

Application of DNBSEQ Technology Oncology Screening & Targeted Treatment

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01

General MGI and DNBSEQ Technology Introduction

The Global Reach of MGI

Sales Network Covering **6** Continents | Operates in **110+** countries and regions | **7** Production Bases | **13** Customer Experience Centers | **9** R&D Centers



Comprehensive Base
(Production/R&D/Marketing)



Customer Experience Center(CEC)

The Snapshot of MGI

A leading producer of clinical high-throughput gene sequencers*

Focusing on research & development, production and sales of sequencing instruments, reagents, and related products to support life science research, agriculture, precision medicine and healthcare.

Standing out as one of the few companies capable of independently developing and mass-producing clinical-grade gene sequencers with varying throughput capacities, ranging from Gb to Tb levels



2,604

2,604 employees worldwide,
including
31.2% are Research and
Development employees



988

988 valid patent applications
(cumulative)



3,300+

More than 3,300 users in 100
countries/regions worldwide



4,500+

Sales and installation of DNBSEQ
sequencing platform have exceeded
4,590 units globally



10,000+

- More than 10,000 papers were published
in top scientific journals
- More than 1,500 articles have been
published in CNS, Lancet and other core
journals based on DNBSEQ platform

Statics as of 31 Dec 2024

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Innovation and Collaboration, Win-Win Industry Ecosystem

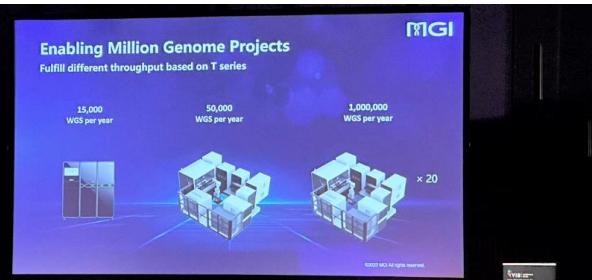
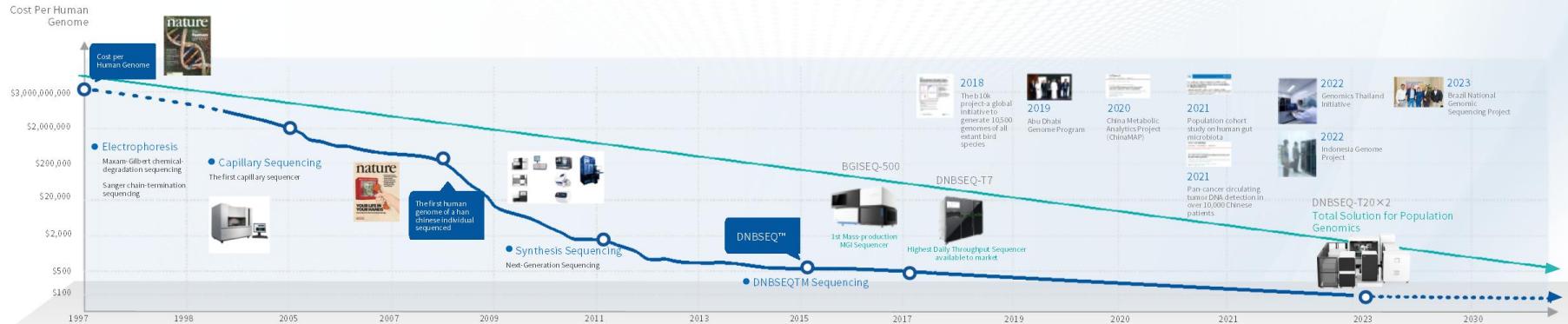


Over 3,300 global users from more than 110 countries and regions
Global installations of DNBSEQ sequencing platforms exceeds 4,500



Statistics as of Sept 30,2024

Cutting the Cost of Sequencing



MGI Trailblazing Path to Sub Hundred-dollar Genome at VIB conference

The genetic sequencing industry has long aimed to reduce the cost of genome sequencing to \$100 or less per unit. At the Advances in Genome Biology and Technology (AGBT) General Meeting 2023, MGI achieved this goal by lowering the price of whole genome sequencing to under \$100 with the launch of DNBSEQ-T20×2*. During the VIB conference, Dr. Yong Hou, General Manager of MGI Europe and Africa, presented "Trailblazing Path to Sub Hundred-dollar Genome", in the plenary session 3: Outbreak & population scale, highlighting the breakthrough pricing per genome again on the DNBSEQ-T20×2* and DNBSEQ-T7 using DNBSEQ technology and accessibility to European market.

Core Business Segments

Equipped with full-read sequencing technology – CycloneSEQ nanoball sequencing & DNBSEQ™ nanopore sequencing, adding cell omics and STOmics, MGI is ready to embrace the 6D era of life sciences to uncode the mystery of life!



SEQ ALL Sequencing Product Portfolio



Lead in achieving R&D and mass production of clinical-grade genetic sequencers that cover different throughput levels from low, medium, to high, as well as full read lengths.

Excited luminous sequencing

Small WGS, targeted sequencing,
16s sequencing, transcriptome
sequencing



G99

640mm x 689mm x 657mm



Small WGS, low-pass WGS, targeted
sequencing,
16s sequencing, gene expression profiling



G50

654mm x 489mm x 545mm



WGS, WES, targeted sequencing, transcriptome
sequencing, single cell sequencing, methylation
sequencing,
spatial sequencing



G400

1086mm x 756mm x 710mm



WGS, WES, targeted sequencing, transcriptome
sequencing, single cell sequencing, methylation
sequencing,
spatial sequencing, proteomics



T1+

1150mm x 750mm x 810mm



T7

1656mm x 903mm x 1815mm



Self-luminous sequencing

Targeted sequencing, small
WGS, gene expression profiling



E25

348mm x 312mm x 257mm



Non-luminous sequencing

Targeted sequencing,
metagenomics, small WGS, full-
length transcriptome sequencing



