LIQUID BIOPSY: REVOLUTIONISING CANCER DETECTION AND TREATMENT MONITORING

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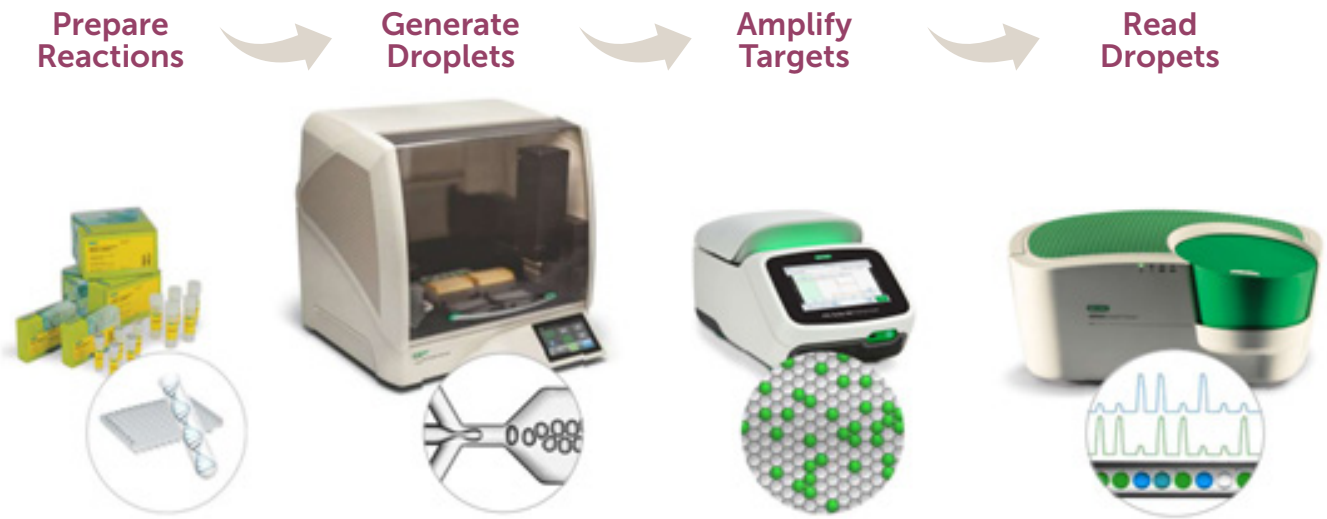
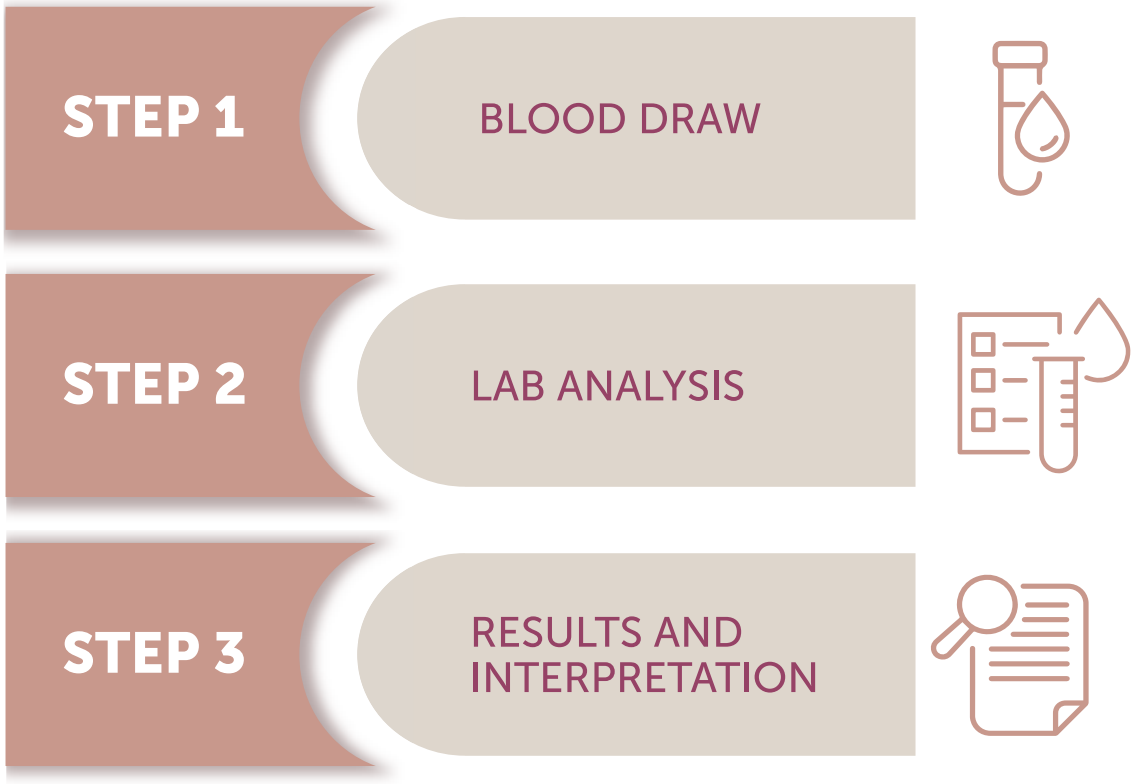
What is liquid biopsy?

