make a dipstick positive for blood. Free hemoglobin from broken red blood cells can do the same. Neither finding proves myoglobin is present.

Delayed transport, unsuitable storage, and very acidic urine may affect myoglobin stability. Laboratories use handling procedures suited to their testing method, so follow any instructions about promptly returning or refrigerating the sample.

Accuracy and limitations

There is no single miss rate or false-positive rate for urine myoglobin testing. Accuracy changes with the testing method, the timing of collection, urine concentration, kidney function, and the type and extent of muscle injury.

The test can miss muscle damage because myoglobin clears rapidly. This is why blood CK is usually the better test when rhabdomyolysis is suspected, especially if several hours have passed.

A urine dipstick is not a specific myoglobin test. It may say "blood" when the sample contains red blood cells, free hemoglobin, or myoglobin. Microscopy and, when needed, a specific laboratory assay help clarify the result.

Even a confirmed positive result can be misleading if viewed alone. Exercise or a minor muscle injury may release myoglobin without severe rhabdomyolysis. Conversely, a low urine result does not guarantee that the kidneys are safe or that no muscle injury occurred.

Risks and complications

Providing a urine sample is painless and has no meaningful physical risk. The main practical concern is contamination, which may make the result harder to interpret and require another sample.

What happens next

If myoglobin is found, the next step depends on your symptoms, the likely cause, and your other test results. You may have blood CK, kidney function, and electrolyte tests. A repeat urine or blood sample may be needed to see whether the abnormality is improving.

A small abnormality after strenuous exercise may only require routine follow-up when you otherwise feel well, but this decision should be based on the full clinical picture.

Seek urgent medical assessment for dark urine together with marked muscle pain, swelling, or weakness, especially after extreme exercise, heat exposure, a seizure, prolonged immobility, or a crush injury. Passing much less urine than usual also needs prompt assessment.

Call emergency services for a serious crush injury, collapse, severe confusion, breathing difficulty, or other signs of a medical emergency. Do not wait for a urine test result before seeking help in these situations.

Common questions

Can I drink coffee before the test?

Usually, yes. Fasting is not required for urine myoglobin testing. Follow different instructions if other tests are being performed at the same time.

Does the time of day matter?

The clock time usually matters less than how soon the sample is collected after possible muscle injury. Myoglobin can clear quickly, so delayed testing may miss it.

Can I exercise beforehand?

Avoid unplanned strenuous exercise before testing if possible. Heavy exercise can release myoglobin and make the result difficult to interpret. Tell the healthcare team if you recently exercised intensely.

Can I take my usual medicines?

Usually, yes, unless you have been given specific instructions. Report all medicines and

supplements because some can contribute to muscle injury or interact with other risk factors.

Can I do the test during my period?

You can, but menstrual blood may contaminate the sample, particularly when a dipstick is used. Tell the person receiving the sample and follow clean-catch instructions.

Does dark urine always mean myoglobin is present?

No. Dark urine can have several causes, including dehydration, blood, medicines, foods, liver or bile problems, and myoglobin. Testing and clinical assessment are needed to distinguish them.

Sources

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