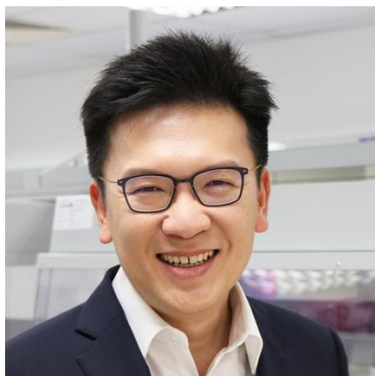


Liquid Biopsy for Cancer: Accurate, Accessible, Affordable?

3 Oct 2022

Introduction






Min-Han Tan


MBBS, FRCP Edin, PhD


**Founding CEO and
Medical Director**

- A medical oncologist and clinical cancer geneticist by training (Cleveland Clinic, National Cancer Center Singapore)
- PhD in Molecular Epidemiology and Biostatistics
- Modelled lifetime cancer risks for Cowden disease, a hereditary breast cancer syndrome
- Over 100 original research publications and 12 patents filed
- Scientific research awards from American Society of Clinical Oncology (ASCO) and Individual Youth Science Award ASEAN

 **National Cancer Centre Singapore**  2m ·  ...

A new collaboration between NCCS and Lucence will see the use of liquid biopsies, that combines both circulating tumor DNA and circulating tumor RNA, to profile prostate cancer patients at NCCS. These innovative combination liquid biopsies aims to identify more treatment opportunities and meaningfully improve care for prostate cancer patients in Asia and across the globe.



LUCENCE.COM 

**Lucence Collaborates with National Cancer Centre Singapore to Launch
Prospective Liquid Biopsy Study for Prostate Cancer | Lucence**

Detecting Cancer Earlier

Our Mission

Profiling cancer to its furthest limits to advance cancer care today

Our Global Footprint

Singapore

Headquarters, R&D,
Manufacturing and
Commercial Office

Suzhou

Manufacturing &
Commercial Office

Palo Alto

Headquarters, R&D,
& Commercial Office

Hong Kong

Commercial Office



Recent Accolades



2022 WIPO Global Awards

Global winner for commercial solutions based on IP rights for social impact



2022 Forbes America's Best Startup Employers

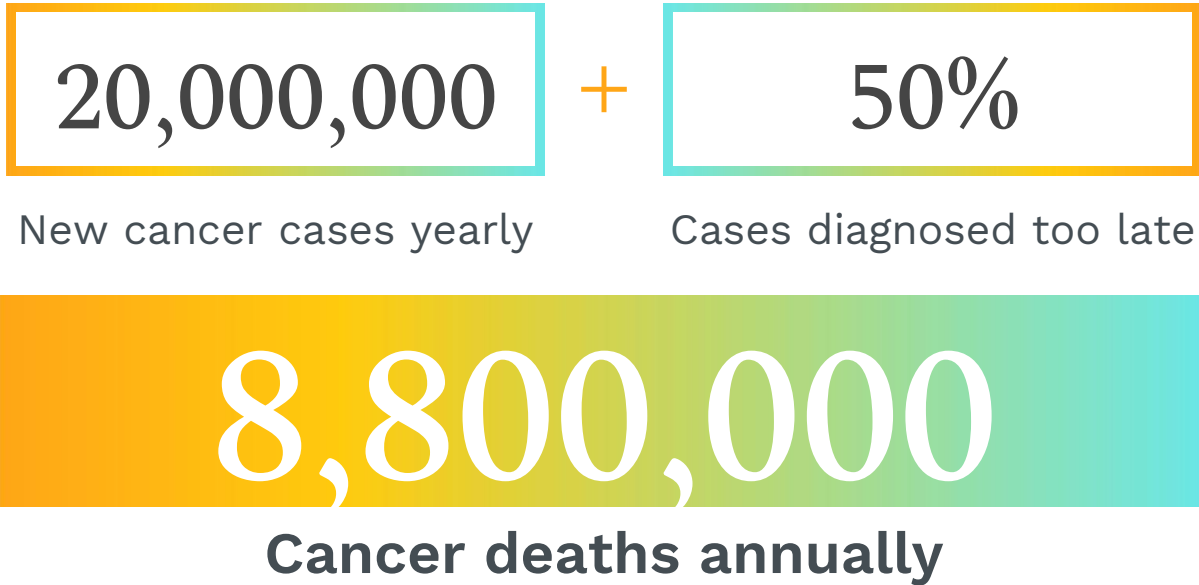
Recognized as one of the best startup employers out of 2,500 U.S. businesses evaluated

