



## **OncoTrack Liquid**

(NGS based Liquid Biopsy Tests)

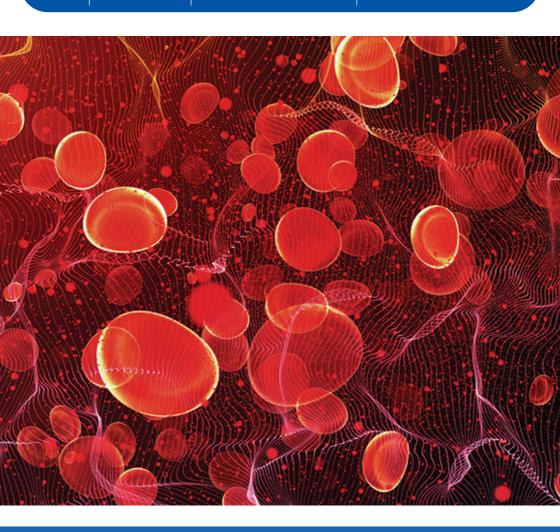
**Genomic Profiling of Solid Tumors from Blood** 

Minimally invasive

High precision multibiomarker

CAP accredited & extensively validated assay

≥20,000X sequencing depth (pre-UMI, LOD of 0.2% VAF)



#### Next Generation Sequencing (NGS) based Liquid Biopsy test

NGS based liquid biopsy is a test performed on the blood of the patient to evaluate tumor derived DNA (ctDNA) for molecular biomarker detection.

Cells in the body die continuously in a process known as "apoptosis", releasing DNA/RNA into the bloodstream. This freely circulating DNA in the blood stream is termed as **Cell free DNA (cfDNA)**.

Tumours cells also shed their contents including DNA into the blood stream. This tumour derived DNA present in the blood stream is called as **Circulating tumour DNA or ctDNA**.

Liquid Biopsy test is advised in the following situations:

#### Patient discomfort, risk & morbidity

**Difficulty in obtaining tumor biopsy** from cancer patients for practical and clinical reasons

#### **Fixation & Quality problems**

Biopsy material is degraded or damaged or improperly/poorly fixed; Bony tissue consistent coverage & fewer assay failures in Liquid Biopsy

#### Low tumor cellularity in Tissue Biopsy

- Tissue unavailability
- Tumor biopsy is limited to single site & time frozen whereas Liquid Biopsy represents more spatial & temporal heterogeneity
- More accurately represents metachronous metastatic sites

#### **Treatment monitoring and Relapse**

in cancer patients (MRD)

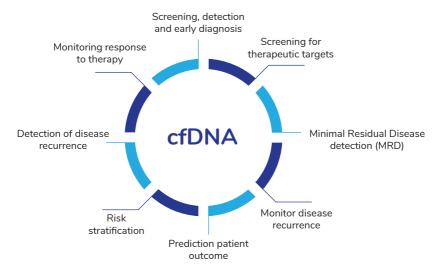
#### Determination of secondary acquired resistance

mutations during the course of treatment (example: EGFR T790M or MET exome skipping mutation in NSCLC)

#### **Urgent treatment**

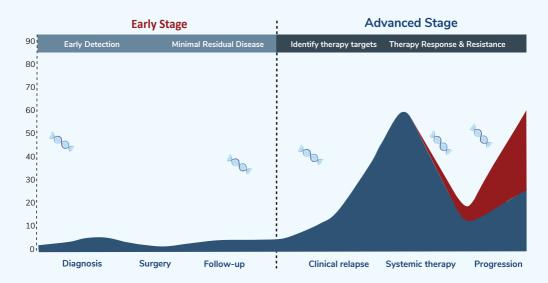
Delay in obtaining tissue Biopsy, Liquid Biopsy saves times

#### **Clinical Applications of Liquid Biopsy**



Liquid Biopsy Test can be used as a Complementary, Alternative, Reflex and Serial to Tissue Biopsy Test

#### **Liquid Biopsy - Implications in Cancer Management**



#### **MedGenome Liquid Biopsy NGS Assays**

#### OncoTrack





- Screens for the presence of oncogenic mutations in four key genes: EGFR, KRAS, NRAS and BRAF.
- These genes have a **potential role in clinical decision making** for different lines of approved targeted therapy and those in clinical trials.
- This assay also screens for resistance mutations that demonstrate the mechanism of acquired secondary/primary resistance to these drugs.

