

HOW DO YOU KNOW what type of cancer you have?

ARTICLE
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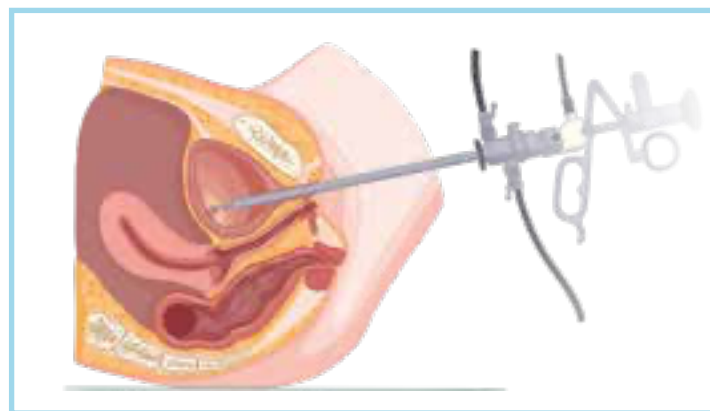
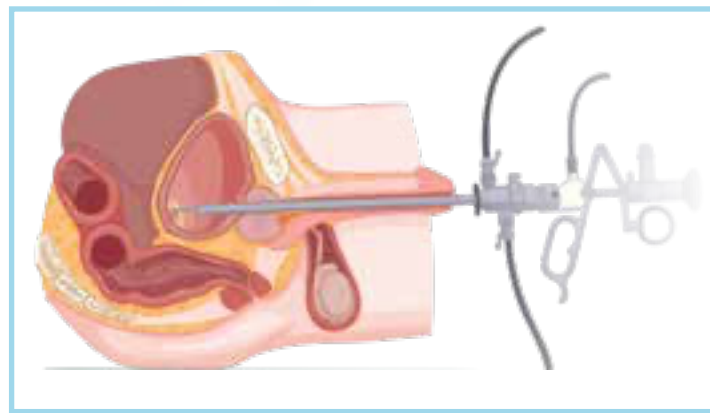
The small samples of your cancer tumour that are sent to pathology are key to finding out all about your cancer so that the doctor can make decisions on appropriate treatment. Lydia gives us an insight into the person who examines those samples: the pathologist.



A pathologist is a doctor who diagnoses disease by looking at urine, blood, cells and small pieces of the cancer. They work in a laboratory and you are unlikely to meet them face to face.

The urologist will remove a piece of the cancer from your bladder by inserting a tube through your urethra during a TURBT (transurethral resection of bladder tumour) procedure, and then give this sample to a pathologist, who will perform various tests.

The pathologist will help your medical team answer questions like these about your cancer.



TURBT procedure for men (above) and women (below)

