



## Liquid Biopsy

Have you heard of the term “liquid biopsy?” Are you wondering about this new medical testing technique and how it works? In this lesson, you will learn about the main benefits of liquid biopsy and how it is involved in cancer testing.

### Target Audience



Cancer patients, family members and their support network.

### Knowledge Level



Beginner.

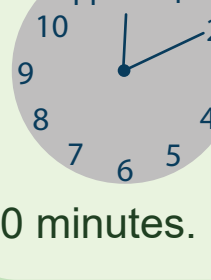
This lesson is compatible with screen readers when viewed in PDF format. The definition of words in **blue** text are in the Glossary at the end of this lesson.

### Lesson Format



Infographic.

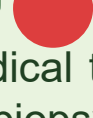
### Duration



10 minutes.

## Liquid biopsy basics

### What is Liquid biopsy?



Liquid biopsy is a medical test that uses fluids from the body. Blood is the most common liquid biopsy source, but saliva, urine or the fluid around organs (like the lungs and brain) can also be used.

### Why is liquid biopsy used?



Liquid biopsy is used to test for cancer, especially when solid tissue biopsy would be risky for the patient. Compared to solid tissue biopsy, liquid biopsy is less invasive, less painful, quicker and more cost effective.

### When is liquid biopsy performed?



Liquid biopsy can be performed at various times during cancer care. It can be used to screen for cancer in high-risk individuals. If performed as soon as cancer is suspected, this test may help with early stage detection. Liquid biopsy can also be performed after a cancer diagnosis to detect metastases, monitor treatment response, and to check for recurrence. While the turnaround time varies, your doctor can expect your liquid biopsy results in about two weeks.

## Steps of the liquid biopsy procedure

1.



15 minutes



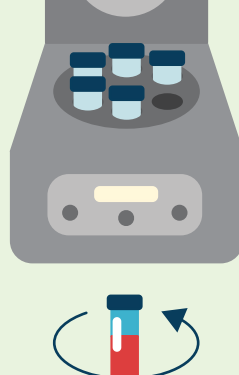
Similar to a regular blood test, a **phlebotomist** will use a needle to draw a small amount of blood from the patient. Tests performed on liquid biopsy samples are very sensitive, so a single vial of blood is enough to perform several tests.

### Did you know?

Special vials are used to protect the sample so that they will produce reliable test results.

2.

10 ml Blood

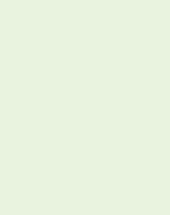


Centrifuge

A tube of blood will be placed in a machine called a centrifuge. The centrifuge will spin the tube at high speed to separate the blood into three distinct layers.

### Did you know?

Blood contains cells, water, salts, nutrients, proteins, and pieces of DNA.



6 ml Plasma

Red blood cells

Buffy coat (white blood cells & platelets)

3.

If the patient has a solid tumour, the plasma may contain circulating tumour DNA (**ctDNA**), and the buffy coat may contain circulating tumour cells (**CTCs**).

ctDNA



CTCs



A **pathologist** can order many different tests for the liquid biopsy sample. Here you will see how DNA sequencing and CTC counts can be used.

### DNA sequencing

ctDNA



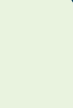
ATGCTACTAGGGCTA  
CGTGATGCTACTAGG  
GCTACGTGATGCTAC  
TAGGGCTACGTGATG  
CTACTAGGGCTACGT  
GATGCTACTAGGGCT



DNA sequencing looks for mutations in the ctDNA. Knowing what mutations are present can help predict if a drug will target the patient's tumour - **this is referred to as precision medicine**. Certain mutations can also indicate whether the patient will have a better chance at survival.

### CTC counts

CTCs



CTCs can be counted under a microscope. If CTC numbers decrease after treatment, this can indicate that the tumour is responding to the drug.

An **oncologist** will use the results of DNA sequencing and CTC count tests to develop a personalized plan for treating and monitoring the disease.

## Summary

Liquid biopsy is a powerful technique that can be used to diagnose and monitor cancer. Liquid biopsy samples can be analyzed by microscopy or using molecular pathology techniques. Liquid biopsy test results help Oncologists develop a precision medicine approach to a patient's treatment.

## Glossary

### CTCs

Circulating tumour cells; living cancer cells that break away from the primary tumour and enter the blood.

### ctDNA

Circulating tumour DNA; DNA found in the bloodstream that comes from cancer cells and tumours in the body.

### Oncologist

A doctor specialized in diagnosing and treating cancer using chemotherapy, hormonal therapy, biological therapy and targeted therapy.

### Pathologist

A doctor trained in examining tissues to diagnose or confirm disease in a patient.

### Phlebotomist

A healthcare worker trained in taking blood samples.

### Plasma

A liquid component of blood containing a complex mix that includes water, salts, proteins and nutrients.