#### **HRR Track**

#### Test code: MGM2455 | TAT - 14 working days



- Indicated for Prostate, Ovarian, Breast and Pancreatic cancer
- Evaluates mutations in cfDNA (ctDNA) shed from dying cancer cells



- Screens for the mutations (SNVs and InDels) in 15 Homologous
   Recombination Repair(HRR) genes including BRCA1 and BRCA2 genes
- Informs PARPi eligibility (approved targeted therapies and in clinical trials.)



- Complete Coding regions and splice site boundaries (+ /-10 bp) are covered
- Detects both somatic and germline\* variants.

\*Germline variants to be confirmed on blood DNA

#### LungTrack Advance

Test code: MGM2623 | TAT - 14 working days





- Detects SNVs, Indels and Fusions, all known / unknown fusion gene partners are detected
- Enhanced coverage of intronic region for key fusion genes and their reported partners
- Variants (SNVs, InDels) can be detected at 0.2% VAF; Fusions >3
  read support
- Detects Primary driver mutation and Secondary resistance markers
- Enables Minimal Residual Disease (MRD) detection

Fusions will be determined in genes highlighted as bold | Novel fusion partners can also be detected

#### **Colorectal Cancer**

#### Test code: MGM3197| TAT - 14 working days

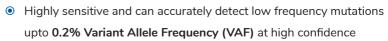


- NGS based CAP accredited assay to screen all the NCCN guided actionable biomarkers in Colorectal Cancer
- Detects SNVs & InDels
- Variants (SNVs, InDels) can be detected at 0.2% VAF
- Detects Primary driver mutation and Secondary resistance markers
- Enables Minimal Residual Disease (MRD) detection

#### **OncoTrack Ultima**

#### Test code: MGM455 | TAT - 14 working days

- Tumor agnostic assay covering 117 Pan cancer genes as recommended by guidelines (FDA, NCCN, ASCO, ESMO etc.)
- Comprehensive coverage of complete coding regions of all the genes and intron/exon boundaries for SNVs & InDels detection

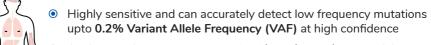


- Analysis and reporting as per ACMG/AMP/ASCO/CAP guidelines
- Detects Primary driver mutation and Secondary resistance markers
- Enables Minimal Residual Disease (MRD) detection
- All HRR genes are covered including BRCA1 and BRCA2

#### OncoTrack Advance

#### Test code: MGM2718 | TAT - 14 working days

- Tumor agnostic assay covering 117 Pan cancer genes as recommended by guidelines (FDA, NCCN, ASCO, ESMO etc.)
- Comprehensive coverage of **complete coding regions** of all the genes and **intron/exon boundaries** for **SNVs, InDels & Fusions** detection



- Analysis and reporting as per ACMG/AMP/ASCO/CAP guidelines
- Detects Primary driver mutation and Secondary resistance markers
- Enables Minimal Residual Disease (MRD) detection
- All HRR genes are covered including BRCA1 and BRCA2



#### OncoTrack CGP (Liquid Biopsy)

Test code: MGM3309 | TAT - 21 working days





- Achieve low limits of detection with UMI-based hybrid- capture library preparation and deep sequencing.
- Sophisticated variant calling algorithms and high depth of sequencing enable detection of key biomarkers in cfDNA with 0.5% limit of detection (LOD)
- Leverage minimally invasive blood samples as a complement to tissue biopsy or as an alternative when tissue is not readily available
- Detects low-frequency somatic variants across 523 genes with high sensitivity and specificity
- Well validated as per CAP guidelines. High throughput Illumina's sophisticated NGS platforms

#### Validation of Liquid Biopsy for advanced non-small cell lung cancer

#### Lung Cancer: Targets and Therapy

Dovepress

open access to scientific and medical resear



ORIGINAL RESEARCH

# Validation of liquid biopsy: plasma cell-free DNA testing in clinical management of advanced non-small cell lung cancer

A total of 163 NSCLC cases were included in the validation, of which 132 patients had paired tissue biopsy and ctDNA. We chose to validate ctDNA using deep sequencing with custom designed bioinformatics methods that could detect somatic mutations at allele frequencies as low as 0.01%. Benchmarking allele specific real time PCR as one of the standard methods for tissue-based *EGFR* mutation testing, the ctDNA NGS test was validated on all the plasma derived cell-free DNA samples. We observed a high concordance (96.96%) between tissue biopsy and ctDNA for oncogenic driver mutations in Exon 19 and Exon 21 of the *EGFR* gene. The sensitivity, specificity, positive predictive value, negative predictive value, and diagnostic accuracy of the assay were 91.1%, 100% 100%, 95.6%, and 97%, respectively. A false negative rate of 3% was observed. A subset of mutations was also verified on droplet digital PCR. Sixteen percent EGFR mutation positivity was observed in patients where only liquid biopsy was available, thus creating options for targeted therapy. This is the first and largest study from India, demonstrating successful validation of circulating cell-free DNA as a clinically useful material for molecular testing in NSCLC.

