Volition

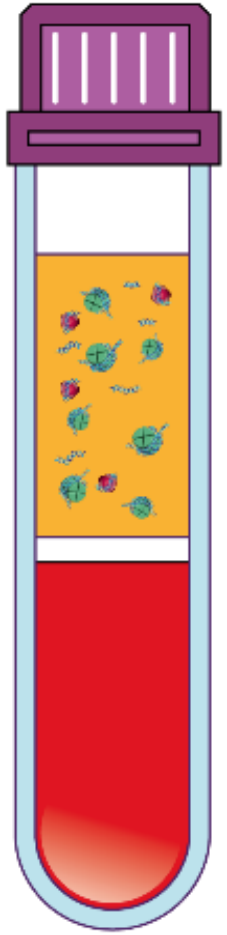
capture seq

Transcription Factor DNA analysis in plasma

March 2026

Biggest Problem in Liquid Biopsy - never solved

capture seq

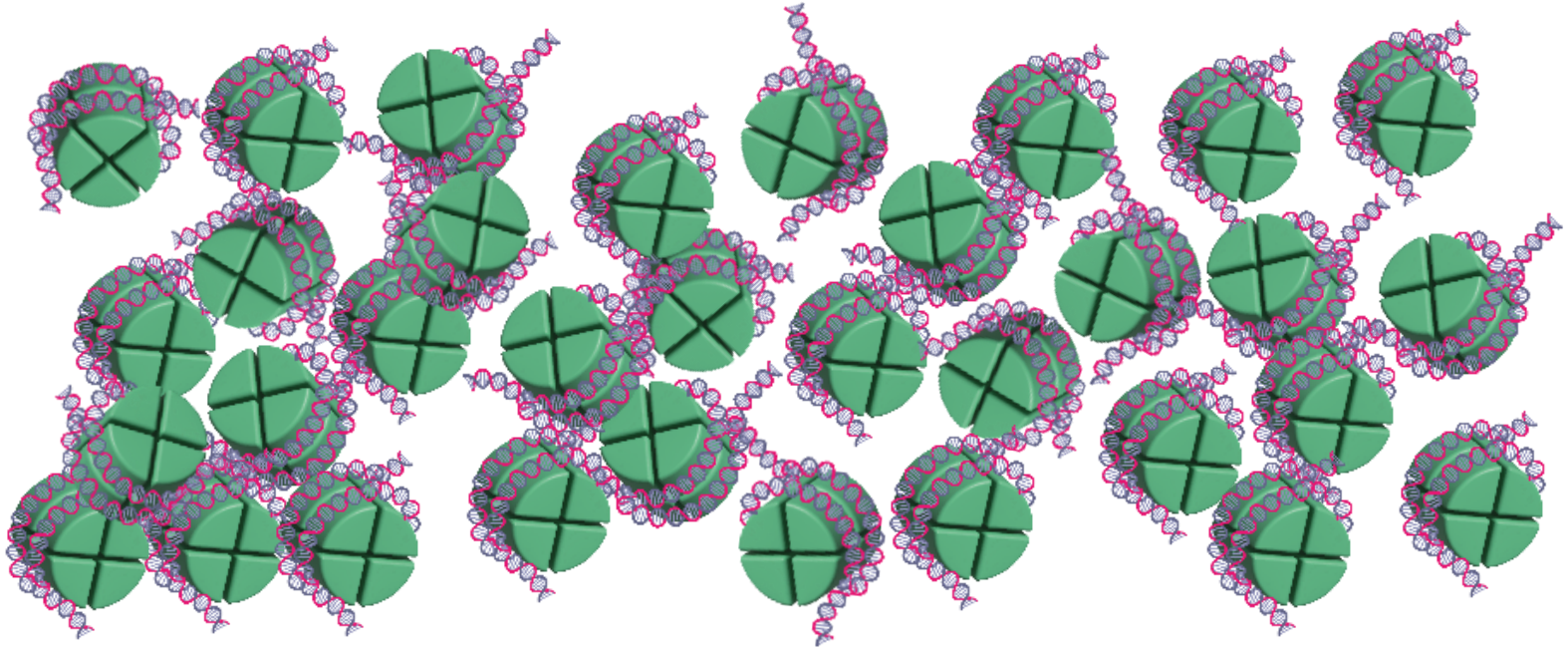


Cell free and tumor DNA all circulates as nucleosomes (a fragment of a chromosome)

But in early cancer <1% of DNA (nucleosomes) comes from the cancer.