WT02

160mm x 165mm x 127mm



WGS sequencing, epigenetics,
full-length transcriptome,
protein-DNA interaction

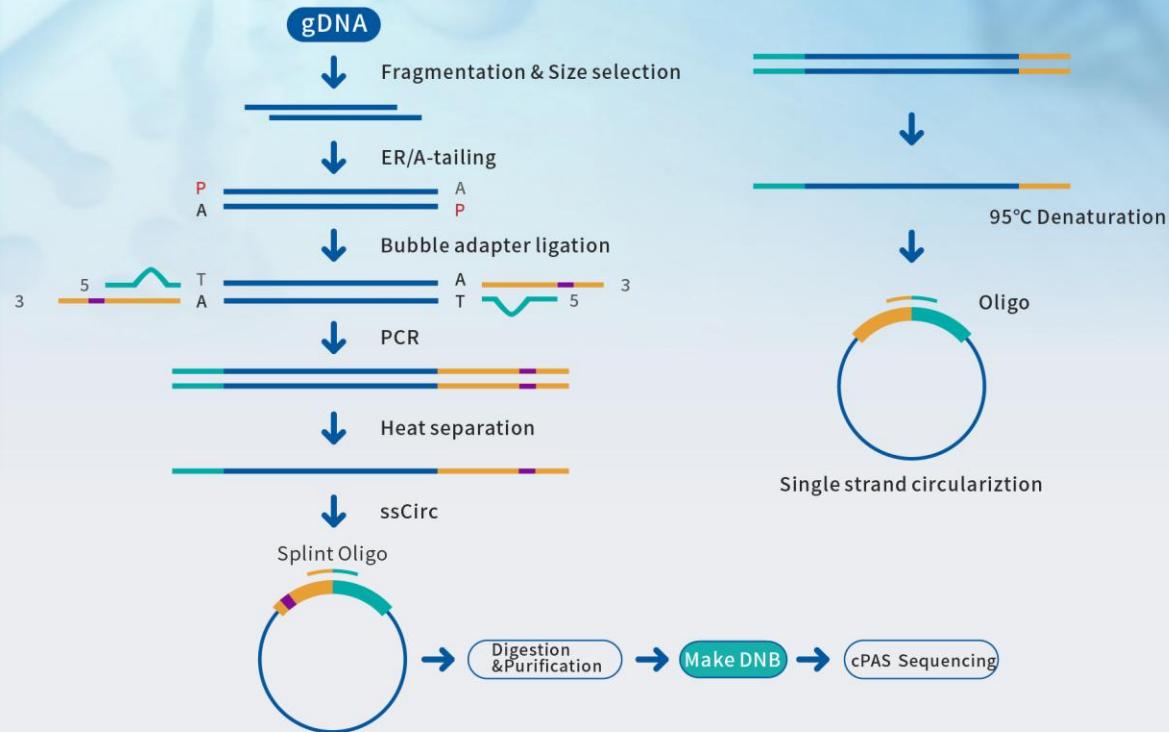
G400-ER

155 mm x 140 mm x 148
mm

DNBSEQ™ Technologies: Library Preparation

MGI

- 1 Library Preparation
- 2 Make DNB & Load DNB
- 3 cPAS Sequencing



* Take the preparation of DNA library as an example

DNBSEQ™ Technologies: Rolling Circle Amplification

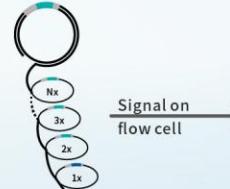
MGI

DNB Technology Ensures Low Index Hopping Rate

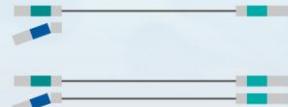
Index hopping using DNA nanoball



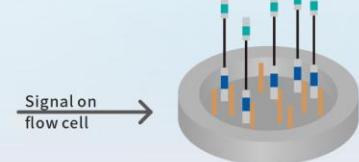
RCA amplification
after index hopping



Index hopping using other chemistry

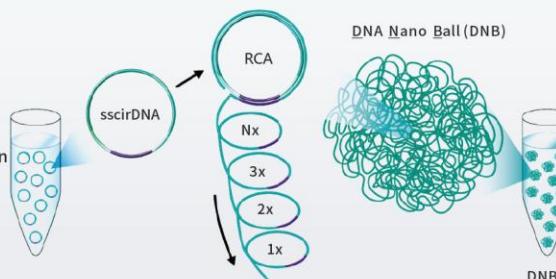


RPA amplification
after index hopping



RCA: MGI DNBSEQ™ Technology

MGI DNA nanoballs

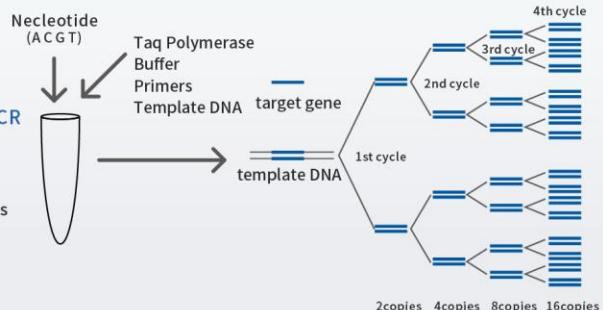


1. Linear amplification
2. Low amplification bias
3. No accumulated amplification error
4. Low index hopping

PCR Exponential Amplification

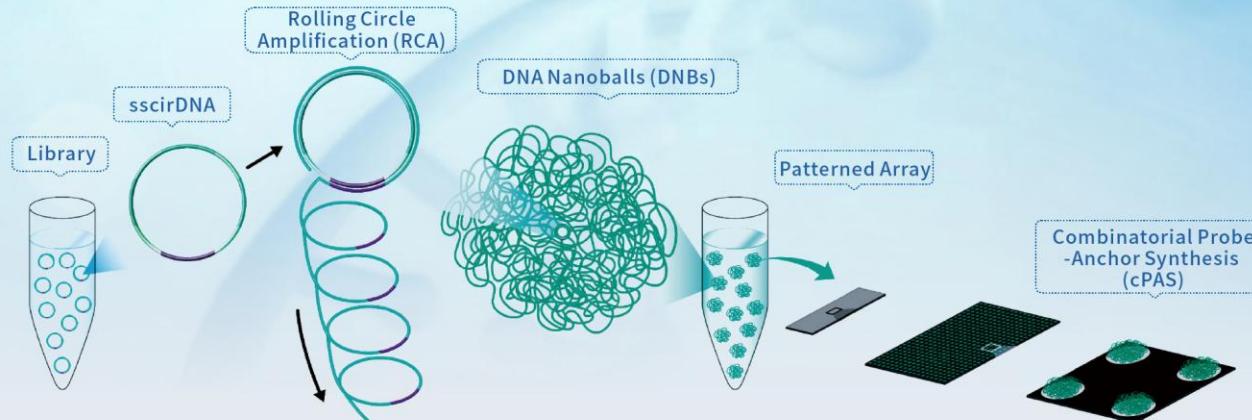
NGS problems introduced by PCR

1. False SNPs
2. False InDels
3. Coverage/GC bias
4. Index hopping

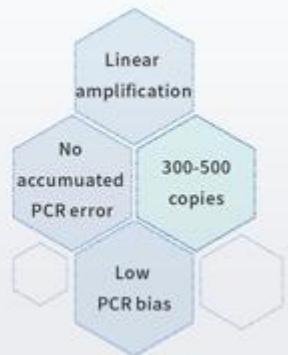


DNBSEQ™ Technologies

MGI



Advantages



Q40 > 85%

DNBSEQ-G99
DNBSEQ-G400
DNBSEQ-T7



02

General Background of Oncology and Its Use of NGS

| What is Tumor

1) Definition of tumor: A **tumor** is a new growth caused by the **abnormal proliferation** (uncontrolled multiplication) of local tissue cells in the body. This happens under the influence of **carcinogenic factors** (things that can cause cancer).

2) General Tumor classification: 3 categories

a. **Benign Tumor (Non-cancerous):** These do not invade surrounding tissues or spread to other parts of the body.

b. **Malignant Tumor (Cancer):** These are **cancerous tumors** that can invade nearby tissues and spread (metastasize) to other parts of the body.

c. **Borderline Tumor**

These tumors are **in-between benign and malignant**. They may have some characteristics of cancer but are not fully malignant.



3) Important Note: Tumor ≠ Cancer

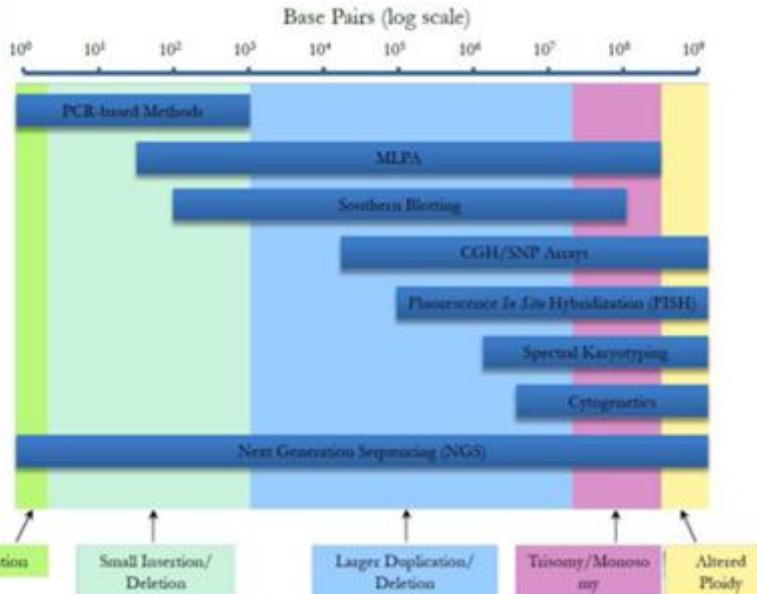
Not all tumors are cancer.

"**Tumor**" is a general term for any abnormal growth, whether it is benign (harmless) or malignant (cancerous).

"**Cancer**" specifically refers to **malignant tumors**.

Next-Generation Sequencing in Oncology: Why It Matters

Different scales for detection



Various target detection

RNA and DNA sequence changes

DNA copy number variations

RNA expression profiles

DNA structure variations

Methylation status

Multi-PCR

Panel

WES

WGS

1Kb

0.5Mb 2Mb

10Mb

45Mb

60Mb

3Gb

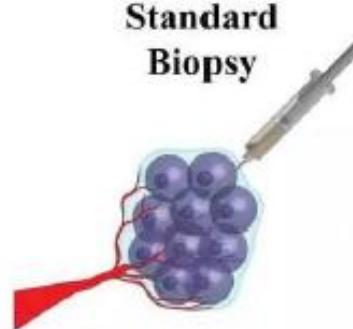
Next-Generation Sequencing in Oncology: Why It Matters

Two types of sampling covering the patient journey

Tissue Biopsy

1. Time-intensive procedure
2. Localized sampling of tissue
3. Not easily obtained
4. Invasive
5. Pain/ risks

It is the standard in clinical diagnosis

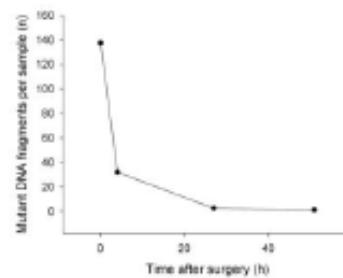


Liquid Biopsy

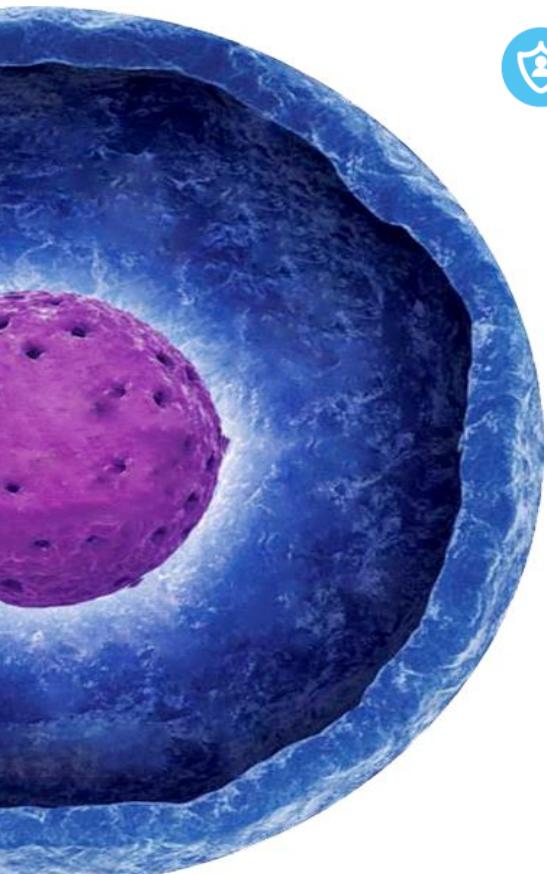
1. Quick
2. Whole-body overview of tumor profiles
3. Easily obtained
4. Minimally invasive
5. Minimal pain/risk

Not all oncology application utilize liquid biopsy

Liquid Biopsy



Next-Generation Sequencing in Oncology: Why It Matters



01 Prevention: Hereditary tumor gene testing



02 Early screening

- Noninvasive cancer screening
- Pan-cancer early screening



03 Medical treatment

- Whole exome detection
- Pan-cancer discovery gene detection



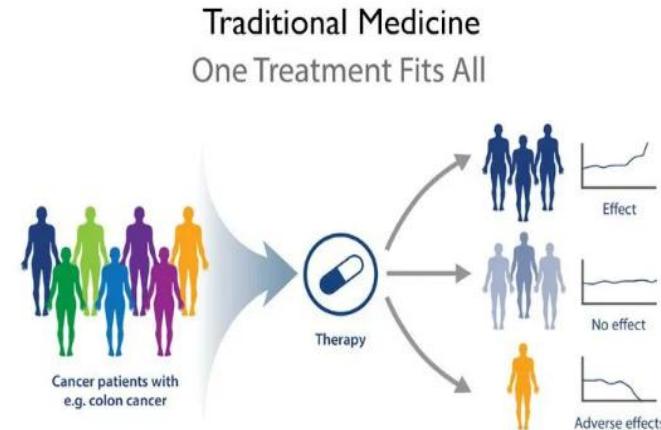
04 Prognosis

- ctDNA Non-invasive lung cancer targeted drug gene testing
- ctDNA Noninvasive tumor individualized diagnosis and treatment gene detection.