- Concordance- 96.96%
- Sensitivity: 91.1%
- Specificity: 100%

- PPV: 100%
- NPV: 95.6%
- Diagnostic accuracy: 97%

## Limit of Detection (LOD) - Liquid Biopsy Assay

Alteration Type	Analytical Sensitivity#	Limit of Detection (LOD)	Analytical Specificity##	
		30ng		*Analytical Sensitivity defined as the Detection Rate for variants present
SNVs*	≥95%	>0.2 AF%	100%	at or above the limit of detection (LoD).
INDELS*	≥95%	>0.2 AF%	100%	**Analytical Specificity defined as 1 minus the
Fusions **	≥95%	≥3 Reads	100%	per-sample false positive rate
v =				

<sup>\*</sup> Tested on cfDNA reference standards \*\* Tested on Lung track advance

## **All Solid Tumours**

Test Code	Test Name	Gene list (SNVs and InDels)	Gene list (Fusions)
MGM2718  TAT: 14  Working  Days	Oncotrack Advance -Liquid Biopsy NGS test (SNVs, InDels and Fusions) Total Genes Covered: 133	No. of Genes Covered: 118  ABL1, ABL2, AKT1, ALK, APC, AR, ARAF, ARID1A, ARID1B, ATM, ATR, ATRX, BAP1, BARD1, BRAF, BRCA1, BRCA2, BRIP1, C11orf65, CCND1, CDH1, CDK12, CDK4, CDKN2, CDK2, CHEK1, CHEK2, CSTR2, CTNNB1, DDR2, EGFR, ERBB2, ERBB3, ERBB4, ERCC2, ESR1, EZH2, FANCL, FBXW7, FGFR1, FGFR2, FGFR3, FGFR4, FLT3, F0XA1, F0XL2, GATA3, GRA11, GNAQ, GNAS, HNF1A, HRAS, IDH1, IDH2, INPP4B, JAK1, JAK2, JAK3, KDMSC, KDM6A, KEAP1, KIT, KRAS, MAP2K1, MAP2K2, MAPK1, MET(Exon 14 skipping) mutations), MH1, MPL, MSH2, MSH6, MTOR, MUTHY, MYC, MYCN, MYD88, NF1, NF2, NOTCH1, NPM1, NRAS, NTRK1, NTRK3, PALB2, PBRM1, PDGFRA, PIK3CA, PMS2, POLD1, POLE, PPP2R2A, PTCH1, PTEN, PTPN11, RAD51B, RAD51C, RAD51D, RAD54L, RAF1, RB1, RET, RHEB, RHOA, RIT1, ROS1, STD2, STB1, SMAD4, SMARCB1, SMO, SPOP, SRC, STK11, TERT, TP53, TSC1, TSC2, VHL	No. of Genes Covered: 15 ALK, BRAF, EGFR, ERBB2, FGFR1, FGFR2, FGFR3, FGFR4, MET, NRG1, NTRK1, NTRK2, NTRK3, RET, ROS1
MGM455  TAT: 14  Working  Days	Oncotrack Ultima - Liquid Biopsy test by NGS (SNVs & InDels) Total Genes Covered: 118	No. of Genes Covered: 118  ABL1, ABL2, AKT1, ALK, APC, AR, ARAF, ARID1A, ARID1B, ATM, ATR, ATRX, BAP1, BARD1. BRAF, BRCA1, BRCA2, BRIP1, C11orif65, CCND1, CDH1. CDK12, CDK4, CDKN2A, CDX2, CHEK1, CHEK2, CSF1R, CTNNB1, DDR2, EGFR, ERBB2, ERBB3, ERBB4, ERRCC2, ESR1, EZTH2, FANCL, FEXWY, FGFR1, FGFR2, FGFR3, FGFR4, FLT3, FOXA1, FOXL2, GATA3, GNA11, GNAQ, GNAS, HNF1A, HRAS, IDH1, IDH2, INPP4B, JAK1, JAK2, JAK3, KDM5C, KDM6A, KEAP1, KIT, KRAS, MAP2K1, MAP2K2, MAPK1, MET(Exon 14 skipping mutations), MLH1, MPL, MSH2, MSH6, MTOR, MUTYH, MYC, MYCN, MYDB8, NF1, NF2, NOTCH1, NPM1, NRAS, NTRK1, NTRK3, PALB2, PBRM1, PDGFRA, PIK3CA, PMS2, POLD1, POLE, PPP2R2A, PTCH1, PTEN, PTPN11, RAD51B, RAD51C, RAD51D, RAD54L, RAF1, RB1, RET, RHEB, RHOA, RIT1, ROS1, SETD2, SF381, SMAD4, SMARCB1, SMO, SPOP, SRC, STK11, TERT, TP53, TSC1, TSC2, VHL	NA
MGM2772 TAT: 14 Working Days	Liquid Biopsy NGS Panel (SNVs, InDels & Fusions) Total Genes Covered: 33	No. of Genes Covered: 33  AKT1, ALK, ATM, BRAF, CDKN2A, CTNNB1, DDR1, DDR2, EGFR, ERBB2, ERBB3, ERBB4, FGFR1, FGFR2, FGFR3, FGFR4, HRAS, KIT, KRAS, MAP2K1, MET, NRAS, NRG1, NTRK1, NTRK2, NTRK3, PIK3CA, PTEN, PTPN11, RET, ROS1, SMAD4, TP53	No. of Genes Covered: 13 ALK, BRAF, FGFR1, FGFR2, FGFR3, FGFR4, MET(Exon, NRG1, NTRK1, NTRK2, NTRK3, RET, ROS1
MGM2649  TAT: 14  Working  Days	Minimal Residual Disease (MRD) by NGS in Solid Tumours (Liquid Biopsy) Total Genes Covered: 118	No. of Genes Covered: 118  ABL1, ABL2, AKT1, ALK, APC, AR, ARAF, ARID1A, ARID1B, ATM, ATR, ATRX, BAP1, BARD1, BRAF, BRCA1, BRCA2, BRIP1, C11orf65, CCND1, CDH1, CDK12, CDK4, CDKN2A, CDX2, CHEK1, CHEK2, CSF1R, CTNNB1, DDR2, EGFR, ERB2, ERB83, ERB84, ERRCC2, ESR1, EZP12, FANCL, FEXWY, FGFR1, FGFR2, FGR83, FGFR4, FLT3, FOXA1, FOXL2, GATA3, GNA11, GNAQ, GNAS, HNF1A, HRAS, IDH1, IDH2, INPP4B, IAK1, IAK2, JAK3, KDM5C, KDM6A, KEAP1, KIT, KRAS, MAP2K1, MAP2K2, MAPK1, MET, MLH1, MPL, MSH2, MSH6, MTOR, MUTYH1, MYC, MYCN, MYDB8, NF1, NF2, NOTCH1, NPM1, NRAS, NTRK1, NTRK3, PALB2, PBRM1, PDGFRA, PIK3CA, PMS2, POLD1, POLE, PPP2R2A, PTCH1, PTEN, PTPN11, RAD51B, RAD51C, RAD51D, RAD54L, RAF1, RB1, RET, RHEB, RHOA, RT11, ROS1, SFD12, SF3B1, SMAD4, SMARCB1, SMO, SPOP, SRC, STK11, TERT, TP53, TSC1, TSC2, VHL	NA
MGM3309  TAT: 21  Working  Days	OncoTrack CGP ( Liquid Biopsy ) Total Genes Covered: 523	Gene list added seperately	23 Genes for fusions - List added seperately