A liquid biopsy is a non-invasive diagnostic test that analyses blood samples, to detect cancer-related genetic material, such as circulating tumour DNA (ctDNA). At C-Lab we are using the ddPCR techonology to perform liquid biopsy tests. ddPCR allows for precise quantification of genetic mutations, making it an effective tool for monitoring minimal residual disease (MRD), detecting early relapse, and tracking treatment response.

How does it work?



Droplet Digital PCR (ddPCR) divides a sample into thousands of droplets, where each droplet acts as an individual PCR reaction. Positive droplets emit fluorescence, allowing for precise quantification by counting the ratio of positive to total droplets. This method provides highly sensitive, absolute quantification of DNA/RNA directly from blood samples.



Advantages of liquid biopsy

1. Non-invasive, requires a blood sample.
2. Cancer detection at an early stage.
3. Monitoring of chemotherapy and radiotherapy treatment effectiveness.
4. Identify genetic mutations or resistance markers for targeted therapies.
5. Track cancer recurrence or progression in real-time.
6. Quicker turn around time (3 to 5 days) to obtain results and enable timely decision making by doctors.
7. **Sensitive:** Detects low levels of ctDNA as ddPCR can identify mutations at a very low mutant allele frequency (MAF) – as little as 1 mutant copy in 10,000 normal DNA copies (0.01%).