Detecting Cancer Earlier

A Common Goal Across Stakeholders

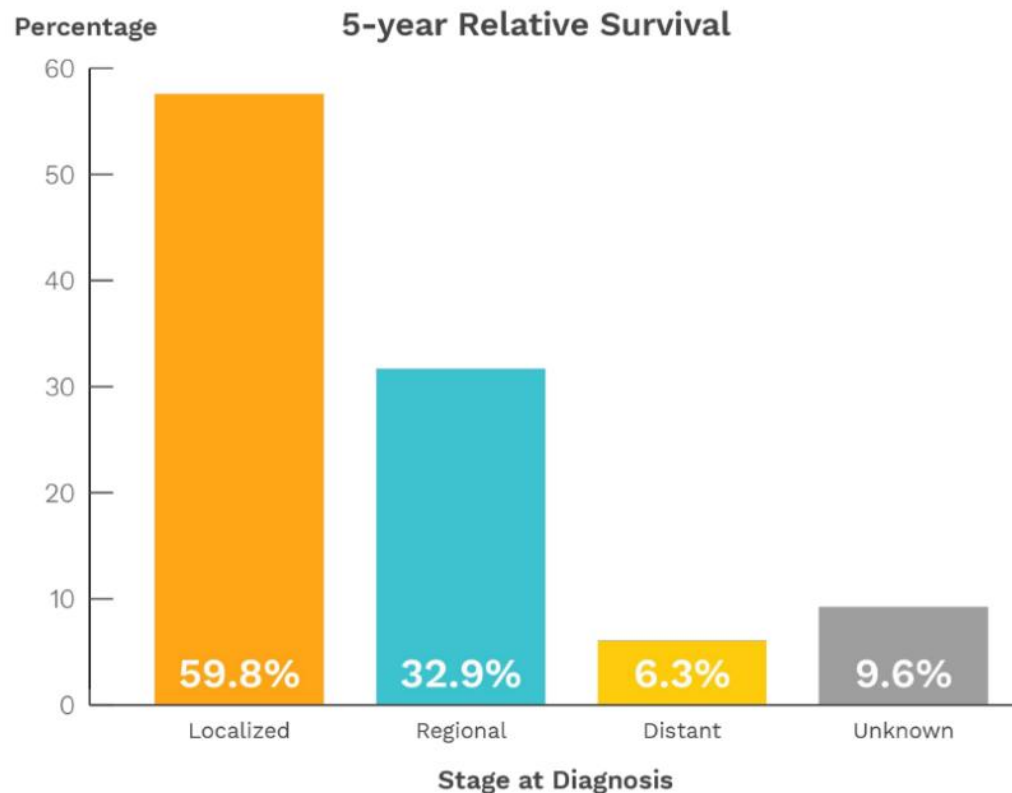
Ensure the delivery of quality and sustainable healthcare with ethical and professional standards