## **Lung Cancer**

Test Code	Test Name	Gene list (SNVs and InDels)	Gene list (Fusions)
MGM2623 TAT: 14 Working Days	LungTrack Advance - Liquid Biopsy test by NGS (SNVs, InDels & Fusions) Total Genes Covered: 24	No. of Genes Covered: 24  ALK, KRAS, BRAF, MAP2K1, CDKN2A, MET(Exon 14 skipping mutations), CTNNB1, NRAS, EGFR, NRG1, ERBB2, NTRK1, ERBB3, NTRK2, ERBB4, NTRK3, FGFR1, PIK3CA, FGFR2, RET, FGFR3, ROS1, KIT, TP53	No. of Genes Covered : 12  ALK, BRAF, MET(Exon 14 skipping mutations), NRG1, NTRK1, NTRK2, NTRK3, FGFR1, FGFR2, RET, FGFR3, ROS1
MGM3213  TAT: 14  Working  Days	Lung Cancer Panel (16 Genes) – Liquid Biopsy  Total Genes Covered: 16	No. of Genes Covered: 16  ALK, BRAF, EGFR, ERBB2, FGFR3, MET, KRAS, NRAS, NTRK1, NTRK2, NTRK3, MAP2K1, PIK3CA, RET, ROS1, TP53	No. of Genes Covered : 9  ALK, BRAF, FGFR3, MET, NTRK1, NTRK2, NTRK3, RET, ROS1
MGM482  TAT: 10  Working  Days	OncoFocus Express - Liquid Biopsy NGS test for EGFR gene mutations Total Genes Covered: 1	No. of Genes Covered : 1 EGFR (Exon 18, 19, 20, 21)	
MGM481 TAT: 12 Working Days	OncoFocus -Liquid Biopsy NGS test for EGFR gene mutations Total Genes Covered: 1	No. of Genes Covered : 1 EGFR (Exon 18, 19, 20, 21)	NA
MGM420 TAT: 12 Working Days	OncoSelect - Liquid Biopsy NGS test for EGFR TKI resistance Total Genes Covered: 2	No. of Genes Covered : 2 EGFR (T790M and C797S)	