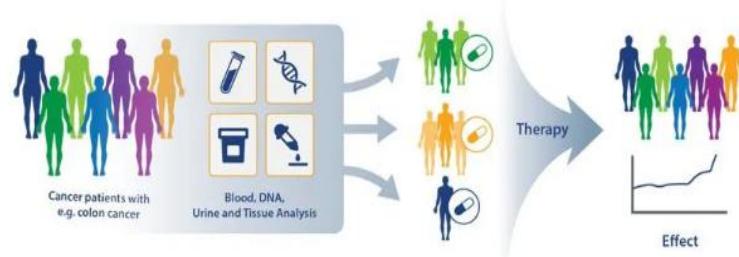
Next-Generation Sequencing in Oncology: Why It Matters

NGS Information – Precision Medicine

1. Actionable mutations/ Resistant mutations: target therapy
2. MSI (Microsatellite Instability): Immunotherapy/ chemotherapy response
3. MRD (minimal residual disease): Response evaluation, early recurrence detection
4. Dynamic monitoring of cDNA: VAF tracking providing insights for treatment plan
5. Germline mutations: PARPi therapy selection; Cancer predisposition for family



Precision Medicine More Personalized Diagnostics





03

MGI Oncology Ecosystem

Ecosystem Partnership on NGS Solutions

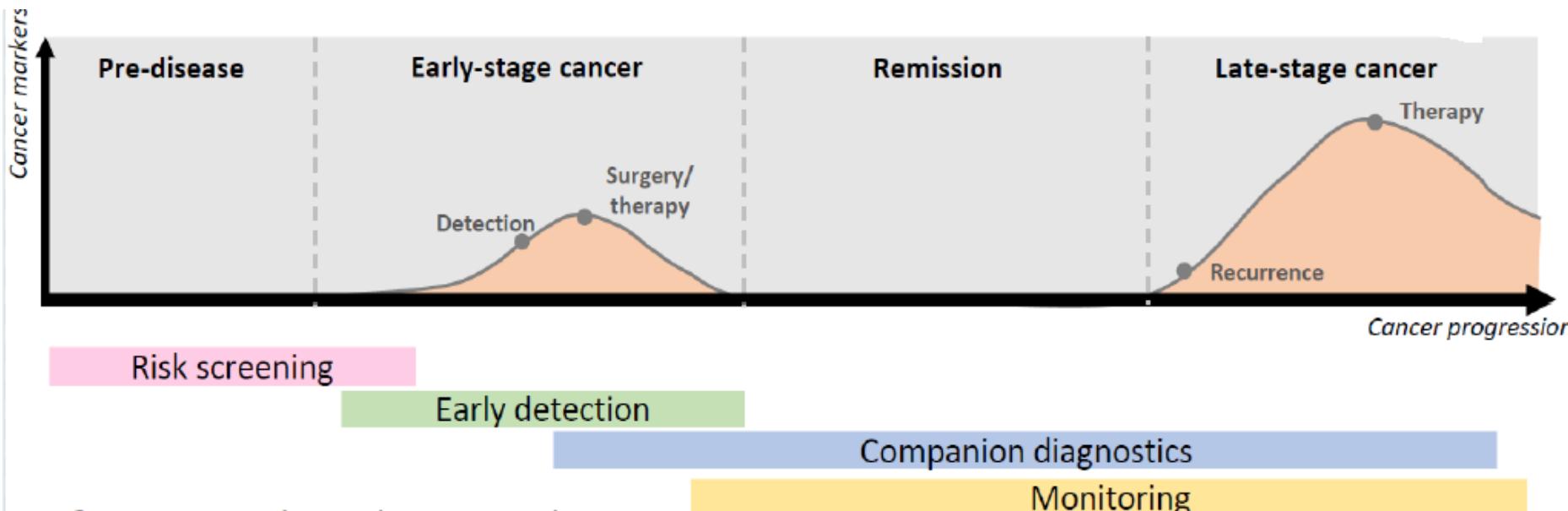


3rd Party Applications



Cancer Genetic Testing Strategies

- Risk screening – T7, G400
- Early detection – G400, G99
- Companion diagnostics – G400, G99, E25
- Monitoring – G400, T7



Ecosystem Partnership on NGS –Based Oncology Solutions

Method	Company	Product	Software	Certificates
tNGS-amplicon	HGT	ATOplex BRCA1/2 panel	HGT bioinformatics analysis system	RUO
tNGS-capture	Geneplus	59,188, 1021 genes pan	Geneplus	CE -IVD
tNGS-capture	Genetron Health	172 genes panel	Genetron Health	CE -IVD
tNGS-amplicon	Genetron Health	Lung cancer panel	Genetron Health	CE -IVD
tNGS- amplicon/ capture	Twist	Pan cancer panels	Twist	RUO
tNGS-capture	Nanodigmbio	Lung Cancer panel	Nanodigmbio	RUO
WES	Nanodigmbio	NEXom XP Panel NEXome Core Panel	Nanodigmbio	RUO
tNGS-capture	Gencast	Oncology panel	Genecast INTEGRO V1	CE -IVD
tNGS-amplicon	NgeneBio	Oncology panels	/	CE-IVD



03

MGI Oncology Ecosystem

ATOplexBRCA1/2 Panel + DNBSEQ-E25/G99/G400 + HGT Analysis Solution

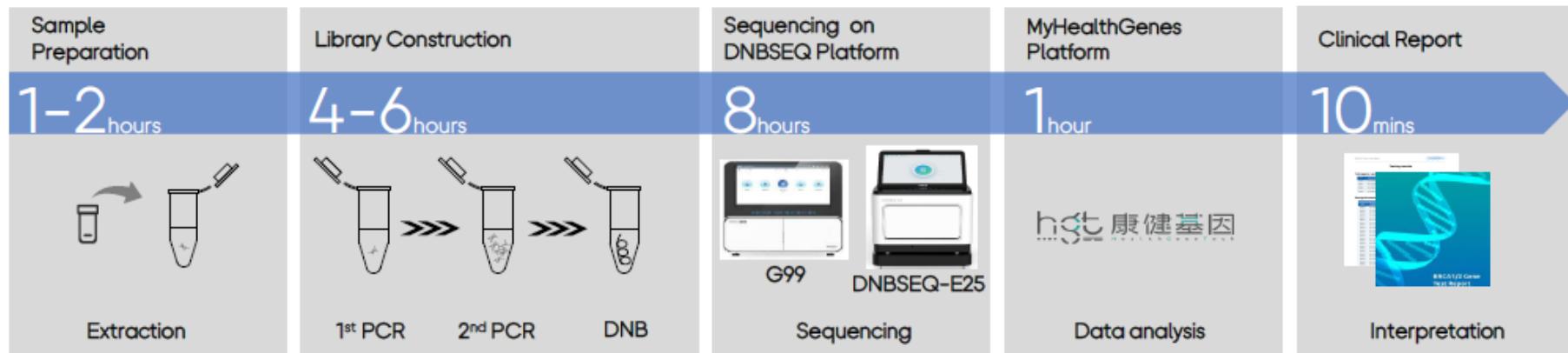
Highlights of ATOPlexBRCA1/2 panel specification

- ATOPlexBRCA1/2 panel detects 23 and 26 exons of BRAC1 and BRAC2, covering 177 target loci
- One-tube reaction

Region	Covers 23 and 26 exons of BRAC1 and BRAC2 gene respectively
Amplicons Size	119-193 bp
Amplicons	177amplicons in one tube
DNA Input	≥10 ng
Sample Type	gDNA from blood and FFPE sample
Uniformity (0.2X)	≥ 90%
On Target Reads Rate	≥ 98%
Data requirement	2-5M reads for somatic mutation, 0.2~0.5M reads for germline mutation (PE100 or PE150)

Workflow of ATOPlexBRCA1/2 panel

The MGI ATOPlexBRCA1/2Panel is a two-step multiplex PCR based solution for the amplification and library preparation of the BRCA1 and BRCA2 genes for breast cancer research and diagnosis. It is automation-friendly and compatible with MGI's MGISP-960 automation platform. The constructed DNB library is compatible with all MGI sequencers, making it an ideal end-to-end solution."



Validation of ATOPlexBRCA1/2 panel

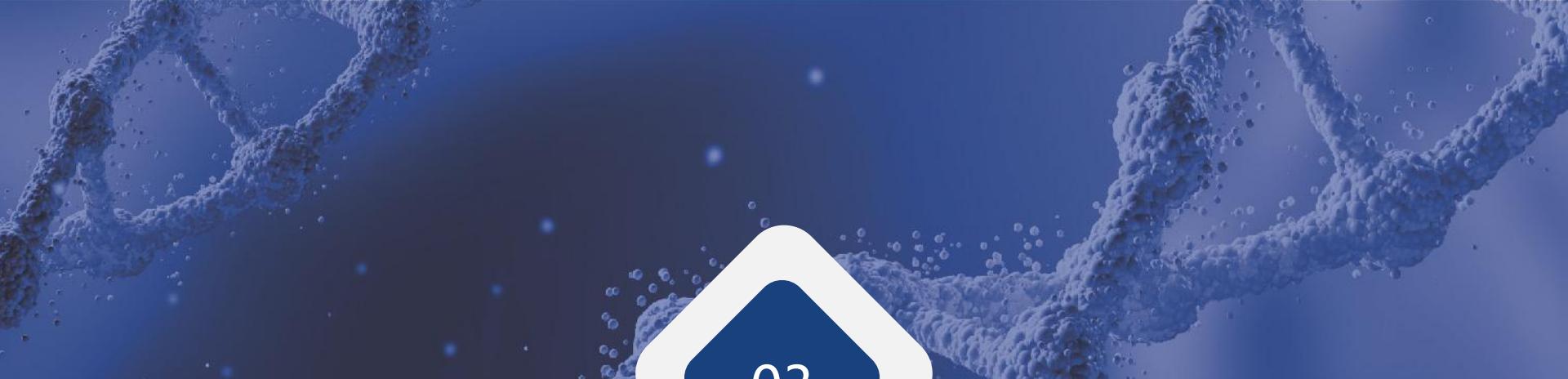
HD793 and HD795 DNA standards (Horizon Discovery), covering 13 verified germline and somatic mutations in BRCA1 and BRCA2, of which Libraries were sequenced on DNBSEQ-E25 /DNBSEQ-G99/DNBSEQ-G400 with PE150. The obtained sequencing data was analyzed by the HGT software and 13 known BRCA1/2mutations all successfully identified by DNBSEQ-E25, DNBSEQ-G99 and DNBSEQ-G400.

HD793

Gene	GRCh37 coordinates	Coding	Protein	Expected VAF	E25 VAF	G99 VAF	G400 VAF
BRCA1	17:41246245	c.1303G>T	p.Asp435Tyr	50.00%	50.57%	50.41%	50.41%
BRCA1	17:41244000	c.3548A>G	p.Lys1183Arg	50.00%	46.35%	49.14%	49.14%
BRCA1	17:41245090	c.2458A>G	p.Lys820Glu	50.00%	48.49%	49.51%	49.51%
BRCA1	17:41244936	c.2612C>T	p.Pro871Leu	100.00%	99.84%	99.81%	99.80%
BRCA1	17:41234451	c.4327C>T	p.Arg1443Ter	0.00%	-	-	-
BRCA1	17:41223094	c.4837A>G	p.Ser1613Gly	50.00%	58.05%	53.85%	53.84%
BRCA2	13:32912750	c.4258G>T	p.Asp1420Tyr	0.00%	-	-	-
BRCA2	13:32937355	c.8021dup	p.Ile2675AspfsTer6	0.00%	-	-	-
BRCA2	13:32913559	c.5073del	p.Lys1691AsnfsTer15	0.00%	-	-	-
BRCA2	13:32913837	c.5351del	p.Asn1784ThrfsTer7	50.00%	52.78%	48.64%	48.64%
BRCA2	13:32906480	c.865A>C	p.Asn289His	50.00%	56.04%	51.14%	51.14%
BRCA2	13:32911463	c.2971A>G	p.Asn991Asp	50.00%	50.93%	51.93%	51.92%
BRCA2	13:32929387	c.7397T>C	p.Val2466Ala	100.00%	99.80%	99.86%	99.84%