100% Sensitivity
>96% Specificity

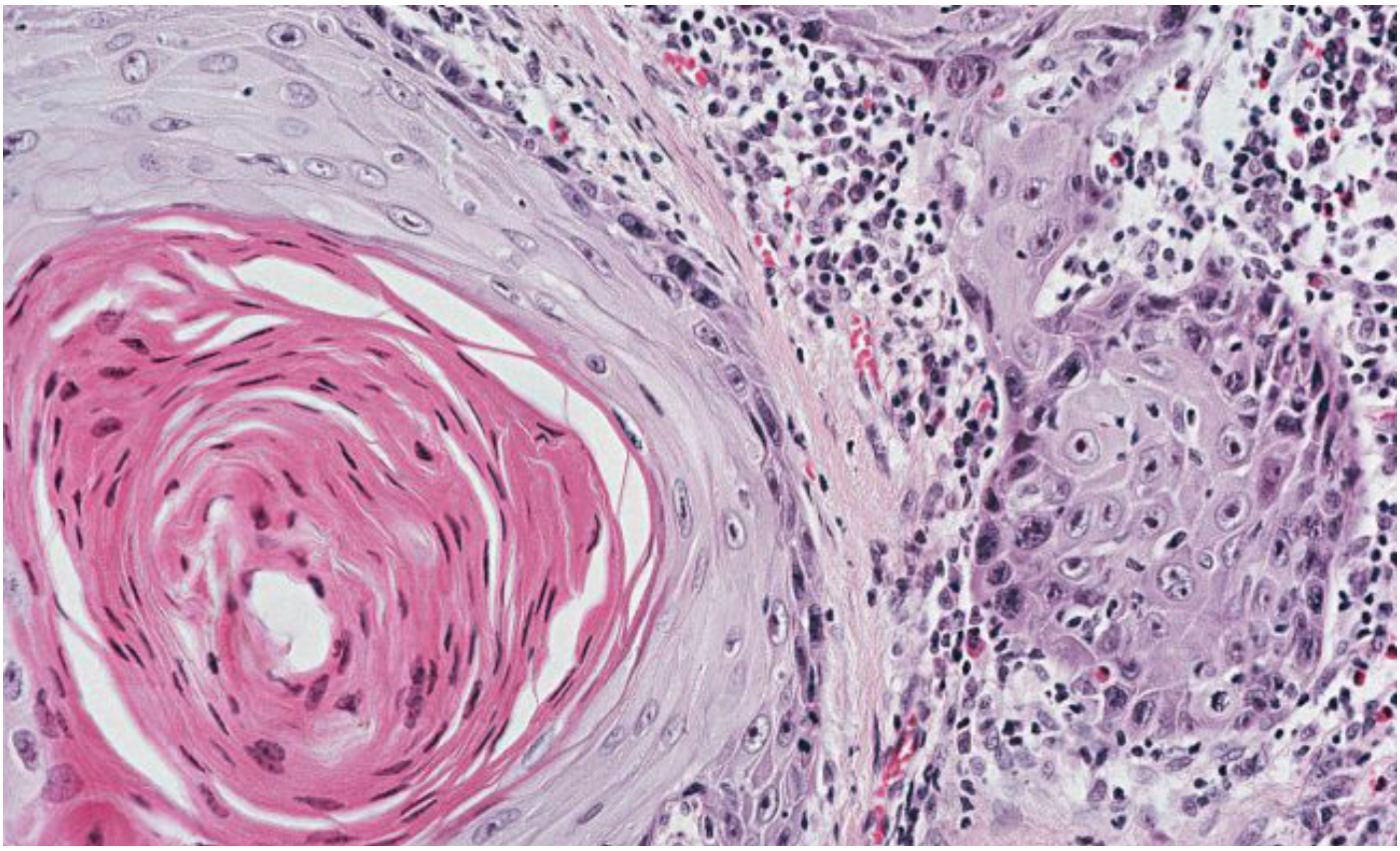
Independent study using FFPE compared to PCR-CE.