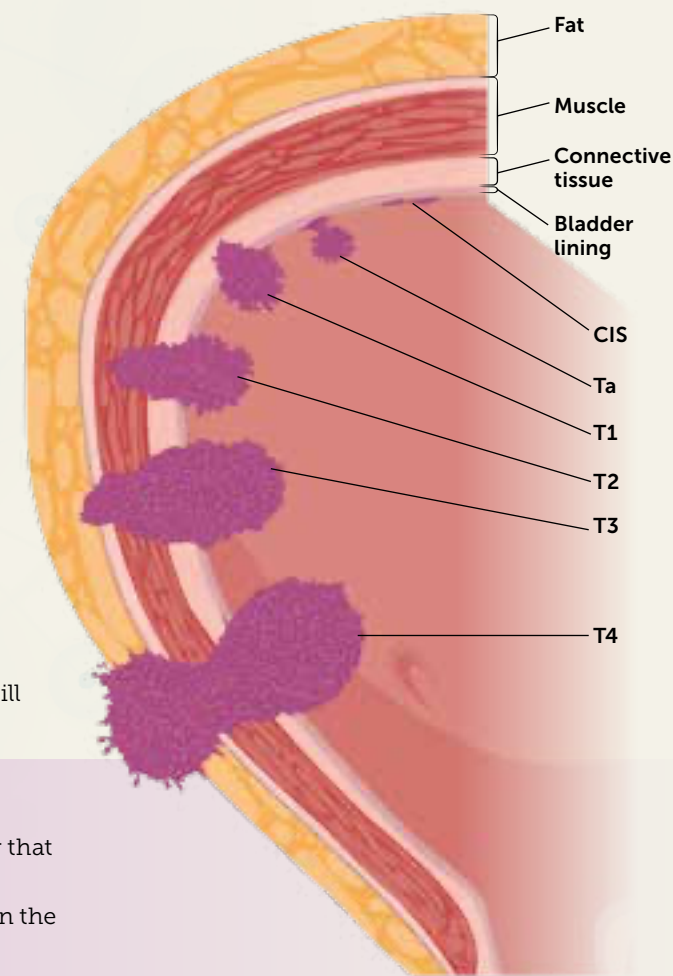


Is this non-muscle-invasive bladder cancer or muscle-invasive bladder cancer?

The pathologist will put a tiny piece of the tumour on a glass slide and look at the slide through a microscope. The pathologist will examine the cancer cells to see if the cancer tumour is sitting on top of the bladder cancer muscle (non-muscle-invasive bladder cancer) or if it is sitting inside the bladder cancer muscle (muscle-invasive bladder cancer).

Based on what they see through the microscope, they will give your cancer one of the following indicators:

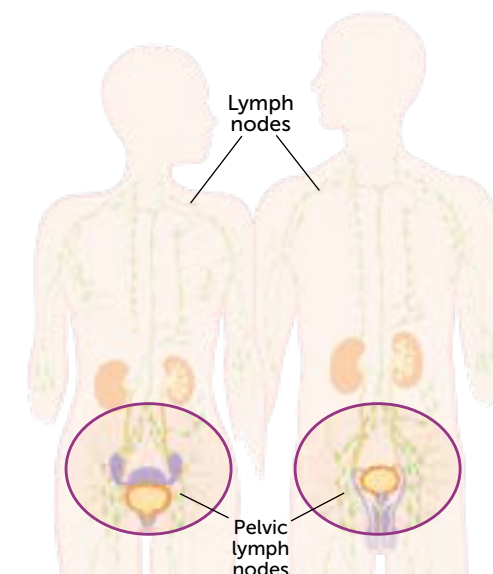
- T0:** no tumour
- TIS (CIS):** carcinoma in situ, a flat, fast-growing tumour that spreads across the inner layer of the bladder
- Ta:** papillary, mushroom-shaped, tumour that is only on the innermost layer of the bladder
- T1:** tumour has started to grow into the connective tissue
- T2:** tumour has grown through the connective tissue into the bladder muscle
- T3:** tumour has grown through the layer of muscles into the surrounding fat layer
- T4:** tumour has spread outside the bladder into other organs such as the prostate or uterus



Is there cancer inside your lymph nodes?

The surgeon might also remove some of the lymph nodes in your pelvis and other regions for examination on a glass slide under a microscope. The pathologist will look at the cells inside the lymph nodes to see if there are any cancer cells, and give your cancer one of these indicators:

- N0:** there are no cancerous cells in any of your lymph nodes
- N1:** there are cancerous cells in one of the lymph nodes in your pelvis
- N2:** there are cancerous cells in two or more of the lymph nodes in your pelvis
- N3:** there are cancerous cells in one or more of the lymph nodes (known as common iliac nodes) deep in your pelvis



What grade is your bladder cancer?

The pathologist will look at your cancer cells under a microscope, count the number of tumours, and then give your cancer a grade. The grade refers to the number and what the cancer cells look like under the microscope compared to healthy tissue and indicates how aggressive the cancer is and how likely it is to spread.

To classify bladder cancers, the World Health Organisation established one system in 1973, and then established a slightly different system in 2004.

In the 1973 grading system, grades are expressed as a number; the higher the number, the less the tumour resembles a normal cell and therefore the more aggressive it is.

- G1 / low grade
- G2 / intermediate grade
- G3 / high grade

Alternatively, your doctor may simply refer to the grade of your tumour as low, intermediate or high.