The other >99% is background DNA.

One nucleosome is from a tumor - but which one?



Biggest Problem in Liquid Biopsy - never solved

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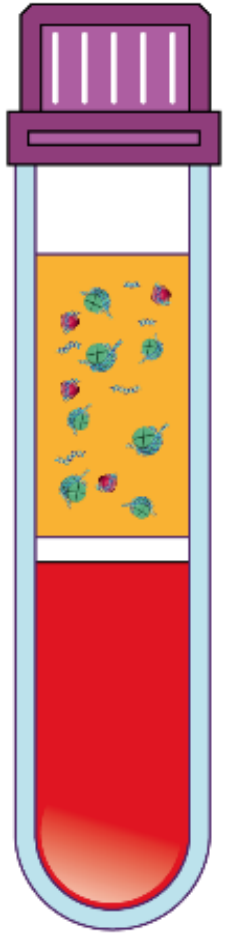
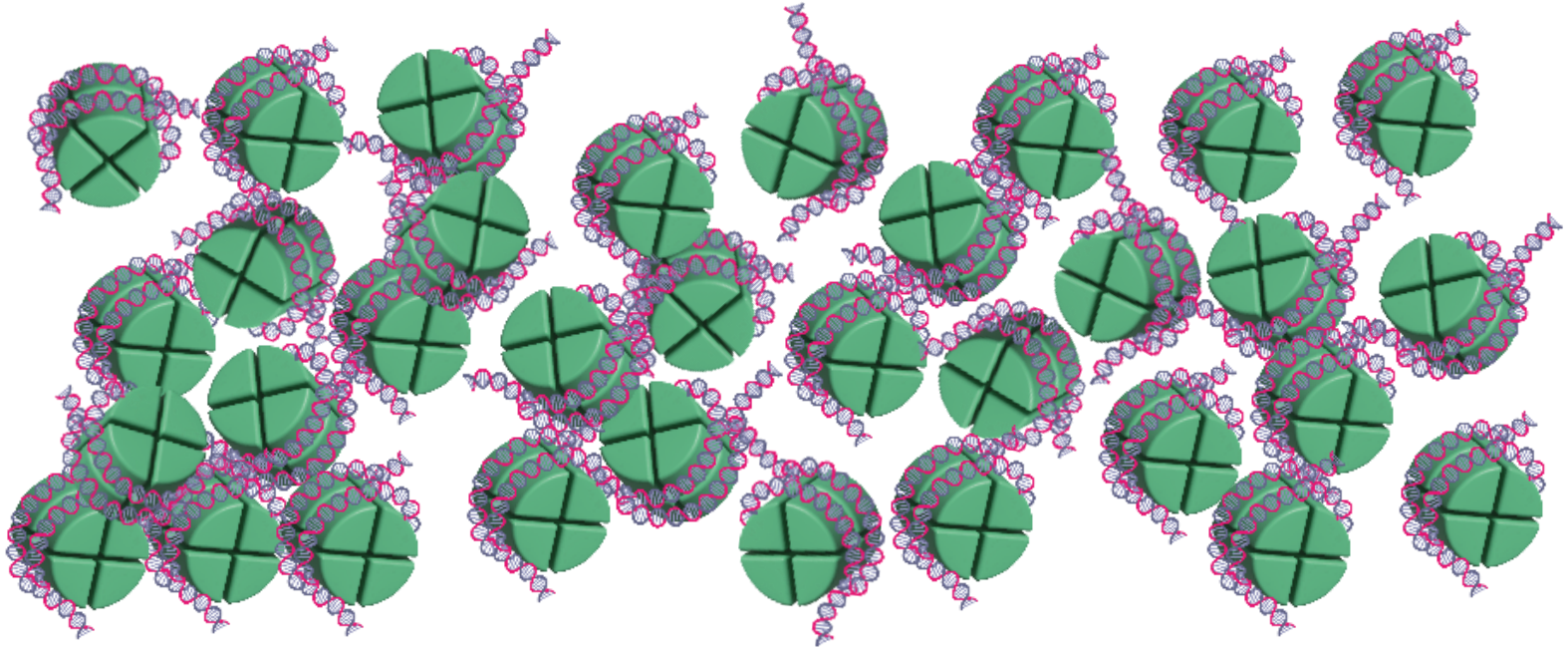


Current liquid biopsy methods:

- Look at DNA fragments of >100bp
- look for a difference in the DNA from tumor cells (eg; a mutation)

One nucleosome is from a tumor - but which one?