A Cancer epidemic driven by late diagnoses



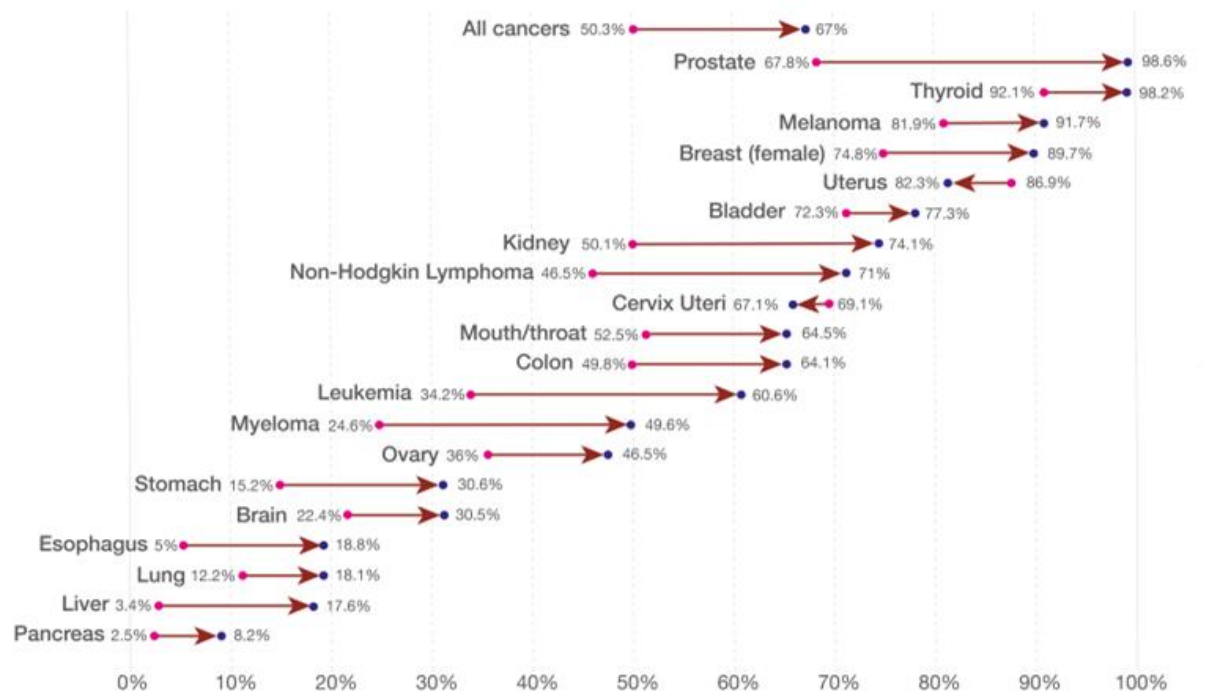
5 year relative survival remains poor at the late stage

Source: NSCLC, SEER 18 2011-2017, All Races, Both Sexes by SEER Summary Stage 20001