In the 2004 system, the categories are:

- PUNLMP (Papillary Urothelial Neoplasm of Low Malignant Potential)
- low grade
- high grade

You can see from the diagram below that the boundaries of the three sections are not the same. It's like comparing UK and European shoe sizes; a size 7 can be a 40 or a 41.

PUNLMP	Low grade	High grade	2004 WHO
Grade 1	Grade 2	Grade 3	1973 WHO

Stratification of tumours according to grade in the WHO 1973 and 2004 classifications



PUNLMP (Papillary Urothelial Neoplasm of Low Malignant Potential), magnified. User: Nephron / Wikimedia Commons / CC-BY-SA-4.0



Low grade bladder cancer, magnified. User: CoRus13/ Wikimedia Commons / CC-BY-SA-4.0



What is the best treatment for your advanced bladder cancer?

If you have advanced or metastatic bladder cancer, your medical team will decide on the best treatment for you based on the following factors:

- how well your kidneys function
- how active you are in your day-to-day life
- if your cancer cells have a protein called PD-L1
- if your cancer DNA has a pattern called NTRK
- if your cancer DNA has a pattern called FGFR

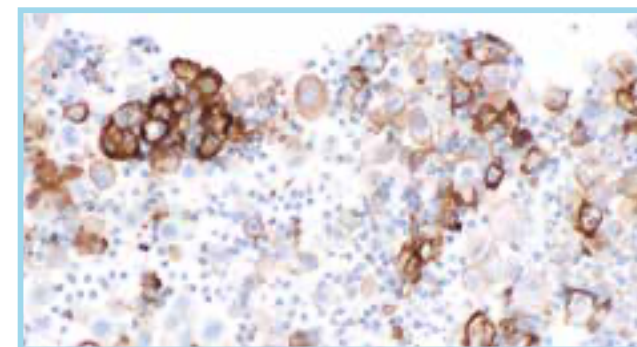
If your kidneys function well, and you are fairly active in your day-to-day life, your medical team is likely to suggest that you have a mix of chemotherapy drugs that includes cisplatin.



If your kidneys don't work as well as they used to, or you are not as active as you used to be, then your medical team will talk to you about your treatment options. They might also do some tests on your cancer cells to help decide which treatments are most likely to work best for you.

PD-L1

The doctor will give the pathologist a piece of your tumour, the pathologist will take a small bit and put on a special dye that will turn brown if the cancer cells have a protein called PD-L1 on their surface.



The centre of the cells are stained blue and the PD-L1 protein on the outside of the cancer cells is stained brown.

PD-L1 positive: If your cancer cells have a protein called PD-L1 on their surface, your medical team might suggest an immunotherapy called atezolizumab to fight your cancer.

PD-L1 negative: If your cancer cells do not have PD-L1 on their surface, your medical team might suggest a mix of chemotherapy drugs that includes carboplatin to fight your cancer.

FGFR & NTRK

Your medical team also might look inside the DNA of your cancer to help them decide the best type of treatment for you to have. Your doctor will take a piece of your cancer tumour and the pathologist will look at the DNA inside the cancer and see if your cancer cells have particular patterns in their DNA.

The pathologist will look for patterns in your tumour called NTRK and FGFR.

NTRK positive: If the pathologist finds an NTRK pattern in your cancer tumour's DNA, they might give you a targeted treatment called entrectinib or larotrectinib to fight your cancer.

NTRK negative: If your cancer tumour's DNA does not have an NTRK pattern inside it, your medical team might suggest a mix of chemotherapy drugs that includes carboplatin to fight your cancer.

FGFR positive: If your cancer tumour's DNA has an FGFR pattern inside it, your medical team might suggest enrolling you in a study to use the targeted treatment erdafitinib to fight your cancer.

FGFR negative: If your cancer tumour's DNA does not have an FGFR pattern inside it, your medical team might suggest mix of chemotherapy drugs that includes carboplatin to fight your cancer.

Remember the final decision about treatment is up to you and your loved ones. Your medical team will discuss all your treatment options with you, give you an update on your prognosis, and go through the advantages and disadvantages of each of the treatment options, including potential side-effects and best supportive care.