Capture-Seq™ isolates pure tumor DNA from plasma

STEP 1: Chemically isolate plasma CTCF-DNA with removal of >99% of background DNA

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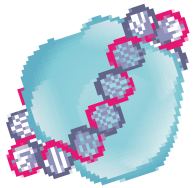
STEP 2: Remainder of non-tumor cfDNA can be excluded by bioinformatics

⇩

cfDNA sequence data sets for cancer samples comprising substantially pure ctDNA

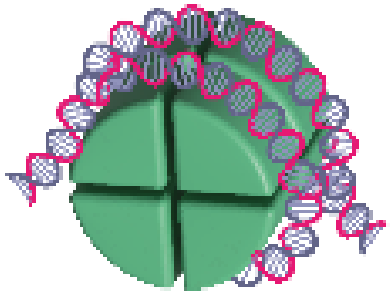
The Chromosome Fragments Involved



CTCF-DNA

DNA is ultrashort
<100bp long

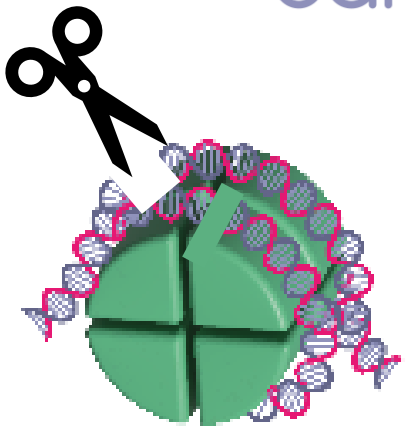
TINY AMOUNT



Nucleosome

DNA is longer
130-200bp long

MAJORITY



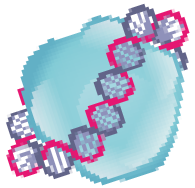
Nicked nucleosome

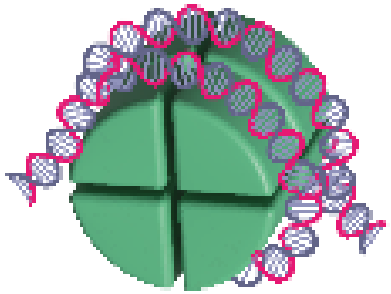
DNA includes short
<100bp long DNA

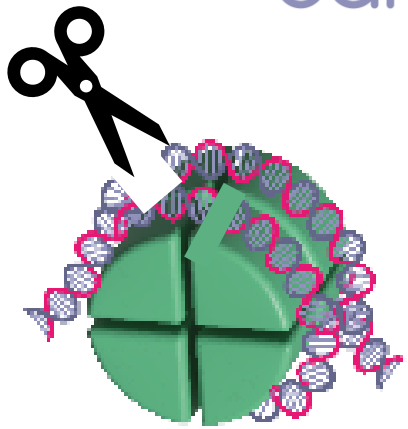
MINORITY

The Chromosome Fragments Involved…

New surprising finding



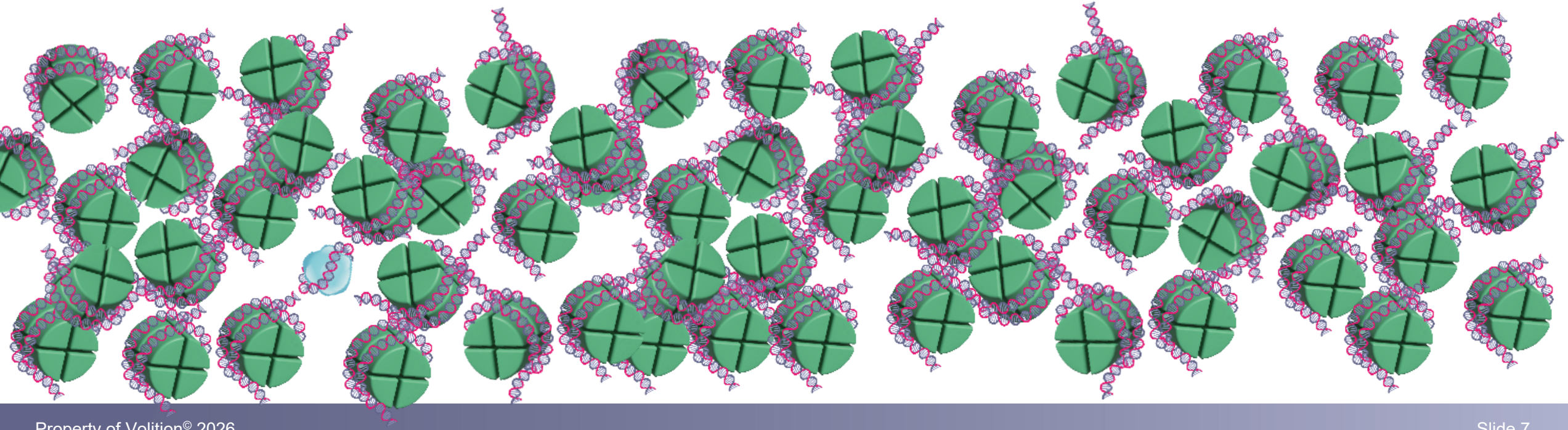




	CTCF-DNA	Nucleosome	Nicked nucleosome
	DNA is ultra short <100bp long	DNA is longer 130-200bp long	DNA includes short <100bp long DNA
	TINY AMOUNT	MAJORITY	MINORITY
Present in blood samples from:	Cancer patients only	Cancer patients and healthy subjects	Cancer patients and healthy subjects