Minimal Input Required

2 ng/10%

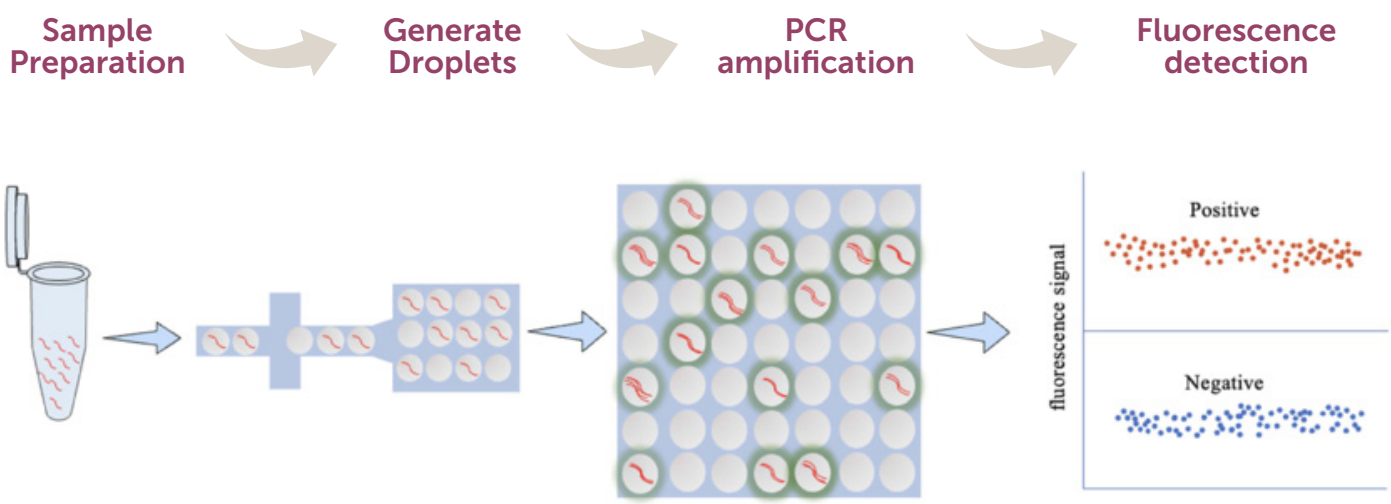
Obtain accurate results with minimal input and tumor content.

Limitations



While liquid biopsy is valuable for monitoring and detecting cancer mutations, it cannot entirely replace tissue biopsies, especially for initial diagnosis. Tissue biopsies provide more detailed histological and molecular information