HD795

Gene	GRCh37 coordinates	Coding	Protein	Expected VAF	E25 VAF	G99 VAF	G400 VAF
BRCA1	17:41246245	c.1303G>T	p.Asp435Tyr	7.50%	8.95%	7.68%	7.68%
BRCA1	17:41244000	c.3548A>G	p.Lys1183Arg	7.50%	7.70%	8.09%	8.08%
BRCA1	17:41245090	c.2458A>G	p.Lys820Glu	7.50%	7.96%	8.25%	8.25%
BRCA1	17:41244936	c.2612C>T	p.Pro871Leu	15.00%	18.03%	18.66%	18.66%
BRCA1	17:41234451	c.4327C>T	p.Arg1443Ter	32.50%	25.28%	19.49%	19.49%
BRCA1	17:41223094	c.4837A>G	p.Ser1613Gly	7.50%	10.02%	9.43%	9.42%
BRCA2	13:32912750	c.4258G>T	p.Asp1420Tyr	32.50%	23.58%	30.09%	30.09%
BRCA2	13:32937355	c.8021dup	p.Ile2675AspfsTer6	10.00%	7.93%	10.10%	10.10%
BRCA2	13:32913559	c.5073del	p.Lys1691AsnfsTer15	32.50%	33.54%	32.76%	32.75%
BRCA2	13:32913837	c.5351del	p.Asn1784ThrfsTer7	40.00%	40.75%	37.85%	37.85%
BRCA2	13:32906480	c.865A>C	p.Asn289His	7.50%	8.43%	7.87%	7.87%
BRCA2	13:32911463	c.2971A>G	p.Asn991Asp	7.50%	8.21%	8.01%	8.01%
BRCA2	13:32929387	c.7397T>C	p.Val2466Ala	100.00%	99.80%	99.84%	99.84%



03

MGI Oncology Ecosystem

Geneplus Multi-Cancer Panels + DNBSEQ-G400/G99 Solution

GenePlus NGS Solutions Cover the Patient Journey



Cancer Screening



Diagnosis & Prognosis



Treatment Monitoring



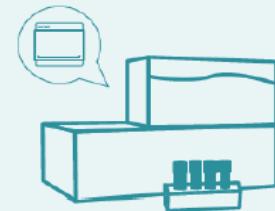
MCED (Multi-cancer early detection)
OncoH (Hereditary panel)



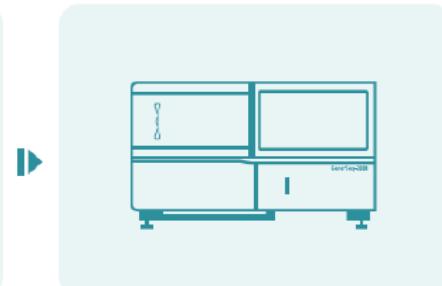
59-gene panel
188-gene panel
1021-gene panel



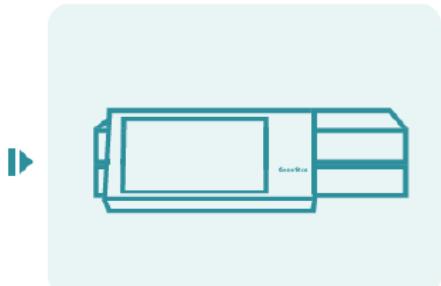
1021 + MRD
(Minimal residual disease)



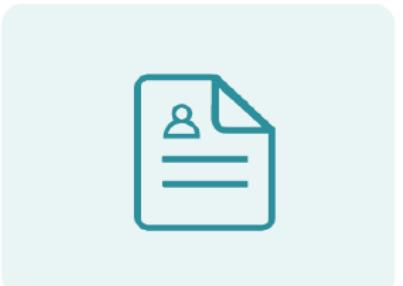
Library Prep Assays +
Automated Workstation



MGI Sequencer



Gene+ Box



Patient Test Report
(from Gene+Box)

GenePlus Product List: Library Prep Assays + Instruments

Application Scenario	Product Description	No. of Genes	Sample Type	Variants/Biomarkers Detected	Related Therapy / Application	Certification
Risk Assessment	Hereditary Cancer Screening Assay (62-gene panel)	62	Whole blood	SNV, InDel, CNV	<ul style="list-style-type: none"> Genetic Risk Assessment 	RUO
Oncology Precision Medicine	Oncology 59-Gene Variant Assay	59	FFPE tissue	SNV, InDel, CNV fusions/rearrangement	<ul style="list-style-type: none"> Targeted therapy Chemotherapy 	CE-IVD
	Oncology 188-Gene Variant Assay	188	FFPE tissue, Plasma (cfDNA)	SNV, InDel, CNV fusions/rearrangement MSI, HRR	<ul style="list-style-type: none"> Targeted therapy Immunotherapy Chemotherapy 	CE-IVD
	Oncology Multi-Gene Variant Assay	1021	FFPE tissue	SNV, InDel, CNV fusions/rearrangement TMB, MSI, HRR	<ul style="list-style-type: none"> Targeted therapy Immunotherapy Chemotherapy 	CE-IVD
	Circulating Tumour DNA 1021-Gene Variant Assay	1021	Whole blood (cfDNA + gDNA)	SNV, InDel, CNV fusions/rearrangement TMB, MSI, HRR	<ul style="list-style-type: none"> Targeted therapy Immunotherapy Chemotherapy 	CE-IVD
	Oncology Multi-Gene Variant Assay + 1021 Homologous Recombination Deficiency (HRD) Assay	1021+16,000 SNPs	FFPE tissue	SNV, InDel, CNV fusions/rearrangement TMB, MSI, HRR, HRD	<ul style="list-style-type: none"> Targeted therapy Immunotherapy Chemotherapy 	RUO
Personalized Cancer Monitoring (MRD Testing)	Oncology Multi-Gene Variant Assay + Personalized MRD Assay	1021+~20 sites	FFPE tissue + Plasma (cfDNA)	SNV, InDel, CNV fusions/rearrangement TMB, MSI, HRR, MRD	<ul style="list-style-type: none"> Dynamic monitoring 	RUO
Library prep + hybridization	GIN16 Workstation Automated Library Preparation Workstation	<ul style="list-style-type: none"> Automated library preparation system To run 1~16 samples simultaneously, able to test 48 samples by June. 				CE-IVD
Data Analysis & Interpretation	Gene+Box Data Analysis and Management System	Automated bioinformatic analysis and interpretation system (data analysis + test report)				CE-IVD

Features of Gene+ Box



Gene+ Box

Your local tumor NGS testing manager



Raw data

Bioinformatic Analysis

Report Interpretation

Data Management

- CE-IVDR & NMPA Approval
- Data Safety: Total Offline
 - On-site server with pre-installed software
 - No need internet, offline data analysis
 - Compliance with **GDPR** in Europe
- Automatic and Efficient
 - Automatic bioinformatic analysis
 - Save labor of at least 3-5 professional analysts
- Run Time*/No. of Samples per Run
 - 188-gene panel:**
 - Tissue: 4 hours/ 16 samples
 - ctDNA: 5 hours/ 3 samples
 - 1021-gene panel:**
 - Tissue: 8 hours/ 8 samples
 - ctDNA: 20 hours/ 8 samples
 - 59-gene panel:**
 - Tissue: 2 hours/8 samples
 - Hereditary panel:**
 - Blood: 2 hours/8 samples

Geneplus Multi-Cancer Panel – Specification

Product name	1021 Gen – FFPE RUO&CEIVD	1021 Gen – ctDNA RUO	1021 Gen – ctDNA CEIVD
Tumor type	Solid tumor		
Technology	Hybridization Capture + NGS		
Certification	CE-IVD & RUO	RUO	CE-IVD
No. of genes	1021		
Target size	1.6 Mb		
Sequencing Coverage	>4G per sample (Ave coverage >500x)	ctDNA:>17G per sample (Ave coverage >4000x) Control:>2.5G per sample	ctDNA:>40G per sample (Ave coverage >30000x) Control:>5G per sample
Target region	All coding regions in 312 genes + Partial coding regions in 709 genes + Specific intron, promoter and fusion-related non-coding regions in 38 genes		
Variants detected & Biomarkers	SNV, Indel, CNV, Rearrangement; TMB, MSI, HRR and detail information for over 30 biomarkers		
Sensitivity (LoD)	Hotspot (SNV and Indel): VAF $\geq 2\%$; Non-hotspot (SNV and Indel): VAF $\geq 5\%$ SV: $\geq 2\%$; CNV: ≥ 4 copies	Hotspots SNV, Indel as low as 0.5% , Non-hotspot SNV and Indel as low as 1% , Rearrangement as low as 1% , CNV as low as 0.2% , CNV as low as 2.5 copies low as 3.2 copies	Hotspots SNV, Indel, Rearrangement as low as 0.2% , CNV as low as 2.5 copies low as 3.2 copies
TAT from sample to report	5-7 days		
Sample type	FFPE tissue (≥ 10 slides, tumor content $\geq 20\%$)	Peripheral blood from patients with solid tumor	
DNA input	≥ 100 ng	ctDNA ≥ 30 ng; gDNA ≥ 200 ng	
Test for each sample	1 test per sample	2 tests per sample	

Geneplus Multi-Cancer Panel- Detected Target Therapy

Target Therapy Targets:

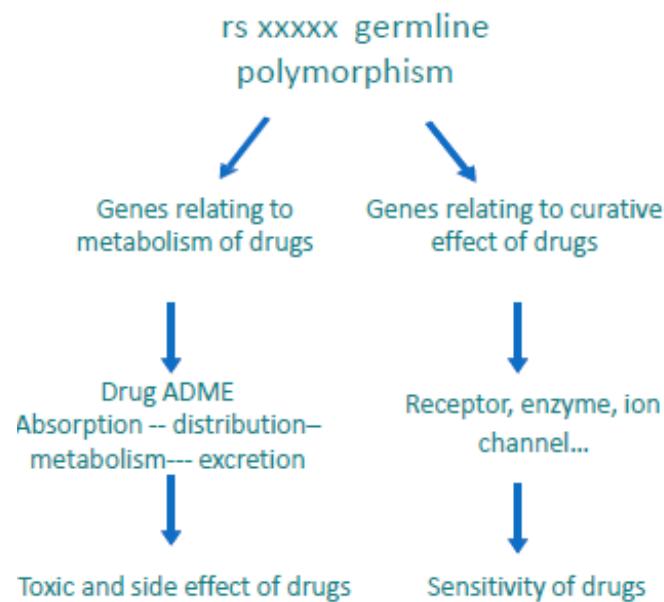
- Include **21 biomarkers** approved by FDA or included in NCCN
- Includes **36 HRR genes**, significantly improve the clinical benefit rate of PARP inhibitors
- Includes **38 rearrangement genes**, such as ALK, ROS1, NTRK, NRG1, FGFR2, etc

HRR genes in 1021 Panel												
ATM	ATR	ATRX	BAP1	BARD1	BLM	<i>BRCA1</i>	<i>BRCA2</i>	BRIP1	CDK12	CHEK1	CHEK2	
<i>C11orf30</i>	<i>ERCC1</i>	<i>FAM175A</i>	<i>FANCA</i>	<i>FANCC</i>	<i>FANCD2</i>	<i>FANCE</i>	<i>FANCF</i>	<i>FANCG</i>	<i>FANCL</i>	<i>FANCM</i>	<i>MRE11A</i>	
NBN	PALB2	RAD50	RAD51	RAD51B	RAD51C	RAD51D	RAD52	RAD54L	RECQL	RECQL4	WRN	