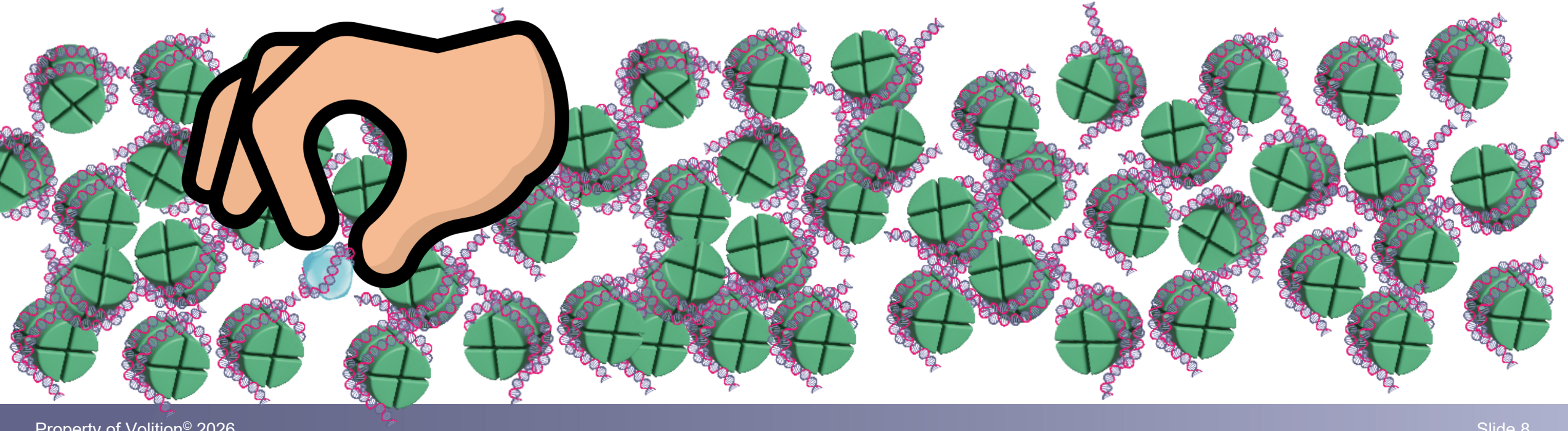
Physically Isolate the CTCF-DNA

capture seq



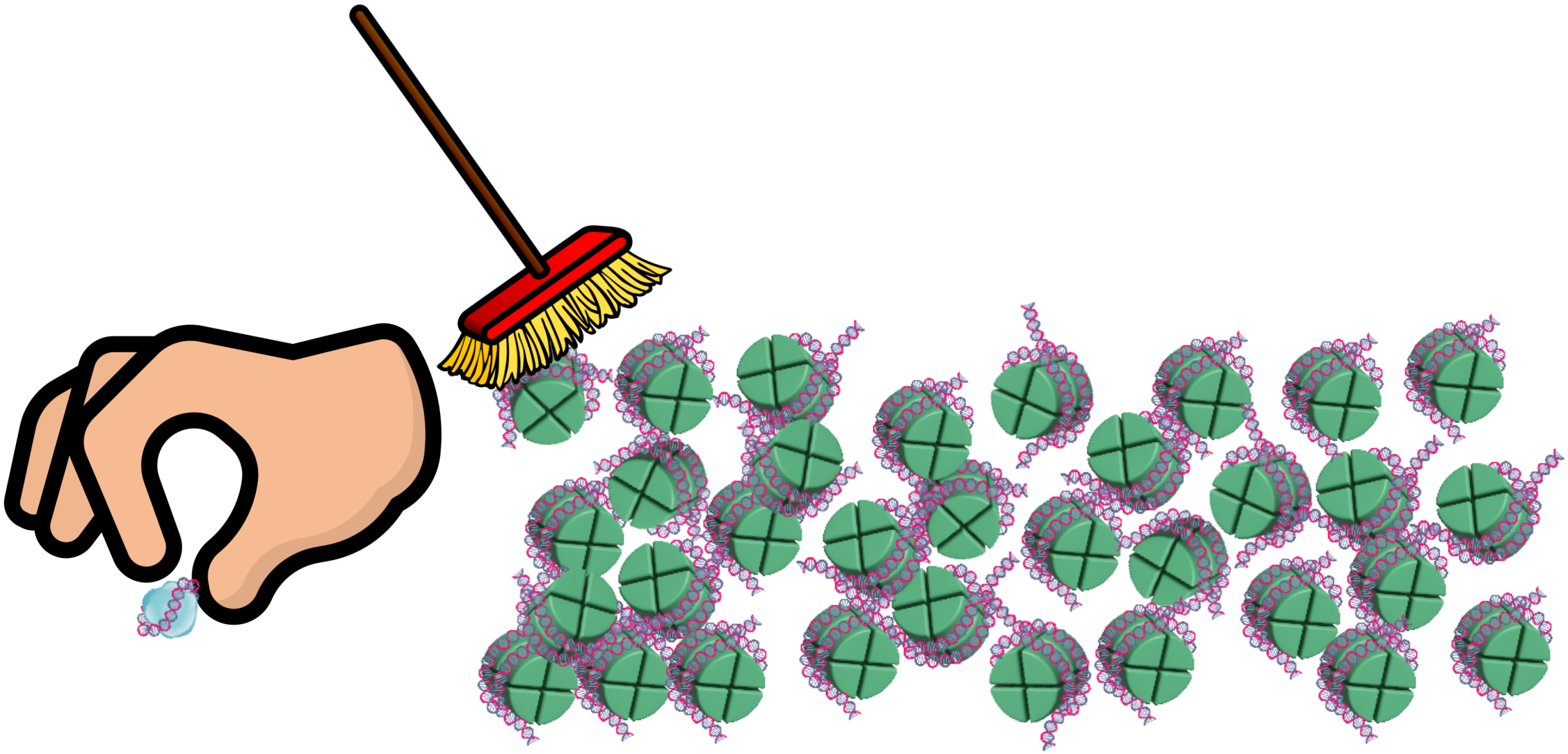
Physically Isolate the CTCF-DNA

capture seq



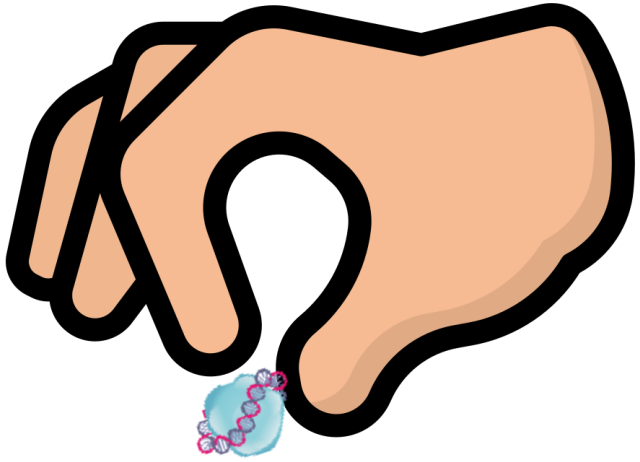
Physically Remove the Nucleosomes