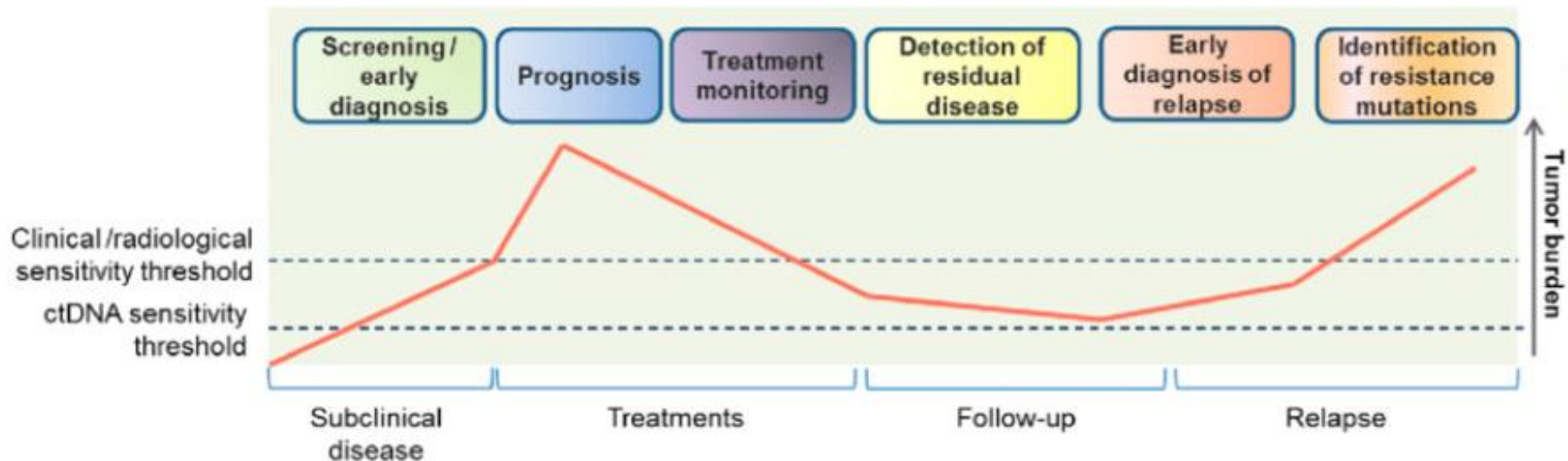
5-year cancer survival rates in the USA

Average five-year survival rates from common cancer types in the United States, shown as the rate over the period 1970-77 [] and over the period 2007-2012 []. This five-year interval indicates the percentage of people who live longer than five years following diagnosis.



Source on data by Journal of the National Cancer Institute: Surveillance, Epidemiology and End Results Program.

What Does Earlier Mean?



Applications of Liquid Biopsy

Cancer Profiling NOW

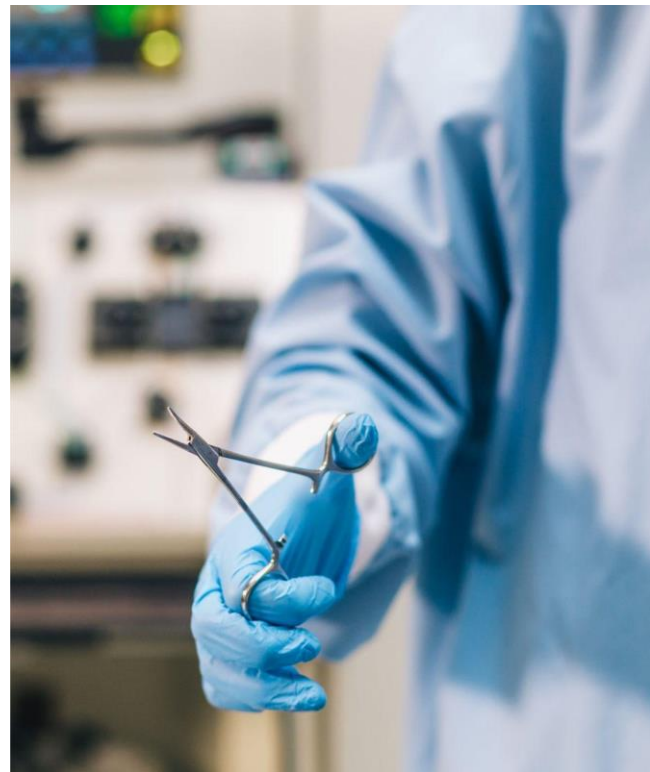
Cancer Screening SOON

The Immediate Problem

Conventional cancer diagnosis by tissue biopsy can be hard to access.

1 in 3

of NSCLC cases have insufficient tissue yield to perform comprehensive genomic profiling

