TEST

Cytology exam of urine

Urine cytology examines cells in urine for changes linked to urinary tract cancer.

WHAT IT MEASURES
Abnormal cells shed from the urinary tract lining

SAMPLE
Urine

FASTING NEEDED?
No

HOW LONG IT TAKES
About 5 to 10 minutes

RESULTS IN
Usually several days, depending on the laboratory

USED FOR
Helping diagnose and monitor urinary tract cancers

MAIN LIMITATION
Often misses low-grade bladder cancers

Overview

A cytology exam of urine, or urine cytology, looks at cells released into your urine. A specialist called a cytopathologist examines these cells under a microscope.

The test mainly looks for changes associated with high-grade urothelial cancer . "Urothelial" refers to the cells lining the bladder, ureters, kidney drainage system, and part of the urethra. High-grade cancer cells look very abnormal and are more likely to be detected in urine than low-grade cancer cells.

Urine cytology does not show where abnormal cells came from. It also cannot confirm or rule out cancer by itself. Results are considered alongside your symptoms, medical history, cystoscopy, imaging, and sometimes a biopsy.

Why the test is ordered

Urine cytology may be ordered when there is concern about cancer somewhere in the urinary tract. Reasons can include:

Carcinoma in situ is a flat, high-grade cancer that can be difficult to see during cystoscopy. Cytology can sometimes detect abnormal cells shed by this type of cancer.

The test is not usually used alone to screen people who have no symptoms or risk factors. It is also not a replacement for cystoscopy, which uses a thin camera to inspect the inside of the bladder.

- Blood in the urine, especially visible blood
- Persistent urinary symptoms without a clear explanation
- An abnormality found during imaging or cystoscopy
- Previous bladder or urinary tract cancer
- A higher risk of aggressive bladder cancer or carcinoma in situ

Who should have the test

You may be offered urine cytology as part of an investigation for blood in the urine or another urinary tract concern. It may also be used during follow-up after treatment for bladder cancer.

Not everyone with microscopic blood in the urine needs cytology. Whether it is useful depends on factors such as your age, smoking history, previous test results, symptoms, and history of urinary tract cancer.

A clinician may also request cytology when a cystoscopy result is unclear or when symptoms continue despite an otherwise negative evaluation.

How to prepare

Fasting is not needed. You can usually eat, drink, and take your regular medicines as normal. Do not stop a medicine unless the clinician who prescribed it tells you to.

Follow the collection instructions from your laboratory. Some laboratories prefer a sample produced after your first urination of the morning because cells can break down while urine remains in the bladder overnight. You may be asked to provide samples on more than one day.

Avoid drinking a very large amount of water immediately beforehand. Overly diluted urine may contain too few cells to examine properly.

Tell the healthcare team if you:

These factors may change how the cells look or affect how the result is interpreted.

- Are menstruating or have vaginal bleeding
- Have symptoms of a urinary infection
- Recently had a catheter, cystoscopy, or another urinary procedure
- Recently received treatment inside the bladder
- Are having chemotherapy or have had pelvic radiation

What happens during the test

Most samples are collected using a clean-catch method.

You clean around the urinary opening, begin urinating into the toilet, and then collect urine in a sterile container without touching its inside. This helps reduce contamination from skin or genital cells.

The sample is labelled and sent to the laboratory. It may need a preservative or prompt refrigeration because cells deteriorate over time.

In some situations, urine is collected through a catheter. Cells may also be collected in fluid used to rinse the bladder during cystoscopy. These methods are more involved than providing a routine urine sample and may yield more cells.

Understanding your results

Urine cytology results use categories rather than a numerical reference range. Laboratories may use wording based on the Paris System, a standardized approach designed to identify high-grade urothelial cancer.

Possible results include:

A negative result does not exclude low-grade bladder cancer. An atypical result also does not mean you have cancer. Infection, inflammation, urinary stones, recent procedures, and treatment effects can all produce unusual-looking cells.

There is no universal normal numerical range for this test. Terminology and interpretation can vary by laboratory and clinical context. Age, sex, pregnancy status, medicines, previous treatment, and the reason for testing may also affect how a result is assessed.