capture seq

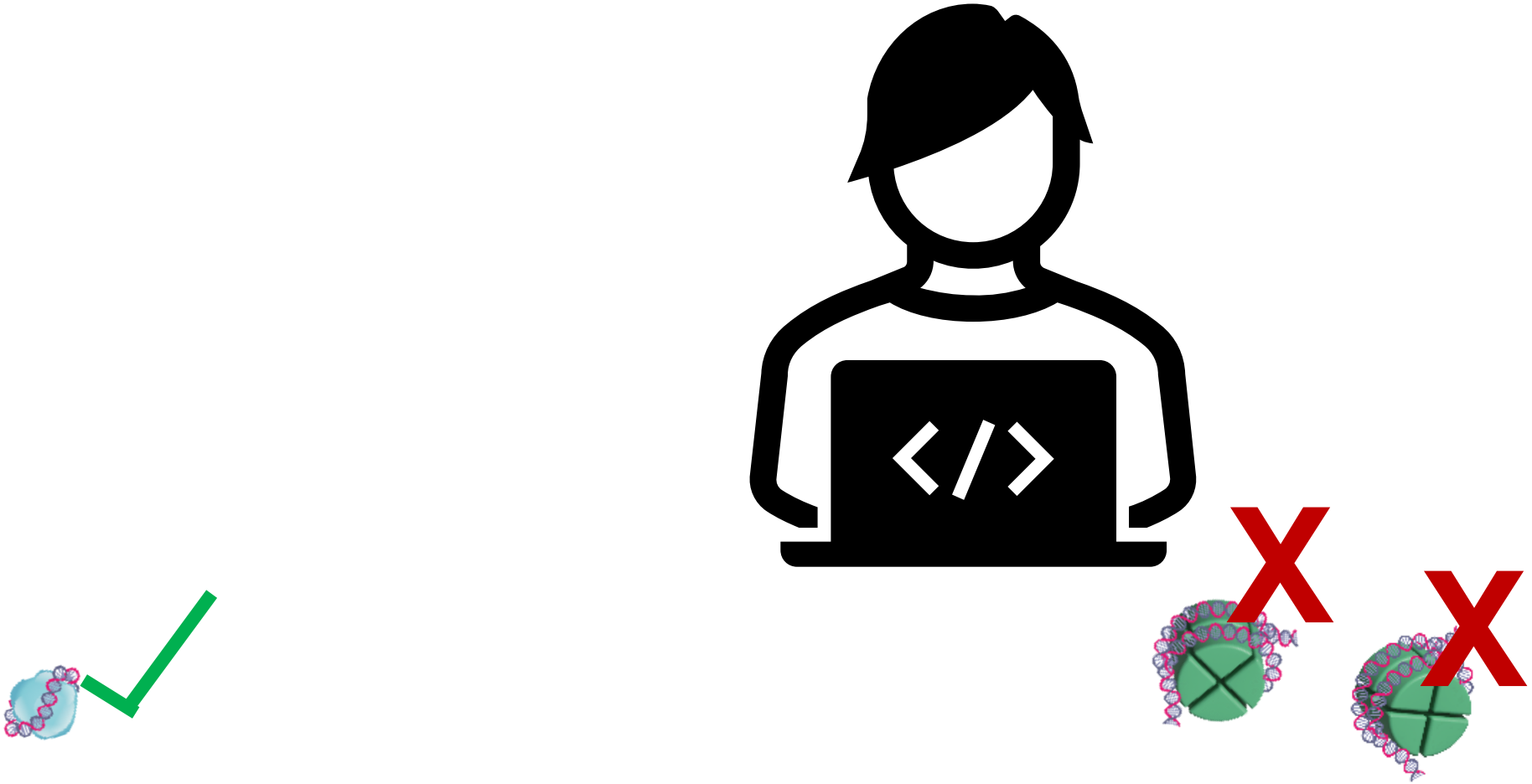


>99% of Background cfDNA Physically Removed

capture seq



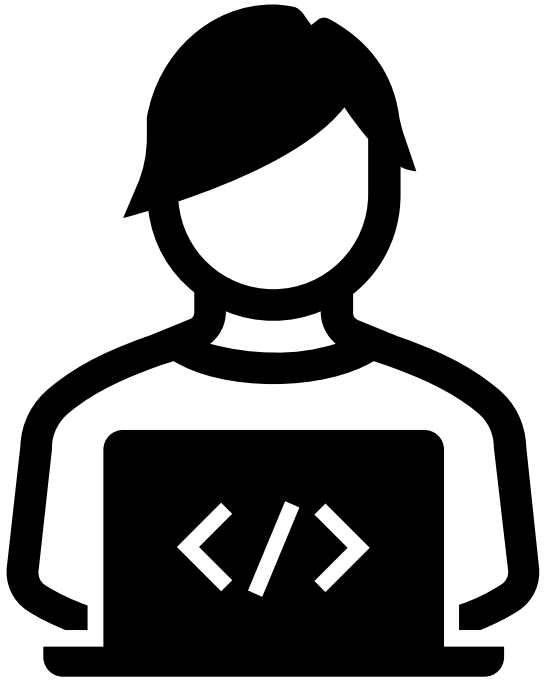
Remove Remaining cfDNA Sequences *in silico*

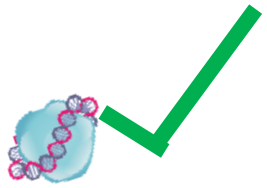