ddPCR in guiding personalised cancer therapy

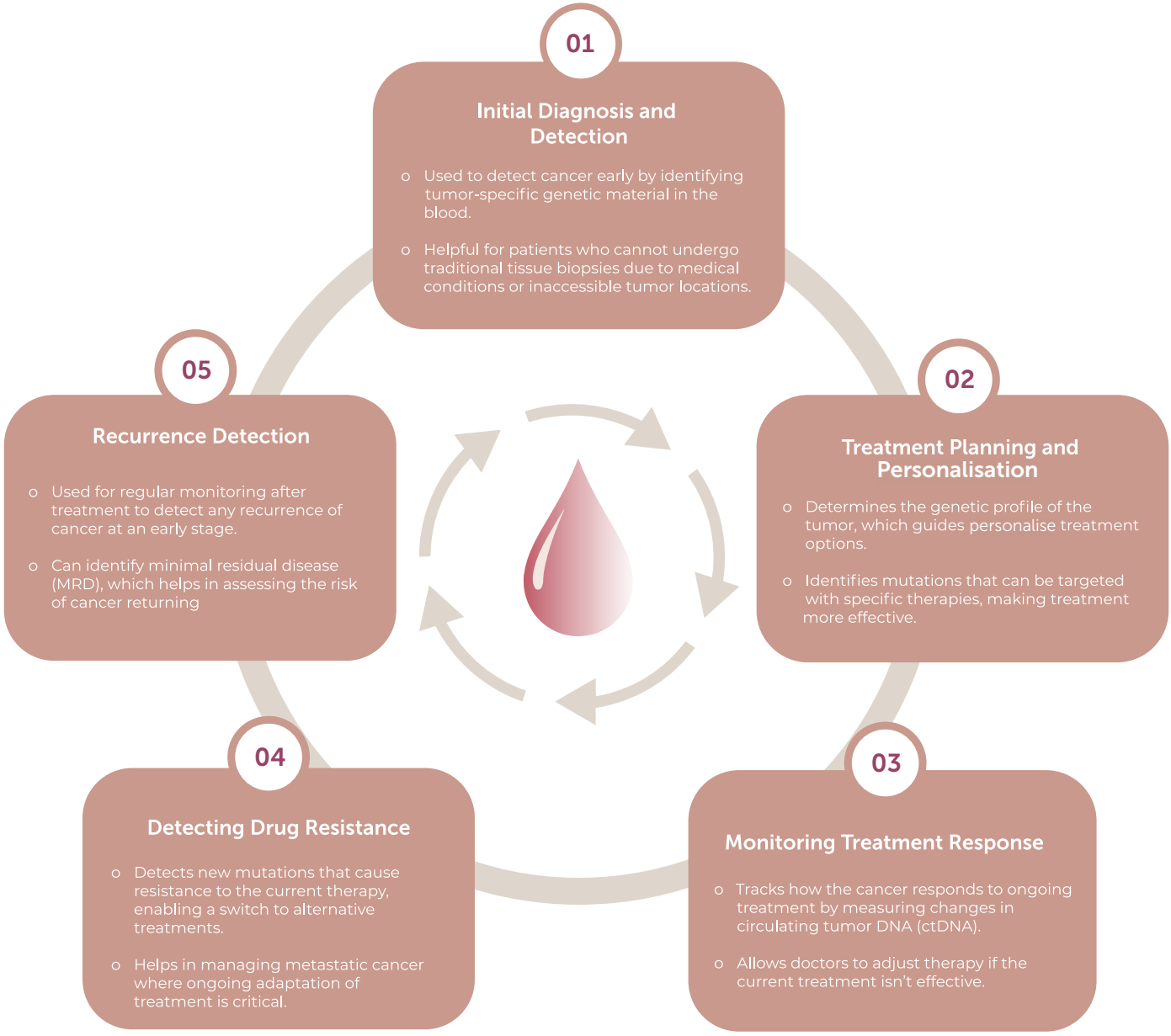


ddPCR can identify specific genetic mutations (e.g., EGFR, KRAS) that are actionable targets for precision therapies. By monitoring these mutations, health practitioners/doctors can adjust treatment plans according to tumour evolution.

Liquid biopsy during cancer treatment

Liquid biopsy provides valuable insights on the genetic and molecular characteristics of tumors. It focuses on detecting and monitoring specific markers that indicate the presence or behavior of cancer, helping doctors to make precise, real-time treatment decisions.

The frequency of liquid biopsy tests depends on the clinical situation. It may be performed before starting treatment, periodically during treatment to monitor response, and after treatment to detect recurrence. According to the National Cancer Institute (NCI), liquid biopsy is useful in the following context:



Liquid biopsy is an innovative diagnostic breakthrough for precision oncology. At C-Lab, we have adopted this method as part of our commitment to innovate and offer the best diagnostics tests to our patients and doctors.

Common mutations found in cancers

Non-small cell lung cancer

- EGFR CNV*
- Ex19 Deletion Screening*
- L858R
- T790M C797S/ T790M L858R
- G719S
- L861Q
- EML4-ALK mRNA fusion
- RET mRNA fusion
- ROS1 mRNA fusion

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Breast Cancer

PIK3CA mutations

- PIK3CA CNV*
- CCND1 GENE OVEREXPRESSION*
- ESR1*
- AKT1*
- BRCA 1 & 2*
- HER2- ERBB2*
- TP53*
- FGFR1 and FGFR2
- CHEK2

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Colorectal Cancer

KRAS mutations

- BRAF V600*
- KRAS G12/G13*
- NRAS G12/G13*

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Melanoma

BRAF mutations

- BRAF V600E*
- BRAF V600K*
- BRAF V600R*

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Glioblastoma

KRAS mutations

- IDH1*
- IDH2*

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Bladder Cancer

HRAS mutations

- HRAS CNV
- Q61K/R/L
- G12V

Thyroid Cancer

- TERT C228T
- TERT C250T

Chronic Myeloid Leukemia

- BCR-ABL*
- HRAS CNV
- G12V
- Q61K/R/L

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Pancreatic Cancer

- PIK3CB*

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Acute Myeloid Leukemia

- FLT3 CNV
- FLT3 D835Y/E

Myeloproliferative Neoplasm

JAKZ CNV

- Jak2 Mutation*

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Ovarian Cancer

- AKT1*
- TP53*

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