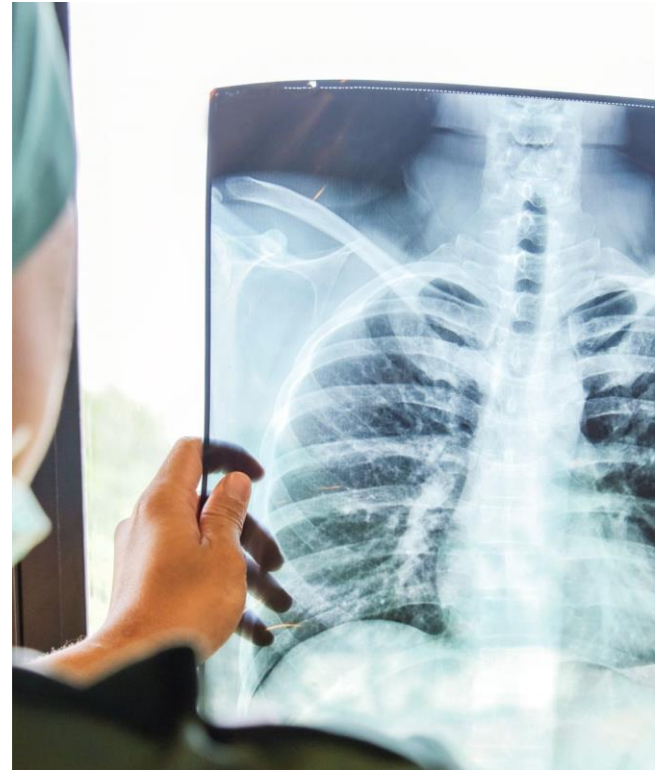


The Pain Points

Conventional cancer diagnosis is **slow**, **invasive**, and hard to access.

Average 30 days

between diagnostic procedure and final molecular report ¹



¹ Choudhury et al. Frontiers in Medicine, 2022.

Conventional cancer diagnosis by tissue biopsy is costly for the payor, especially where serial sampling is concerned

40-80%

Increase in costs for repeat biopsies of the same type

Mean cost of a single lung biopsy

\$11 350+

Medicare: averaged across inpatient/outpatient settings and biopsy method¹

The Problem: 1 in 3 Cancer Patients Miss Opportunities for Therapies due to Inadequate Tissue Biopsies^{1,2}

Tissue Profiling is:

- Slow (up to 4 weeks for results)
- Painful
- Expensive

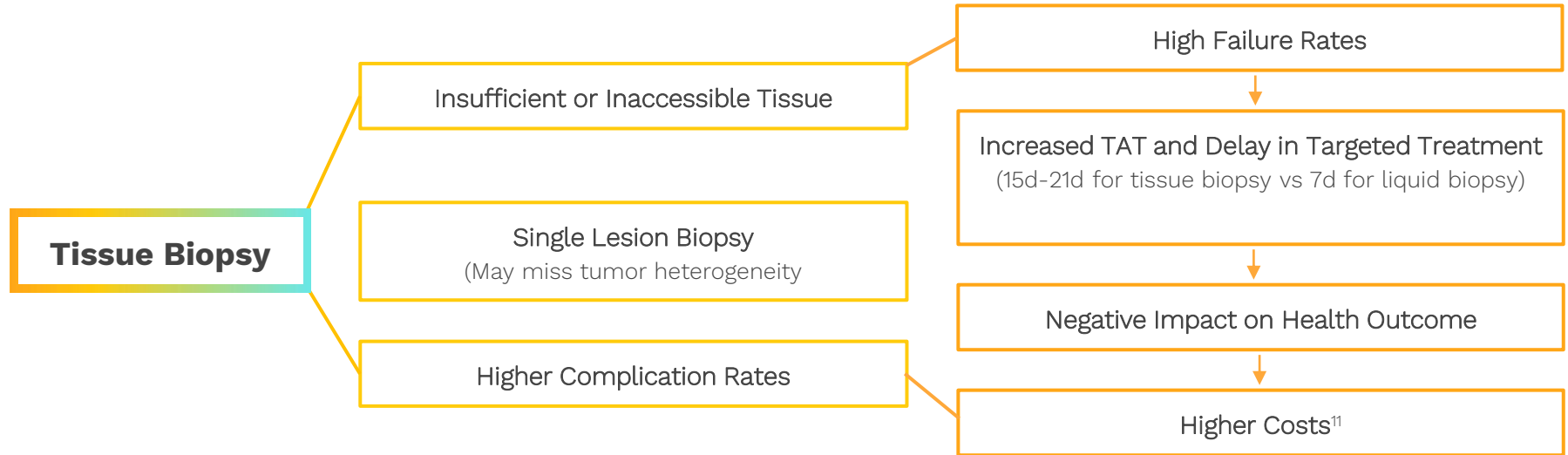
How can Liquid Biopsies Save Time and Support Treatment Selection?