Remove Remaining cfDNA Sequences *in silico*

capture seq

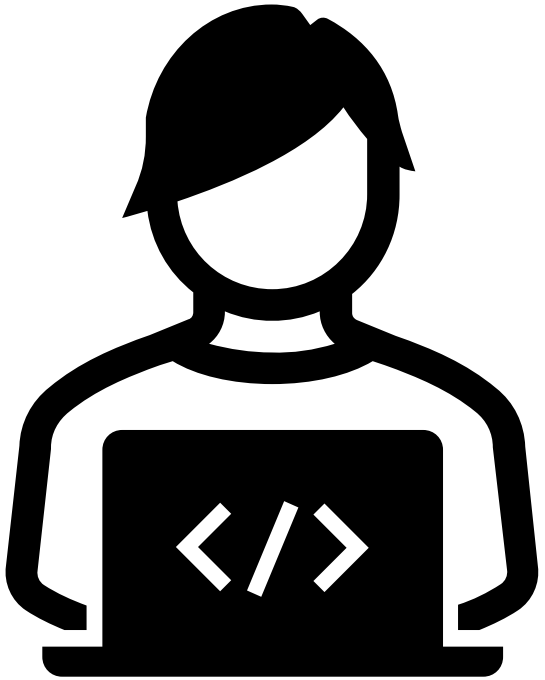
pure ctDNA

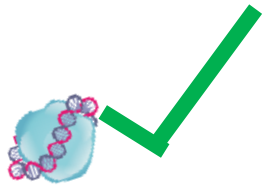




Remove Remaining cfDNA Sequences *in silico*

Remaining DNA is pure tumor derived ctDNA





Capture-Seq™ Isolates Pure Tumor DNA from plasma

Chemically isolate plasma CTCF-DNA with 180-fold enrichment

⇩

Remainder of non-tumor cfDNA can be excluded by bioinformatics

- Excluded as nucleosomal
- Excluded as low affinity or low probability ChIP-seq peak (probable random event)