- BRCA1/2: A (APPROVED by FDA for specific cancer types or included in specialized clinical guidelines)*
- Other HRR: C (approved by FDA or other professional body for other cancer types; Or has been used as a screening criteria for clinical trials; Or supported by multiple small studies)*

Geneplus Multi-cancer Panel- Detected Chemotherapy Targets

Prediction of Curative Effect and Toxic and Side Effect of Chemotherapeutic Drugs (23 Types)			
Carboplatin	Taxane	5-Fu	Cyclophosphamide
Cis-platinum	Taxol	5-Fu + oxaliplatin	Cyclophosphamide + doxorubicin
Oxaliplatin	Taxol + cis-platinum	5-Fu + capecitabine	Cyclophosphamide + epirubicin
Platinum	Methotrexate	5-Fu + folinic acid	Anthracycline
Platinum compounds	Irinotecan	Tegafur + folinic acid	Etoposide
	Folinic acid	Capecitabine	Gemcitabine

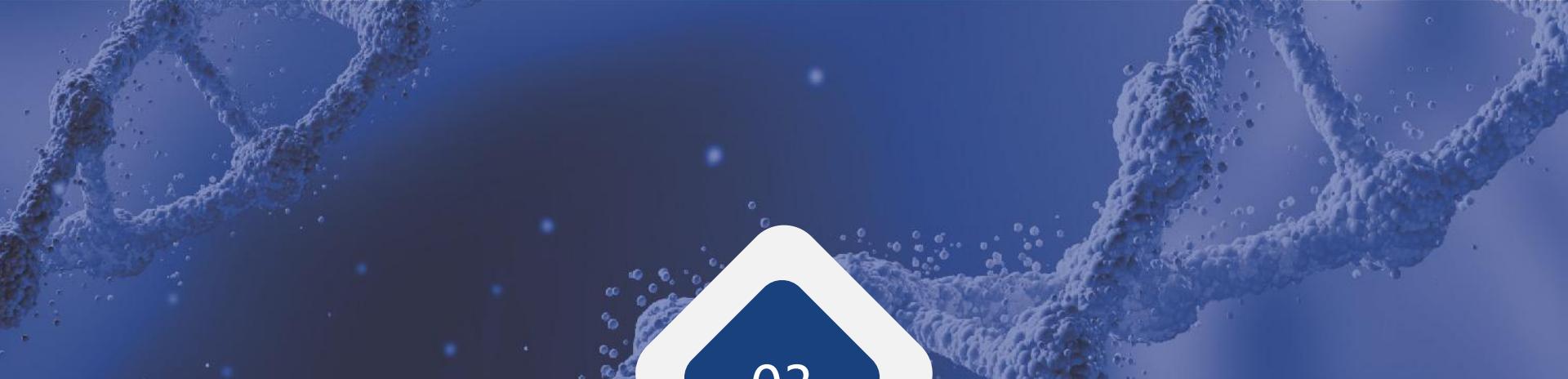


Geneplus Multi-cancer Panel- Drug Sensitivity and Resistance Detection

Targets	Type of Drugs	Drugs
Targeted drugs (171 types)	Drugs approved by FDA (97 types)	Fam-trastuzumab deruxtecan-nxki, T-DM1, Afatinib, Entrectinib, Gefitinib, Osimertinib, Lapatinib, Neratinib, Crizotinib, Ceritinib, Lorlatinib, Brigatinib, Alectinib, Ensartinib, Panitumumab, Trastuzumab, Pertuzumab and Trastuzumab, Dacomitinib, Icotinib, Erlotinib, Olaparib, Nilotinib, Mobocertinib, Furmonertinib, Dabrafenib and Trametinib, Lenvatinib, Amivantamab, Pemigatinib, Vemurafenib and Cobimetinib, Imatinib, Cetuximab, Temsirolimus, Sirolimus, Everolimus, Nimotuzumab, Trametinib, Encorafenib and Binimetinib, Vemurafenib, Sorafenib, Dabrafenib, Almonertinib, Vismodegib, Pralsetinib, Selpercatinib, Erdafitinib, Pyrotinib, Disitamab vedotin, Fulvestrant, Larotrectinib, Pertuzumab, Alpelisib, Palbociclib, Abemaciclib, Ribociclib, Niraparib, Pamiparib, Rucaparib, Belzutifan, Fluzoparib, Talazoparib, Regorafenib, Sunitinib, Tazemetostat, Sonidegib, Vorinostat, Infigratinib, Inetemab, Margetuximab, Tucatinib, Tucatinib+Trastuzumab, Trastuzumab and Lapatinib, savolitinib, Tepotinib, Cabozantinib, Capmatinib, Dasatinib, Pazopanib, Bevacizumab, Ponatinib, Vandetanib, Binimetinib, Tofacitinib, Ruxolitinib, Selumetinib, Ivosidenib, Enasidenib, Bortezomib, Avapritinib, Ripretinib, Dabrafenib and Trametinib and Cetuximab/Panitumumab, Vemurafenib and Cetuximab/Panitumumab and Irinotecan, RAF inhibitor and EGFR monoclonal antibody/MEK inhibitor, Encorafenib+Cetuximab, Encorafenib+Panitumumab, Encorafenib and Binimetinib and Cetuximab/Panitumumab, Sotorasib...
	Hormonic drugs (11 types)	Enzalutamide, abiraterone, bicalutamide, Nilutamide, Flutamide, Tamoxifen, Letrozole, Anastrozo, Tamoxifen, Exemestane...
	Drugs at clinical trial phase (63 types)	Entrectinib, Sunvozertinib, Befotertinib, Patritumab deruxtecan, Iruplinalkib, SAF-189s, 1st and 3rd generation EGFR-TKI, Bugatinib and cetuximab, Abivertinib, Poziotinib, CLN-081, Amivantamab and Lazertinib, Oritinib, Rezivertinib, Limertinib, Adagrasib, Taletrectinib, Gunagratinib, Futibatinib, A166, KN026, Gedatolisib, Capivaser, Ipatasertib, ABI-009, Galunisertib, LGK974, Zanidatamab, Alisertib, Bozitinib, Alrizomadlin, CC-223, MLN0128, AZD4547, Dovitinib, Dinaciclib, Buparlisib, Momelotinib, FCN-159, Tipifarnib, PD0325901, Vorasidenib, Repotrectinib, Unecritinib, BOS172738, RXDX-10, Lazertinib, AC0010, Nazartinib, Crenolanib, Neratinib+Trastuzumab, AZD3759, JDQ443, LOXO-195, Glumetinib, APR-246, PC14586, AZD1775...
Immune checkpoint inhibitor (11 types)	Pembrolizumab, Nivolumab, Atezolizumab, Avelumab, Durvalumab, Cemiplimab, Dostarlimab, Toripalimab, Sintilimab, Camrelizumab, Tislelizumab	
Chemotherapeutic drugs (23 types)	Cisplatin, Platinum compounds, Oxaliplatin, Carboplatin, Paclitaxel, Docetaxel, Taxanes, Paclitaxel+cisplatin, Etoposide, Gemcitabine, Vincristine, Vinorelbine, Pemetrexed...	

Geneplus Multi-cancer Panel-Multiple Types of Cancer Cover

Head and Neck Cancers	Endometrial Carcinoma	Cervical Cancer	Pancreatic Adenocarcinoma	Bladder Cancer	Esophageal and Esophagogastric Junction Cancers	Gastric Cancer	Gastrointestinal Stromal Tumors	Hepatocellular Carcinoma	Other Solid Tumors			
AR-(No drug recommended)	ERBB2	NTRK	BRCA1	FGFR2	ERBB2	ERBB2	NTRK	NTRK	ALK	FGFR2	RANBP2	TSC1
BRAF	POLE	RET	BRCA2	FGFR3	NTRK	BRAF	PDGFRA	RET	APC	FGFR3	SDHB	MTOR
RET	TP53	MSI/MMR	PALB2		MSI/MMR	RET	KIT	MSI/MMR	BCOR	GU1	SMARCB1	FGFR1
HER2	NTRK	TMB	ALK		TMB	NTRK	NF1	TMB	BRAF	IDH1	TFE3	CDK12
HRAS-(No drug recommended)	MSI/MMR		NRG1		BRAF	MSI	FGFR		BRCA1	KIT	WT1	CDKN2A
PIK3CA-(No drug recommended)	TMB		NTRK			TMB	SDHA		BRCA2	KRAS	YAP1	ARID1A
NTRK			ROS1			BRAF			COK4	MDM2	NRG1	KDM6A
MSI			FGFR2			SDHB			CIC	MYOD1	MAP2K1	HGF
TMB			RET			SDHC			CTNNB1	NTRK1	CCNE1	ERCC1
			BRAF			SDHD			DNAJB1	NTRK2	FBXW7	FLCN
			KRAS						ERBB2	NTRK3	RAF1	ERBB4
			HER2						ERG	PAX3	SMO	ARAF
			MSI/MMR						ETV1	PAX7	NF2	FGFR4
			TMB						ETV6	PDGFRA	NF1	
									EWSR1		TSC2	



03

MGI Oncology Ecosystem

Genetron Lung Cancer Panel + DNBSEQ-G99 Solution

Genetron Lung Cancer Panel

Lung Basic

The Lung Basic Test is a qualitative in vitro diagnostic test that uses **One-Step** multiplex PCR, targeted high throughput sequencing technology (**DNBSEQ-G99/G400**) to detect single nucleotide variants (SNVs), insertions, and deletions in **48 genes from DNA, fusions in 5 genes from RNA** isolated from formalin-fixed, paraffin-embedded (**FFPE**) tumor samples or **fresh tissue** samples from patients with **non-small cell lung cancer (NSCLC)**, including core genes EGFR, KRAS, BRAF, HER2, PIK3CA, ALK, ROS1 and MET.



