



# Bencos Healthcare Liquid Biopsy Panel

Accurate ctDNA Analysis  
with Market-leading Specificity  
and Sensitivity

## Key Features

- Small amount of sample requirement.
- Market-leading Specificity and sensitivity.
- Accurate analysis by molecular barcode.
- Targeted Panel for Lung, Breast and Colon.

## Liquid Biopsy Panel

Bencos Healthcare Solutions has developed NGS-based ctDNA kits for colon, breast, and lung cancer assays. We have integrated our market-leading proprietary technologies including hybridization probe design algorithms, noise removal techniques, and reagent optimization. The use of molecular barcodes allows for the identification and tracking of individual DNA molecules throughout the sequencing process, minimizing errors and enabling the precise detection of rare genetic variants.



### SPECIFICATION

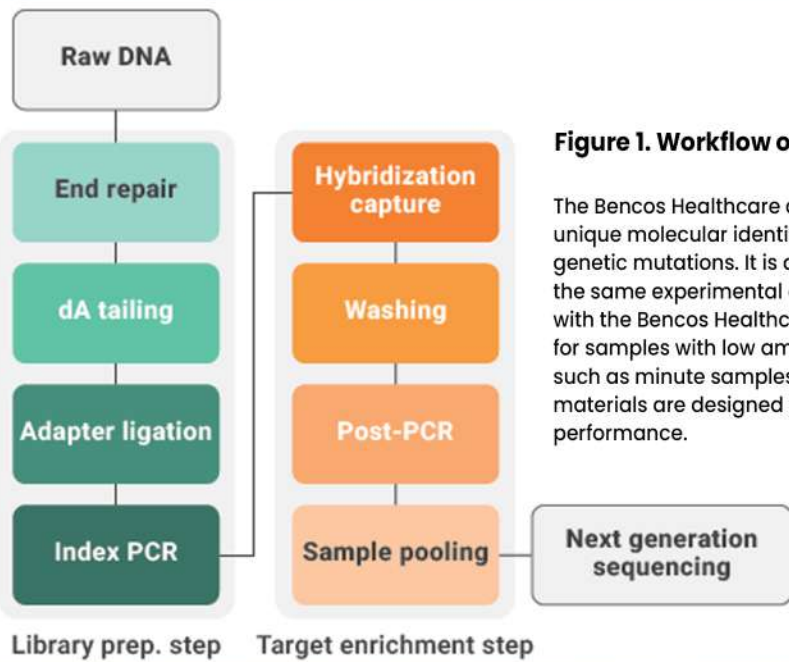
	Colorectal Cancer	Breast Cancer	Lung Cancer
Gene Count	15	27	28
Covered region	Whole CDS	Whole CDS	Whole CDS for 8 genes and Hotspot exonic region for 20 genes
Target size	> 45 Kb	> 95 Kb	> 40 Kb
Mutation type	SNV, Indel		
Sample type (Amount)	Plasma (>20 ng of cfDNA)		
Platform	All sequencers from Illumina		
Bioinformatics Support	1. Primary Analysis: FASTQ to annotated VCF 2. Secondary Analysis: CNV, Large Indel 3. Tertiary Analysis: Clinical interpretation, Visualization Curation * Linux-based consensus read generation software		

\*Gene Add-On Service: Genes can be added by customer's request.

# Performance Data

## Bencos Healthcare ctDNA Panels

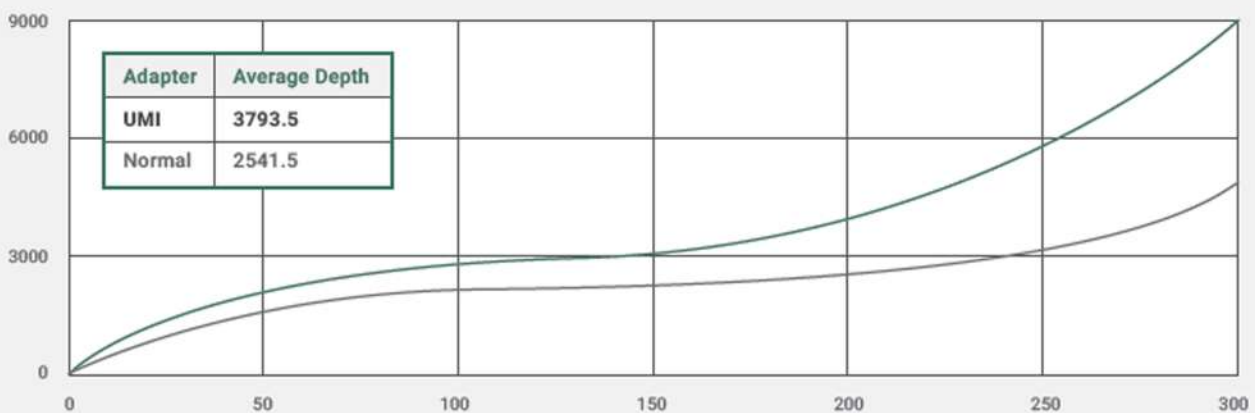
ctDNA analysis has revolutionized the field of oncology by offering a non-invasive and highly informative method for diagnosing and managing cancer. Bencos Healthcare Solution's ctDNA Colorectal, Breast, and Lung Cancer Panel allows for more precise and personalized approaches to treatment, improving patient outcomes. Our NGS panels enable healthcare providers to tailor treatments to individual patients based on the genetic characteristics of their tumors, ultimately improving the management and outcomes of cancers.