⇩

cfDNA sequence data sets for cancer samples comprising substantially pure ctDNA

⇩

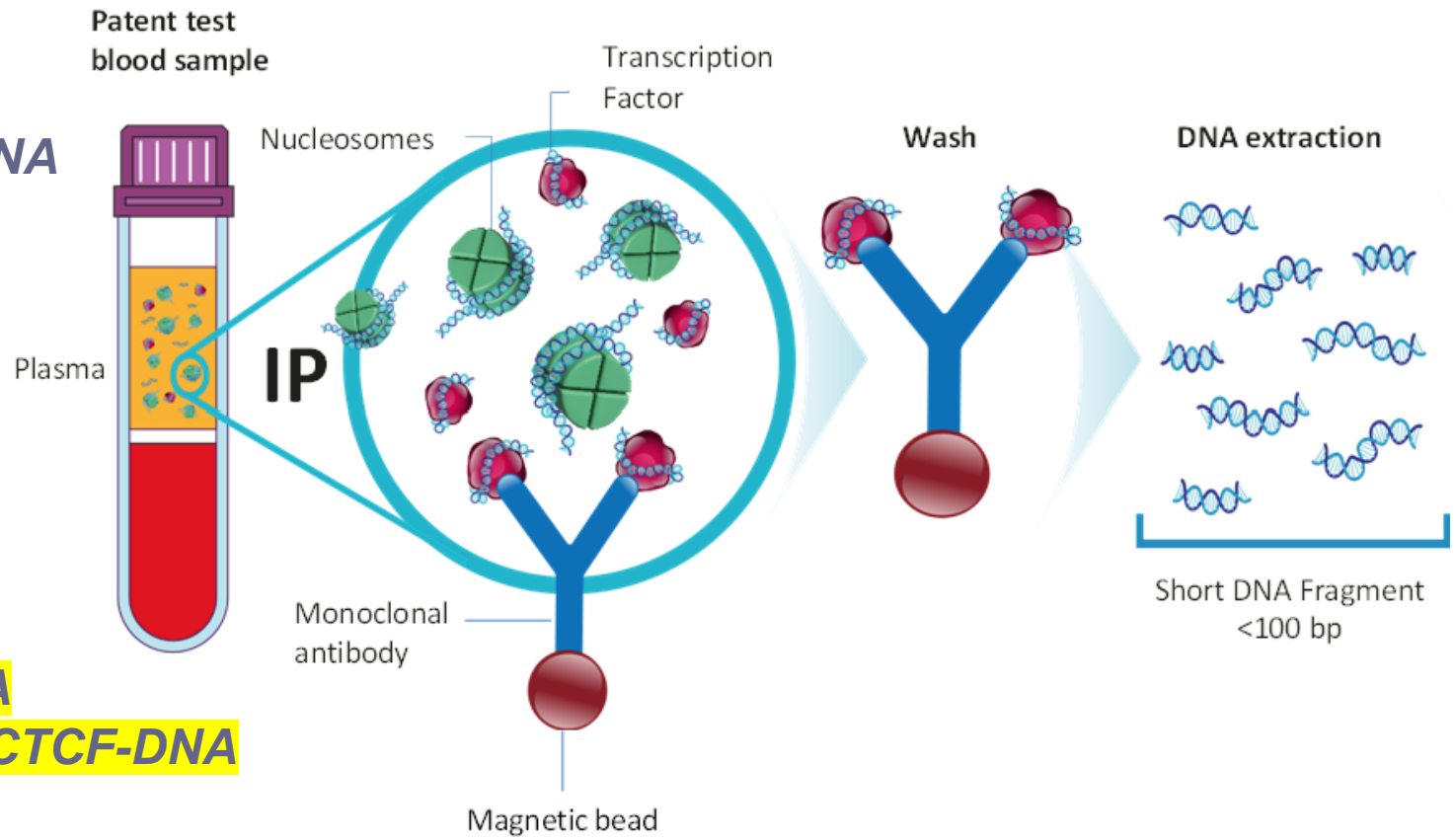
High sensitivity/specificity liquid biopsy assays for cancer

CTCF Capture-Seq™?

World first:
Isolation of Transcription Factor-DNA from plasma

Washing away all nucleosomes removes >99.7% of cfDNA

48% recovery of plasma CTCF-DNA
180-fold (18,000%) enrichment for CTCF-DNA



Proof-of-Concept in Development (training) Cohort

Cohort

11 healthy, 10 chronic inflammatory, 49 cancer samples

- 10 CRC, 10 PCa, 10 LC, 10 BC, 5 Liver, 4 Bile duct cancer
- 11 stage I, 12 stage II, 8 stage III and 18 stage IV

Results

Sensitivity: 49/49 cancer samples positive

Specificity: 21/21 control samples negative

Proof-of-Concept in Blinded Validation Cohort

Cohort

10 healthy, 8 CRC, 6 LC (mostly stage III/IV)

Identify cancer

Correctly identified 13 of 14 samples from cancer patients

Correctly identified 9 of 9 samples from healthy subjects

Clinical Applications:

Many potential applications including:

- Early detection of cancer by blood test
- Tumor naïve testing for minimal residual disease (MRD) after treatment
- Treatment monitoring

Summary:

- World first isolation of transcription factor-DNA from blood
- World first preparation of pure tumor derived DNA sequence data sets
- A novel class of thousands of new biomarkers
- A new method for their analysis in liquid biopsy

Volition

capture seq

Transcription Factor DNA analysis in plasma

March 2026