Lung basic testing kit



G99 sequencing platform



G400 sequencing platform

Genetron Lung Cancer Panel – Gene List

Point Mutations (SNVs) and Deletion/Insertion Variants (Indels) -DNA (48 Genes)

FDA-approved therapy or NCCN recommend therapy drug	<i>EGFR</i>	<i>ALK</i>	<i>KRAS</i>	<i>ERBB2</i>	<i>BRAF</i>	<i>RET</i>	<i>MET</i>			
Prognosis	<i>TP53</i>	<i>STK11</i>	<i>PTEN</i>	<i>RB1</i>	<i>CDKN2A</i>	<i>PIK3CA</i>				
	<i>JAK3</i>	<i>HRAS</i>	<i>VHL</i>	<i>NRAS</i>	<i>KIT</i>	<i>IDH2</i>	<i>FBXW7</i>	<i>FLT3</i>	<i>JAK2</i>	<i>FGFR2</i>
Clinical trial therapy drug	<i>PDGFRA</i>	<i>ATM</i>	<i>FGFR3</i>	<i>MPL</i>	<i>IDH1</i>	<i>GNAS</i>	<i>EZH2</i>	<i>SMARCB1</i>	<i>PTPN11</i>	<i>GNA11</i>
	<i>GNAQ</i>	<i>AKT1</i>	<i>CTNNB1</i>	<i>KDR</i>	<i>NOTCH1</i>	<i>HNF1A</i>				
Pre-Clinical Study	<i>SMAD4</i>	<i>SMO</i>	<i>SRC</i>	<i>APC</i>	<i>ERBB4</i>	<i>CDH1</i>	<i>CSF1R</i>	<i>ABL1</i>	<i>FGFR1</i>	

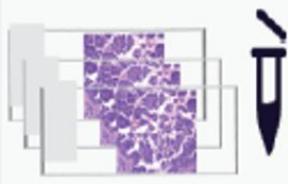
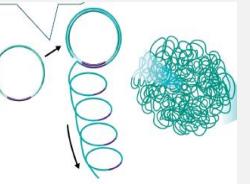
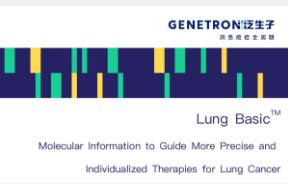
Fusions -RNA (5 Genes)

FDA-approved therapy or NCCN recommend therapy drug	<i>ALK</i>	<i>ROS1</i>	<i>RET</i>	<i>MET</i>	<i>NTRK1</i>					
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- The genes fragment cover the hotspot locations
- This kit is used to qualitatively detect SNV Indels of 48 genes in DNA, the fusion of 4 genes and the skipping of MET exon 14 in RNA

Genetron Lung Cancer Panel – Super fast One-step library construction

Finish within **2 days**

DNA+RNA Extraction	2.5h -4h	Lung Basic test kit (DNBSEQ-G99)	4h	DNB generation	2h -4h	DNBSEQ-G99	12h	Report generation	1-3.5h
Sample preparation		Library preparation		Library loading		Sequencing		BAM/fasta/vcf Report	
								 <p>GENETRON泛生子 Lung Basic™ Molecular Information to Guide More Precise and Individualized Therapies for Lung Cancer</p>	
DNA>20ng RNA>50ng		Complete library construction with greater stability		Circulation, DNB, Expand sequencing signal		Ready-to-use modular sequencing reagents, output 24 Gb~48 Gb in 12 hours		Automated reporting system on MegaBOLT	

One-step library construction + G99 = **Faster than faster**

Genetron Lung Cancer Panel – SNVs & Indels Validation

Sample ID	AA mutation	Reference		DNBSEQ-G99 outcome	
		Frequency	Gene	Depth (x)	Frequency
HD730	p.V600E	7.00%	BRAF	21561	3.60%
HD730	p.V600M	4.30%	BRAF	21353	5.20%
HD730	p.G719S	17.90%	EGFR	2885	18.10%
HD730	p.E746-A750del	1.90%	EGFR	6913	1.80%
HD730	p.D835Y	4.30%	FLT3	10193	4.30%
HD730	p.Q209L	4.50%	GNA11	8046	3.60%
HD730	p.R132H	3.40%	IDH1	20513	3.40%
HD730	p.A146T	5.80%	KRAS	5618	5.00%
HD730	p.G12S	5.20%	KRAS	20324	6.20%
HD730	p.G13D	20.80%	KRAS	20129	24.60%
HD730	p.Y1253D	3.70%	MET	8642	3.10%
HD730	p.Q61H	5.10%	NRAS	20641	3.00%
HD730	p.E542K	4.40%	PIK3CA	6358	4.60%
HD730	p.H1047R	32.10%	PIK3CA	12326	30.20%
HD827	p.V600E	10.50%	BRAF	20891	8.20%
HD827	p.S33Y	32.50%	CTNNB1	15991	33.70%
HD827	p.G719S	24.50%	EGFR	3130	25.80%
HD827	p.L858R	3.00%	EGFR	21216	2.40%
HD827	p.E746_A750delE LREA	2.00%	EGFR	7193	1.60%
HD827	p.D816V	10.00%	KIT	10620	8.80%
HD827	p.G13D	15.00%	KRAS	15653	15.50%
HD827	p.G12D	6.00%	KRAS	15714	7.40%
HD827	p.Q61K	12.50%	NRAS	28268	9.70%
HD827	p.E545K	9.00%	PIK3CA	5989	8.90%
HD827	p.H1047R	17.50%	PIK3CA	11266	17.00%

Standard sample: HD730 and HD827

Conclusions

- All of 25 SNVs and InDels (HD730: 14, HD827: 11) were successfully detected by using DNBSEQ-G99 sequencer
- Of which, frequencies of mutations varying from 1.9% to 32.5% were all efficiently detected

Genetron Lung Cancer Panel – SNVs & Indels Validation

Sample ID	Ref*	Alt**	Gene	Ref Frequency	DNBSEQ-G99 Depth (x)	DNBSEQ-G99 detected Frequency
P2309050201	A	C	EGFR	4.70%	6469	3.17%
P2309050201	A	T	PIK3CA	4.90%	13626	3.46%
P2309050201	G	A	EGFR	4.80%	6286	3.44%
P2301290258	T	A	TP53	27.20%	9652	21.27%
P2301290258	GAATTAAGAG AAGCA	-	EGFR	22%	15327	22.05%
P2303100268	G	A	KIT	43.10%	13388	46.52%
P2303100268	T	G	EGFR	53.60%	30924	54.99%
P2303090244	C	T	IDH2	2.30%	4563	1.60%
P2303150265	C	T	KRAS	6.70%	24010	8.15%
P2303150265	T	A	BRAF	7.30%	9827	7.59%
P2304080206	T	G	EGFR	6.20%	9568	7.09%
P2306030239	C	T	AKT1	15.50%	5546	14.30%
P2306030239	T	G	KRAS	17.60%	17944	13.14%
P2308250264	T	C	KRAS	11.90%	25584	12.00%
P2309080232	AG	-	APC	21.20%	17149	22.42%
P2309080232	G	T	NRAS	20.40%	37866	17.57%
P2310190222	C	G	KRAS	5.60%	6503	5.04%
P2310140208	G	T	TP53	9.80%	4511	10.77%
P2401120259	G	A	BRAF	7.60%	11096	5.97%
P2401120259	G	A	IDH1	7.80%	9667	6.32%
P2401120259	T	G	BRAF	7.40%	11126	5.93%
P2309280257	C	A	IDH1	25.70%	16503	14.28%
P2309280257	A	T	BRAF	15.60%	16108	8.01%
P2309150220	G	A	TP53	16.10%	11067	17.09%
P2312250236	T	G	EGFR	5.70%	20818	5.58%
P2312250236	C	T	TP53	45.80%	16864	40.32%

Clinical DNA Samples: 15 clinical samples, with 26 SNVs and InDels

Conclusions: All of 26 SNVs and In Dels in 15 clinical samples, with frequency varying from 2.3 to 53.6%, were successfully detected by using DNBSEQ-G99 sequencer

Genetron Lung Cancer Panel – RNA Fusion Validation

Sample ID	Fusion Type	Exon	DNBSEQ-G99 Targeting Reads	DNBSEQ-G99 Frequency	Result
P2309080264	MET-skipping	E14:E14	132245	1.06%	Positive
P2401160230	EML4-ALK	E18:E20	29147	0.88%	Positive
P2308130210	KIF5B-RET	E15:E12	84688	0.52%	Positive
P2312260251	MET-skipping	/	134177	1.99%	Positive
P2401050226	EML4-ALK	E13:E20	23867	0.26%	Positive
P2309150220	KIF5B-RET	E23:E12	29632	0.26%	Positive
P2312250236	KIF5B-ALK	E24:E20	21272	0.36%	Positive
P2401020240	EZR-ROS1	E10:E34	344066	8.29%	Positive
P2311160238	EML4-ALK	E6:E20	3716	0.09%	Positive
P2401180249	CD74-ROS1	E6:E34	292410	10.93%	Positive
P2306050237	CCDC6-RET	E1:E12	1754	0.06%	Positive
P2306080235	SDC4-ROS1	E2:E32	89471	1.86%	Positive
P2311090219	EML4-ALK	E20:E20	69139	1.56%	Positive

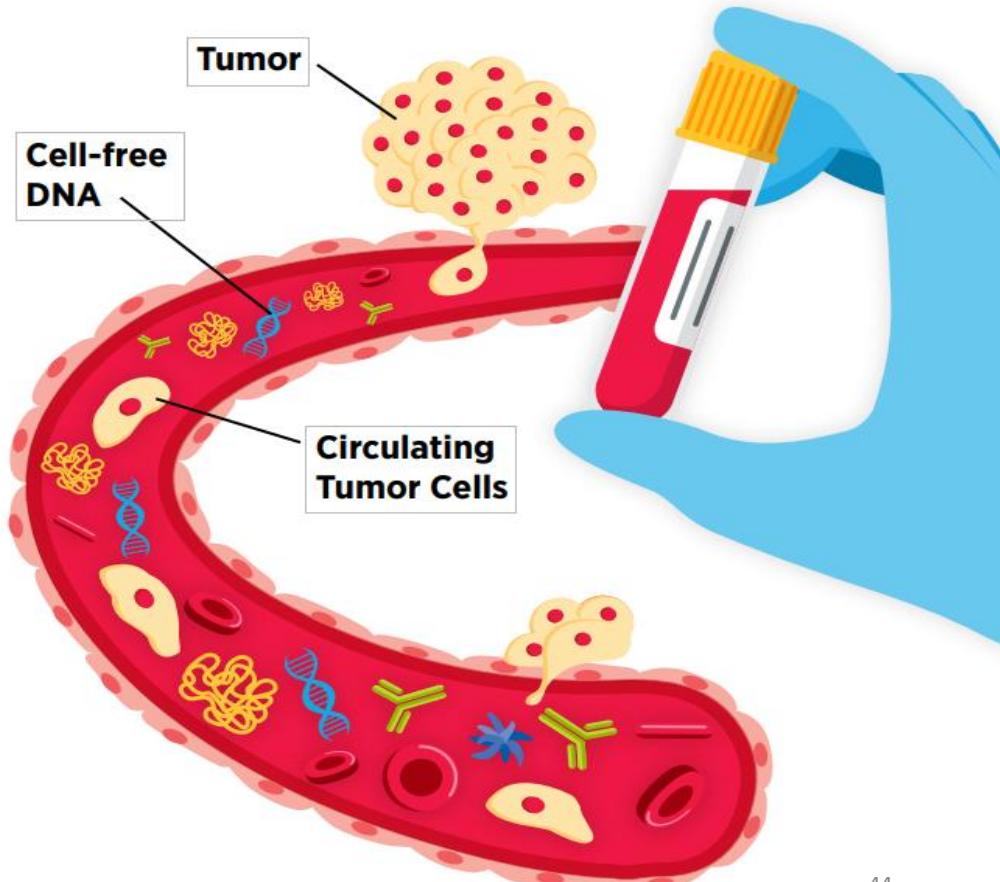
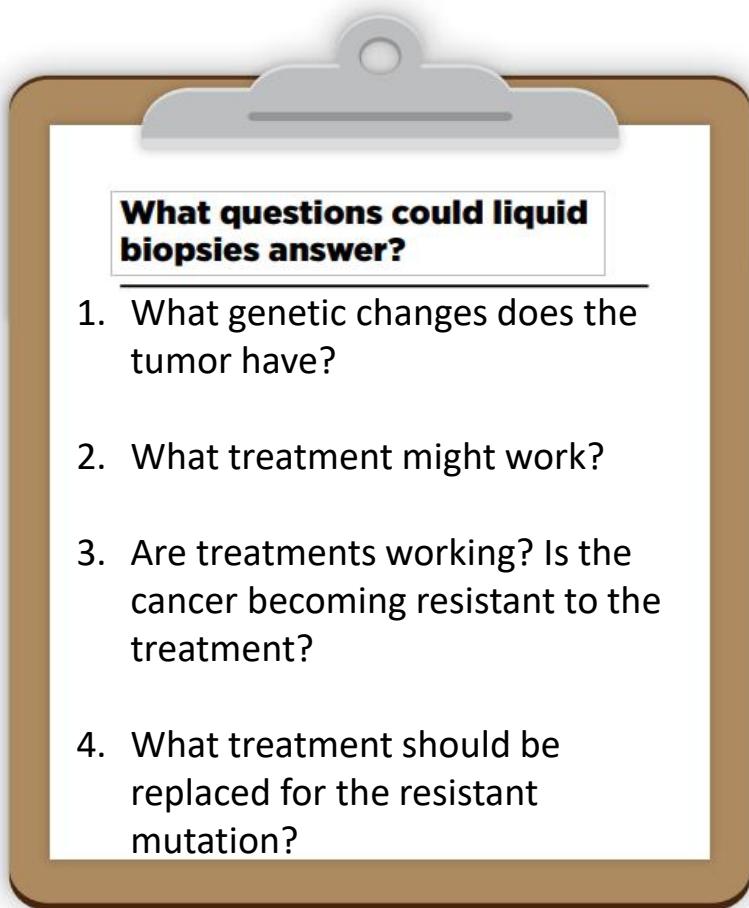
Clinical Samples of RNA: 13 positive clinical samples with 8 types of RNA fusion.