¹ Hagemann et al. Cancer, 121 (4), 2015

² Al-Kateb et al. Molecular Oncology, 121 (4), 2015

Summary of tissue biopsy limitations



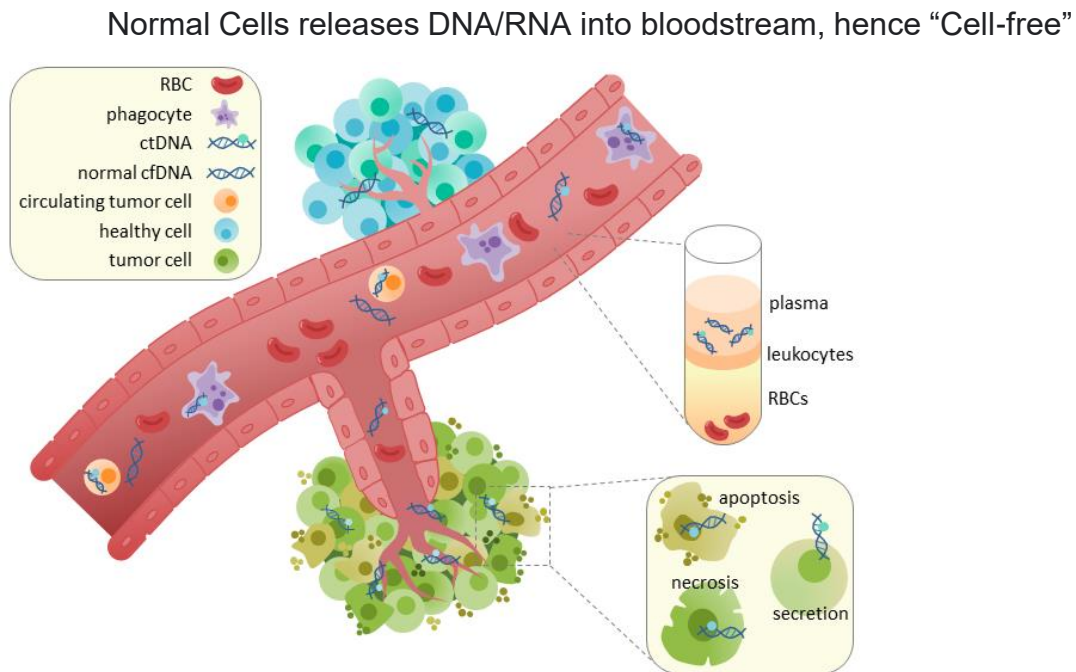
How can liquid biopsy help?

Liquid Biopsies	Tissue Biopsy
Adoption increasing in clinical practice	Current gold standard of tumor profiling
Single draw of blood - non-invasive procedure	Invasive procedure (higher risk of complications)
Faster turnaround (~7 days) and more affordable	Slower turnaround time (~2 weeks) and more expensive
Does not require specialist input (able to be carried out by phlebotomist or nurse practitioner)	Requires specialist (physician) input and tissue inaccessible in certain patient groups e.g. COPD
Negligible risk of hematoma or local infection	Risk of bleeding, infection, seeding
Potential to reflect tumor heterogeneity (spatial and temporal)	Representative of the sampled location only (operator dependent)
Allows for serial disease monitoring	Serial sampling less feasible as yield of tissue becomes less every re-biopsy

