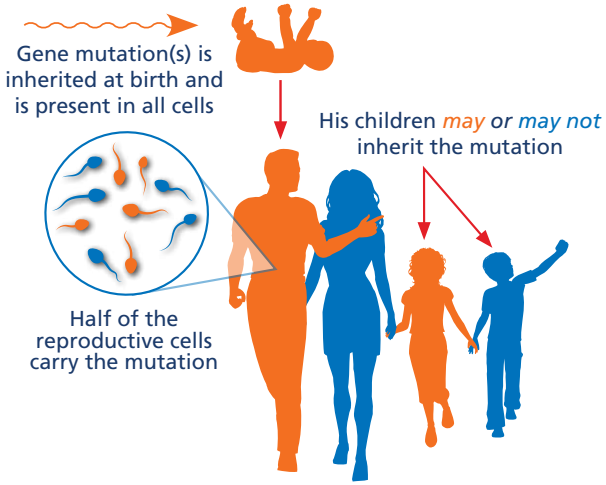
Other important considerations

While most mutations found in cancer cells are acquired mutations, in some situations, a mutation detected in cancer cells may be an **incidental heritable mutation**. A proportion of cancer patients developed cancer because they inherited a cancer-predisposing gene mutation. These heritable mutations can be passed from parent to children and are present in all cells. When these individuals undergo tumour genetic testing, the heritable mutations may be detected in the cancer cells. Unfortunately, tumour genetic testing alone is unable to definitively distinguish heritable from acquired mutations. If your doctor suspects that one or more of the mutations detected in your tumour are a potentially heritable mutation, you may benefit from genetic counselling and further genetic testing using blood or saliva to confirm the nature of the mutation. Your doctor will advise you accordingly.

Inherited Mutations



Which cancer types are suitable for tumour genetic testing?

With the advancement in cancer research and understanding of important biomarkers, the role of tumour genetic testing is increasing. There is an ever growing list of cancers for which tumour genetic testing is considered routine as the information is critical to guide the choice of drug treatment for the patient. These tumour types include ovarian, prostate, colorectal, breast and lung cancers, just to name a few. Please speak to your doctor to find out more about whether tumour genetic testing would be useful for your cancer.

Acknowledgements

This booklet is prepared by the Cancer Genetics Clinic, National University Cancer Institute, Singapore (NCIS).

All information is correct at the time of printing and subject to revision without notice.

For more information, please consult your doctor.

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National University Cancer Institute Singapore

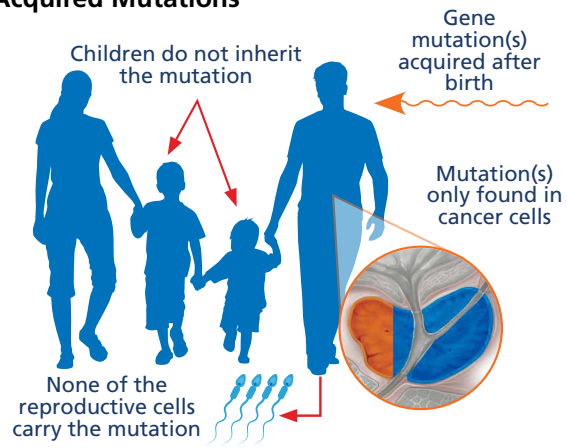
TUMOUR GENETIC TESTING

What is tumour genetic testing?

Cancers develop when mutations (or changes) occur in the DNA sequence of genes causing harmful consequences. Tumour genetic testing refers to the process of analysing and identifying genetic mutations that are present in cancer cells. This will include both acquired as well as inherited mutations.

Most cancers occur due to **acquired mutations**. Acquired mutations are changes that are not present at birth but develop later on in life, and are usually found only in cancer cells but not in other normal cells in a cancer patient. Acquired mutations cannot be passed from parent to children (i.e., not heritable).

Acquired Mutations



Why is this test important?

Some of the mutations present in a cancer cell are 'targetable'. This means that there exists a drug that specifically targets a particular pathway to stop the cancer from growing uncontrollably. Other mutations serve as important biomarkers that can help doctors personalise your cancer treatment.

How is tumour genetic testing done?

A sample of your tumour will be required. If you previously had a biopsy or surgery for your tumour and the sample has been stored by the hospital, your doctor can check if this archived sample is suitable to be used for tumour genetic testing. If unsuitable, you might be required to go for a biopsy to obtain a new tumour sample for the test. If you require a fresh biopsy, your doctor will discuss with you how best to do that.

Samples of your tumour will be sent to specialised laboratories for tumour genetic testing. Some tumour genetic tests use more targeted approach testing only specific gene mutations, while others test multiple cancer genes. Your doctor will be able to advise you on which test would be most suitable for your cancer.

How much will it cost?

This will depend on the actual test selected by your doctor. You will be briefed on the costs and mode of payment by our staff before proceeding.

How long will it take for results to return?

The results may take 3-4 weeks to return depending on the type of test offered. Your doctor will advise you further.

Interpreting the results

Result	Implications on Treatment
Mutation present that suggests your cancer may respond to a particular drug treatment	Based on the result, you may respond to a specific drug treatment. Your doctor will advise you further on your options.
Mutation present but its significance on cancer treatment is currently unknown	Does not impact treatment. However, if more information is known about this mutation in the future, you will be informed by your doctor.
No mutation found	Does not impact treatment
Testing unsuccessful/ inconclusive	There might be a need to repeat the test using a different tumour specimen. Your doctor will discuss this with you if necessary.