Conclusions: All of 13 clinical samples with 8 types of RNA fusion were successfully detected by using DNBSEQ-G99 sequencer, sequencing outcome is consistent with clinical diagnosis.

Genetron Lung Cancer Panel – Clinical Validation in Numerous Hospitals

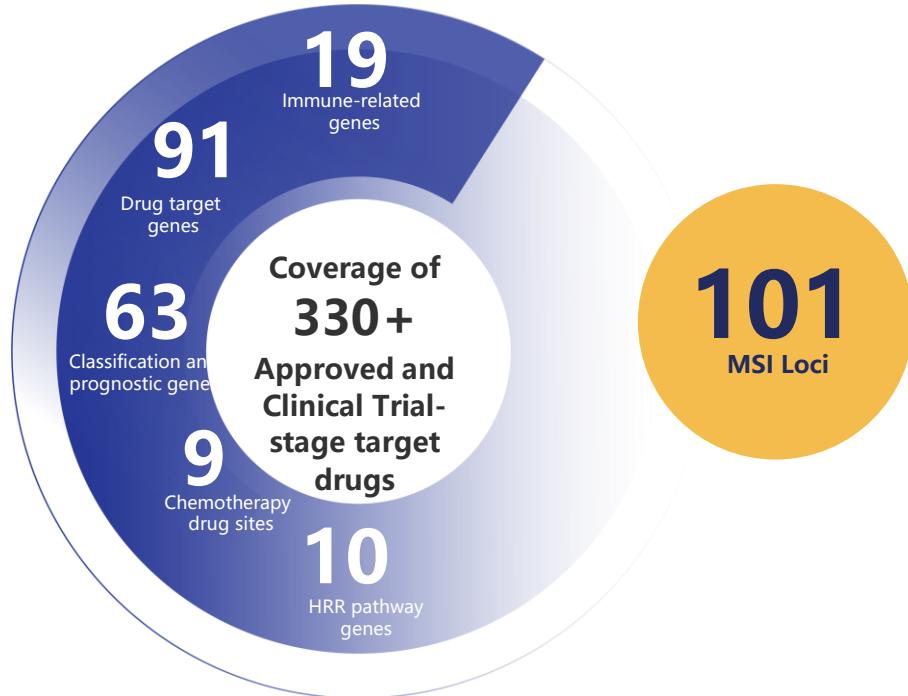


Onco Sonar – Moving Toward to Non-Invasive



Onco Sonar – High Sensitivity Liquid Biopsy

Onco Sonar is a highly sensitive liquid biopsy NGS testing that can easily and reliably identify a range of biomarkers from targeted therapy, bMSI, HRR, and prognosis monitoring, coverage of **172 genes** with 108 clinically high-evidence grade genes and 64 frequently mutated genes.



- **Comprehensive genomic profiling**

Coverage of multi biomarkers related to diverse therapies which could be valuable for clinical decision-making such as medication, classification and prognostic prediction.

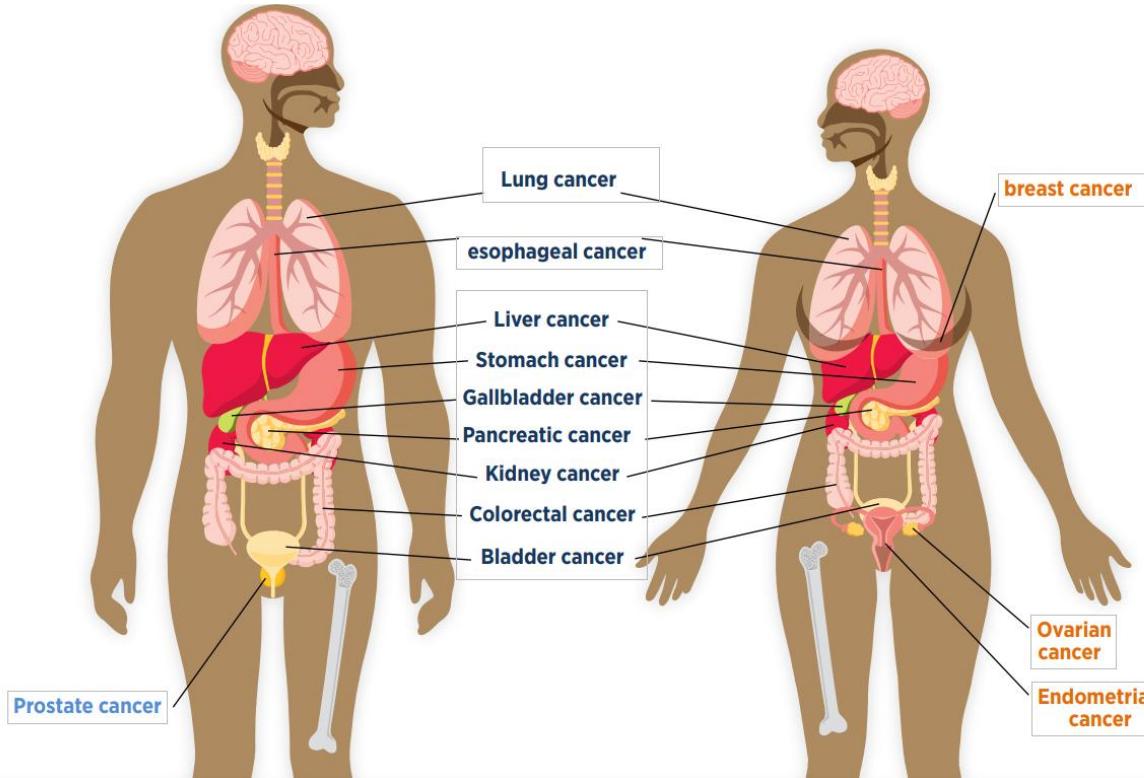
- **Highly sensitive and accurate detection**

30000X ultra-high depth sequencing + dual identity authentication tag site denoising + BayVarC algorithm specific identification, ensuring high-fidelity detection of gene loci.

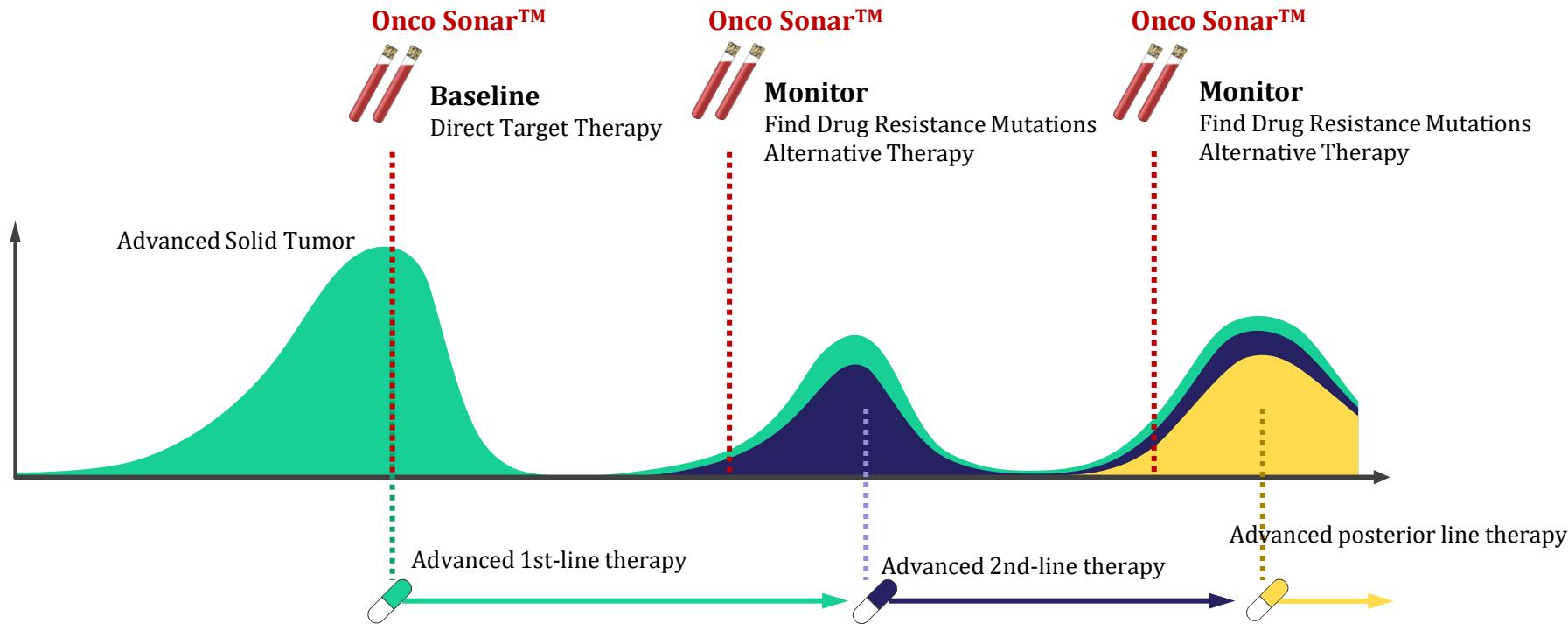
- **Outstanding and reliable test performance, gaining insights on therapy response analysis and new biomarker exploration**