- Negative for high-grade urothelial carcinoma: No convincing high-grade cancer cells were seen

- Atypical urothelial cells: Some cells looked unusual, but the changes were not enough to classify them as suspicious or cancerous
- Suspicious for high-grade urothelial carcinoma: Cell changes raise concern, but the sample does not provide a definite answer
- High-grade urothelial carcinoma: The cells strongly support the presence of high-grade cancer
- Nondiagnostic or unsatisfactory: There were too few suitable cells, or the sample could not be assessed reliably

What affects the results

Urine can contain abnormal-looking cells even when there is no cancer. It can also fail to contain cancer cells when a tumour is present.

Important influences include:

Menstrual blood and vaginal cells can contaminate a voided sample. Tell the collection team if you are menstruating so they can advise whether to proceed or collect the sample later.

A recent blood transfusion does not usually affect urine cytology because the test examines urinary tract lining cells, not red blood cells.

- Dilute urine: Drinking excessive fluid may reduce the number of cells in the sample
- First-morning urine: Cells may deteriorate after remaining in the bladder overnight
- Delayed processing: Cells can break down if the sample is not preserved or examined promptly
- Urinary infection or inflammation: Irritated cells may look atypical
- Urinary stones: Friction and inflammation can change the appearance of lining cells
- Recent instrumentation: A catheter, cystoscopy, or other procedure can dislodge or damage cells
- Cancer treatment: Bladder treatments, chemotherapy, and pelvic radiation may cause treatment-related cell changes
- Low cell shedding: Some tumours release few or no cells into urine

Accuracy and limitations

Urine cytology is better at finding high-grade urothelial cancer than low-grade disease. High-grade cancer cells tend to look more abnormal and are more likely to shed into urine.

The test can miss cancer. This is more likely when a tumour is low-grade, small, releases few cells, or is located where cells do not readily enter the sample. A poorly preserved or very dilute specimen can also lead to a false-negative result.

The test can also suggest cancer when cancer is not present. Severe inflammation, infection, recent urinary procedures, stones, radiation, and some treatments can produce concerning cell changes. These results are often reported as atypical or suspicious rather than definitively positive.

Accuracy differs according to sample quality, tumour type, laboratory methods, and the experience of the person interpreting the cells. Repeating cytology may improve the chance of collecting abnormal cells, but it cannot replace other investigations.

Cystoscopy is better for directly viewing the bladder. Imaging is needed to assess parts of the urinary tract that cannot be seen during cystoscopy. A biopsy, in which tissue is removed and examined, is generally required to confirm cancer.

Risks and complications

Providing a urine sample has no significant physical risks. Some people find collecting a clean-catch sample awkward.

If urine must be collected through a catheter or during cystoscopy, there may be temporary discomfort, mild bleeding, or a small risk of infection related to that procedure.

What happens next

A negative result may need no separate action if your other tests are reassuring. However, follow-up may still be needed when you have ongoing blood in the urine, persistent symptoms, an abnormal scan, or a previous urinary tract cancer.

An atypical or unsatisfactory result may lead to another urine sample. A suspicious or positive result usually leads to timely further assessment, such as cystoscopy, imaging, or biopsy. It does not by itself establish a cancer diagnosis.

Contact your healthcare team promptly if visible blood in your urine continues or returns. Seek urgent medical care if you cannot pass urine, are passing large clots or heavy amounts of blood, or have blood in the urine with fever, severe side or back pain, fainting, or marked

weakness.

Common questions

Can I drink coffee before urine cytology?

Usually, yes. Fasting is not required. Avoid drinking so much coffee, water, or other fluid that your urine becomes extremely dilute.

Does the time of day matter?

It can. Some laboratories advise against the first urine of the morning because cells may have deteriorated overnight. Follow the instructions supplied with your collection container.

Can I exercise beforehand?

Routine activity is unlikely to change the appearance of urinary tract cells. Strenuous exercise can sometimes cause temporary blood in the urine, so mention recent intense exercise if the test is part of an investigation for bleeding.

Can I provide a sample during my period?

Menstrual blood and vaginal cells can contaminate the sample. Ask the collection team whether to proceed or wait until bleeding has stopped.

Do antibiotics like amoxicillin or doxycycline affect the result?

Antibiotics do not usually alter urinary cells directly, but the infection being treated may cause inflammation and atypical cells. Tell the healthcare team about current medicines and recent infections.

Does a positive result mean I have cancer?

Not by itself. A positive result is concerning and needs prompt follow-up, but cystoscopy, imaging, and usually a biopsy are used to identify the source and confirm the diagnosis.

Sources

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