**Figure 1. Workflow of Bencos Healthcare ctDNA Panels.**

The Bencos Healthcare ctDNA panels incorporates Bencos Healthcare's unique molecular identifier (UMI), enabling more precise analysis of genetic mutations. It is designed to provide high-quality results using the same experimental approach without any additional steps. Also, with the Bencos Healthcare's carrier materials, it enables sequencing for samples with low amount, typically difficult to perform sequencing, such as minute samples like ctDNA. Bencos Healthcare's carrier materials are designed for easy use without compromising sequencing performance.

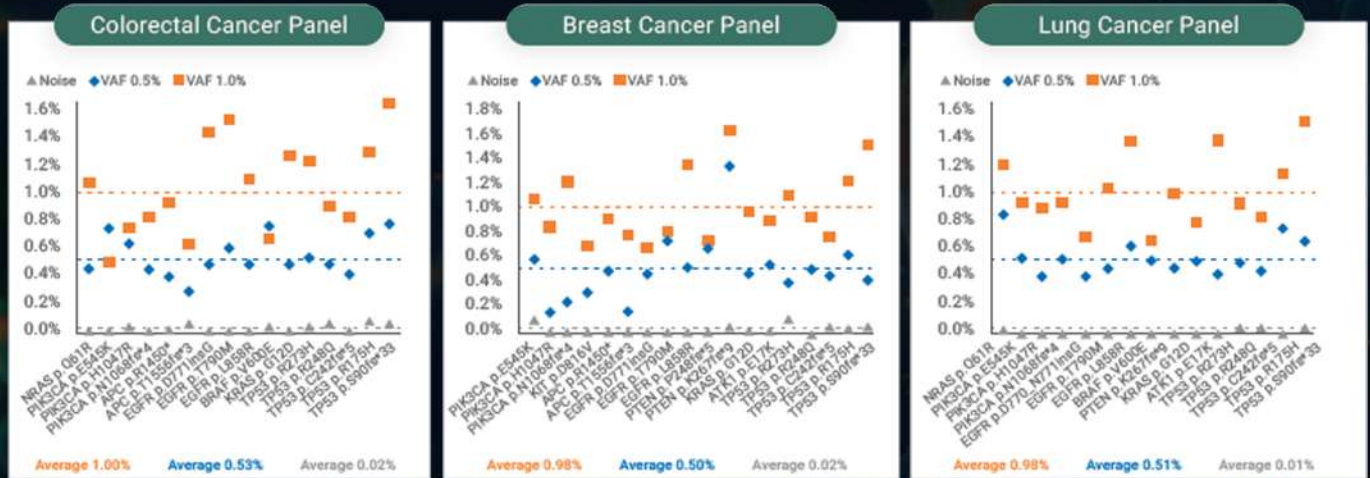
## Increased Sequencing Depth with Bencos Healthcare UMI



**Figure 2. Comparison of sequencing depth when using normal and UMI in Bencos Healthcare ctDNA Colorectal Cancer Panel.**

The average sequencing depth was 3793.5 when using UMI, and 2541.5 when using a normal adapter. It was confirmed that when using UMI, the average sequencing depth was more than 1200 depth higher than when using a normal adapter.

# Performance Data



Sensitivity	Specificity	Sensitivity	Specificity	Sensitivity	Specificity
Freq. 0.5 %: 100 %	97.9 %	Freq. 0.5 %: 94.4 %	96.3 %	Freq. 0.5 %: 100 %	100 %
Freq. 1.0 %: 100 %		Freq. 1.0 %: 100 %		Freq. 1.0 %: 100 %	

**Figure 3. Analysis results for Bencos Healthcare ctDNA Panels.**

Bencos Healthcare's ctDNA Panel is designed to detect the markers in 15, 27, and 28 key genes associated with Colorectal, Breast, and Lung cancer respectively. Our panel achieves more than 94% of analytical sensitivity both of allele frequency of 0.5% and 1.0% with more than 96% of specificities in all tested panels. The tests are performed by using Sereaseq® ctDNA Reference Material v2 AF1%, Sereaseq® ctDNA Reference Material v2 AF0.5%, and Sereaseq® ctDNA Mutation Mix v2 WT.

## Gene List

Gene List of ctDNA Colorectal Cancer Panel				
APC	ATM	BRAF	EGFR	ERBB2
FBXW7	KRAS	MET	NRAS	PTEN
PDGFRA	PIK3CA	SMAD4	TCF7L2	TP53

Gene List of ctDNA Breast Cancer Panel				
AKT1	APC	AR	BRCA1	BRCA2
CCND1	CDH1	EGFR	ERBB2	ESR1
FGFR1	FGFR2	GATA3	IGF1R	KIT
KRAS	MAP2K4	MAP3K1	MDM2	MYC
NF1	PIK3CA	PIK3R1	PTEN	RB1
TOP2A	TP53			

Gene List of ctDNA Lung Cancer Panel				
AKT1	ALK	ARAF	ARID1A	BRAF
CBL	CDKN2A	EGFR	ERBB2	HRAS
KEAP1	KRAS	MAP2K1	MET	MTOR
NF1	NRAS	NTRK1	NTRK2	PIK3CA
PTEN	RB1	RIT1	ROS1	SETD2
STK11	TP53	U2AF1		

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