Cell-free (cf) vs Circulating Tumor (ct) Nucleic Acids

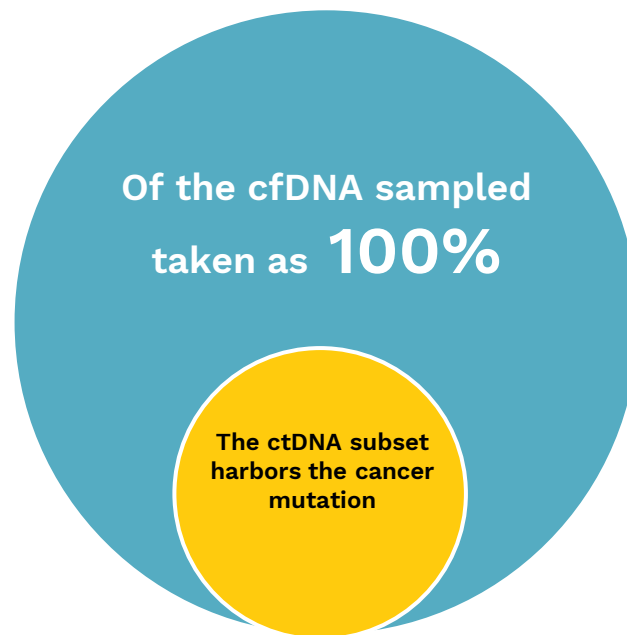
Circulating tumor DNA (ctDNA) is tumor-derived fragmented DNA in the bloodstream that is not associated with cells.

ctDNA should not be confused with cell-free DNA (cfDNA), a broader term which describes DNA that is freely circulating in the bloodstream, but is not necessarily of tumor origin.



Tumor Cells releases DNA/RNA too, hence “Circulating-Tumor)

ctDNA/RNA is a subset of cfDNA/RNA



How ctDNA supports Plasma-First Paradigm for Cancer Profiling

75%

Sensitivity

10 days to treatment
vs 30 days to conventional
profiling

27%

Added Yield

Helps 1 in 3 patients

for whom no answers from
failed tissue testing

Helps 2 in 3 patients

where tissue can be used for
conventional profiling

The Unique Value Proposition of Combined ctDNA and ctRNA for Cancer Profiling

Fusions detected in 103 NSCLC patients

ctDNA-only
analysis

21

/103

ctDNA + ctRNA
analysis

30

/103

43%

*Relative increase in the
number of fusions
detected by including
ctRNA**

*ctRNA result currently investigational

Liquid Biopsy Cancer Profiling: US and EU guidelines supported

A blue diamond-shaped graphic composed of smaller diamonds, with the word "perspectives" written in white lowercase letters across the center.

perspectives

Latest Articles

News

Columns

All Articles

The logo for the European Society for Medical Oncology (ESMO), consisting of the letters "ESMO" in a bold, sans-serif font. The "E" and "S" are white, while the "M" and "O" are black, all set against a white background.

ESMO

New ESMO recommendations on the use of ctDNA

07 / 7 / 2022

Developed by the ESMO Precision Medicine Working Group, they provide guidance to medical oncologists on the use of circulating tumour DNA assays in clinical practice

Share this story



Upcoming Applications: Liquid Biopsies for Cancer Screening

**71% of cancer deaths are caused by cancers
not currently screened for**

Upcoming Applications: Liquid Biopsies for Cancer Screening

**Ongoing prospective studies to establish
real-world outcomes for Stage I/II multi-
cancer screening tests**

Legal Disclaimer

The contents of this presentation may not be used, reproduced or disseminated without the prior written consent of Lucence Health Inc. and its affiliates (collectively, "Lucence").

All or some of the products detailed in this presentation may still be under development, and certain specifications, including but not limited to, release dates, prices and product features, may change. The products may not function as intended and a production version of the products may never be released. Even if a production version is released, it may be materially different from the pre-release version discussed in this presentation.

Nothing in this presentation shall be deemed to create a warranty of any kind, either express or implied, statutory or otherwise, including but not limited to any implied warranties of merchantability, fitness for a particular purpose or non-infringement of third party intellectual property rights with respect to any products detailed herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this presentation.

Lucence, its agents and employees, and all persons acting on its or their behalf, disclaim any and all liability for any error, inaccuracy or incompleteness of information in this presentation.