Onco Sonar – Applicable Solid Tumor with Feasible Taret Drug

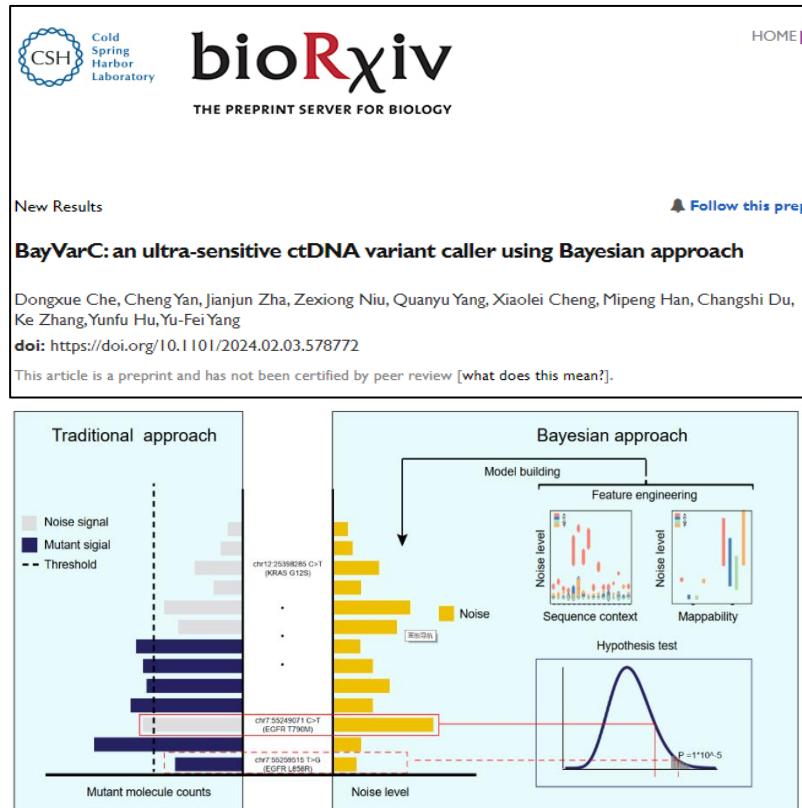
Core focuses: Lung, Colorectal, Gastric, Breast, Liver



Onco Sonar – Target Therapy Guidance and Molecular Response



Onco Sonar – Verified and Recognized



- ✓ Onco Sonar was launched in Sept. 2023 & CE-marked
- ✓ A few studies is ongoing, including a study of 2,000 tests with AstraZeneca.
- ✓ The BayVarC model, its core principle of bioanalysis, has a 10+ IF publication.
- ✓ The product went through rigorous testing with a detailed validation report and the performance (i.e, SNV LoD 0.1%) is comparable or even superior to other best-selling products.

Onco Sonar – 172 genes and Blood MSI

Point Mutations (SNVs) and Deletion Variants (Indels) (167 Genes), All Exons 29 Genes*																
ABCB4	ACVR2A	AGO2	AKT1	AKT2	AKT3	ALK	APC	AR	ARAF	ARID1A	ARID2	ATM*	ATR	B2M	BAI1	BAI3
BRAF	BRCA1*	BRCA2*	BRD7	BRIP1*	CARD11	CCND1*	CCNE1*	CD274	CDH1	CDK4*	CDK6*	CDKN1B	CDKN2A*	CDKN2B	CHEK1	CHEK2*
CREBBP	CTNNB1	DDR2	DNMT3B	EGFR*	EPHA2	EPHA3	EPHA5	EPHB6	ERBB2*	ERBB3	ERBB4	ERCC3	ERCC4	ESR1	EZH2	FAM135B
FANCA*	FAT1	FAT3	FBXW7	FGF19*	FGFR1*	FGFR2*	FGFR3*	FGFR4	FLT1	FLT3	FLT4	FOXL2	GATA3	GNA11	GNAQ	GNAS
HDAC2*	HDAC9	HRAS	IDH1	IDH2	IKZF1	JAK1	JAK2	KDM6A	KDR	KEAP1	KIT*	KMT2B	KMT2D	KRAS*	LRP1B	MAP2K1
MAP2K2	MAP2K3	MAP2K4	MAPK1	MAPK3	MAX	MDM2*	MED12	MET*	MLH1	MLH3	MRE11A	MSH2	MSH3	MSH6	MST1	MTOR
MUC16	MYC*	NEGR1	NF1	NF2	NFE2L2	NOTCH1	NOTCH2	NOTCH3	NOTCH4	NRAS	NRG1	NRG3	NTRK1	NTRK2	NTRK3	NUTM1
PALB2*	PDGFRA	PDGFRB	PHF20L1	PIK3CA*	PIK3R1	PMS1	PMS2	POLD1	POLE	PREX2	PTEN*	PTPRD	PTPRT	RAF1	RB1*	RBM10
RET	RHOA	RICTOR	RNF43	ROBO1	ROS1	RUNX1T1	SEMA3A	SETD2	SF3B1	SLIT2	SMAD2	SMAD3	SMAD4	SMARCA4	SPTA1	STK11*
TCF7L2	TERT	TGFB2	TMPRSS13	TP53*	TSC1	TSC2	U2AF1	UBR5	VEGFA	VEGFB	VHL	WT1	ZNF814			
Amplifications (16Genes)																
CCND1	CCNE1	CDK4	CDK6	EGFR	ERBB2	FGF19	FGFR1	FGFR2	FGFR3	KIT	KRAS	MDM2	MET	MYC	PIK3CA	
Fusions (16 Genes)																
ALK	CD74	EGFR	ETV6	FGFR1	FGFR2	FGFR3	NTRK1	NTRK2	RAF1	RET	ROS1	SDC4	NTRK3	EML4	LTK	

*ETV6 is a common rearrangement partner for NTRK3; CD74 and SDC4 are common rearrangement partners for NRG1 and ROS1.

Onco Sonar™ covers all the biomarkers that ESMO recommendations on the use of circulation tumour DNA assays(2020) and the use of NGS for patients with metastatic cancers(2022); covers all the gene variants of the largest national NSCLC umbrella study, covers all the HRR Genes in GALAHAD clinical trial

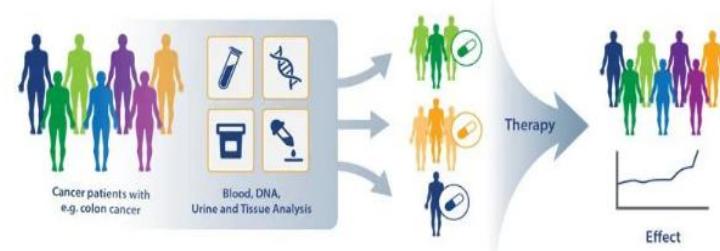
Ecosystem Partnership on NGS –Based Oncology Solutions

Method	Company	Product	Software	Certificates
tNGS-amplicon	HGT	ATOplex BRCA1/2 panel	HGT bioinformatics analysis system	RUO
tNGS-capture	Geneplus	59,188, 1021 genes pan	Geneplus	CE -IVD
tNGS-capture	Genetron Health	172 genes panel	Genetron Health	CE -IVD
tNGS-amplicon	Genetron Health	Lung cancer panel	Genetron Health	CE -IVD
tNGS- amplicon/ capture	Twist	Pan cancer panels	Twist	RUO
tNGS-capture	Nanodigmbio	Lung Cancer panel	Nanodigmbio	RUO
WES	Nanodigmbio	NEXom XP Panel NEXome Core Panel	Nanodigmbio	RUO
tNGS-capture	Gencast	Oncology panel	Genecast INTEGRO V1	CE -IVD
tNGS-amplicon	NgeneBio	Oncology panels	/	CE-IVD

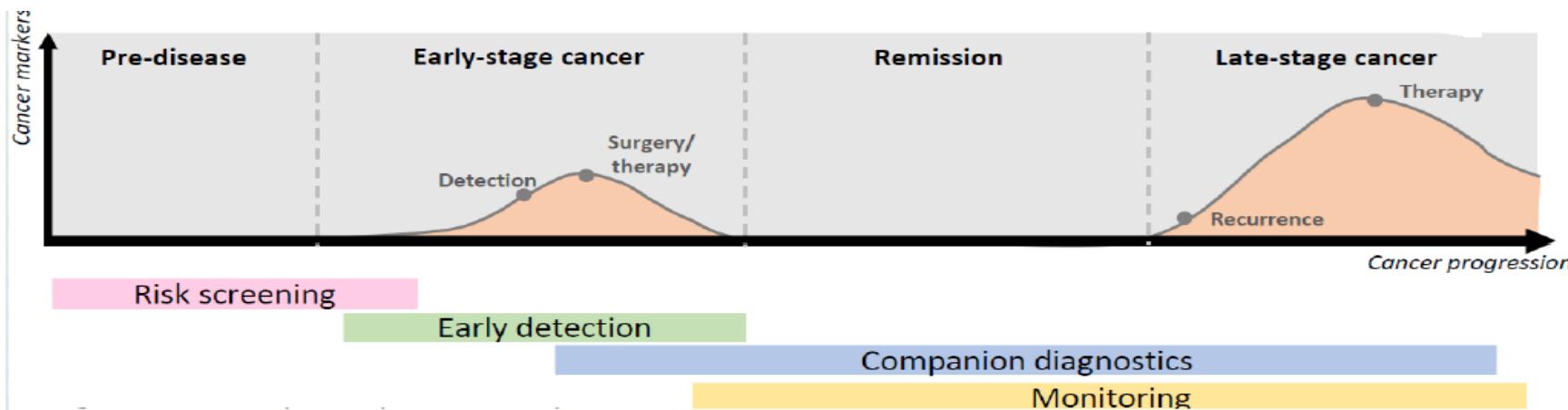
Next-Generation Sequencing in Oncology: Why It Matters

Information	Action
Actionable mutations/ Resistant mutations	Target therapy
MSI (Microsatellite Instability)	Immunotherapy/ chemotherapy response
MRD (minimal residual disease)/ Dynamic monitoring of cDNA	Response evaluation, early recurrence detection → insight treatment plan
Germline mutations	PARPi therapy selection; Cancer predisposition for family

Precision Medicine
More Personalized Diagnostics



<https://manhattancenterforgynecology.com/%20precision%20medicine/>





Thank You for Your Attention!

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