## **Colorectal Cancer**

Test Code	Test Name	Gene list (SNVs and InDels)	Gene list (Fusions)
MGM3197 TAT: 14 Working Days	Colorectal Cancer Panel (Liquid Biopsy) Total Genes Covered: 9	No. of Genes Covered: 9  KRAS, NRAS, HRAS, BRAF, PIK3CA, AKT1, SMAD4, ERBB2, PTEN	
MGM455 TAT: 14 Working Days	Oncotrack Ultima - Liquid Biopsy test by NGS (SNVs & InDels) Total Genes Covered: 118	No. of Genes Covered: 118  ABL1, ABL2, AKT1, ALK, APC, AR, ARAF, ARID1A, ARID1B, ATM, ATR, ATRX, BAP1, BARD1, BRAF, BRCA1, BRCA2, BRIP1, C11orf65, CCND1, CDH1, CDK12, CDK4, CDKN2A, CDX2, CHEK1, CHEK2, CSF1R, CTNNB1, DDR2, EGFR, ERBB2, ERBB3, ERBB4, ERCC2, ESR1, EZH2, FANCL, FBXW7, FGFR1, FGFR2, FGFR3, FGFR4, F1T3, FDXA1, FOXL2, GATA3, GNA11, GNA0, GNAS, HNF1A, HRAS, IDH1, IDH2, INPP4B, JAK1, JAK2, JAK3, KDM5C, KDM6A, KEAP1, KIT, KRAS, MAP2K1, MAP2K2, MAPK1, MET (Exon 14 skipping mutations), MLH1, MPL, MSH2, MSH6, MTOR, MUTH4, MYC, MYCN, MYDB8, NF1, NF2, NOTCH1, NPM1, NRAS, NITRK1, NTRS, PALB2, PBRM1, PDGFRA, PIK3CA, PMS2, POLD1, POLE, PPP2R2A, PICH1, PTEN, PTPN11, RAD51B, RAD51C, RAD51D, RAD54L, RAF1, RB1, RET, RHEB, RHOA, RIT1, ROS1, SETD2, SF3B1, SMAD4, SMARCB1, SMO, SPOP, SRC, STK11, TERT, TP53, TSC1, TSC2, VHL	NA
MGM2649 TAT: 14 Working Days	Minimal Residual Disease (MRD) by NGS in Solid Tumours (Liquid Biopsy) Total Genes Covered: 118	No. of Genes Covered: 118  ABL1, ABL2, AKT1, ALK, APC, AR, ARAF, ARID1A, ARID1B, ATM, ATR, ATRX, BAP1, BARD1, BRAF, BRCA1, BRCA2, BRIP1, C11orf65, CCND1, CDH1, CDK12, CDK4, CDKN2A, CDX2, CHEK1, CHEK2, CSF1R, CTNNB1, DDR2, EGFR, ERBB2, ERBB3, ERBB4, ERCC2, ESR1, EZH2, FANCL, FBXW7, FGFR1, FGFR2, FGFR3, FGFR4, FLT3, FOXL2, GATA3, GNA11, GNAQ, GNAS, HNF1A, HRAS, IDH1, IDH2, INPP4B, JAK1, JAK2, JAK3, KDM5C, KDM6A, KEAP1, KIT, KRAS, MAP2K1, MAP2K2, MAPK1, MET, MLH1, MPL, MSH2, WSH6, MTOR, MUTYH, MYC, MYCN, MYOSB, NF1, NF2, NOTCH1, NPM1, NRAS, NTR41, NTRK3, PALB2, PBRM1, PDGFRA, PIK3CA, PMS2, POLD1, POLE, PPP2R2A, PTCH1, PTEN, PTPN11, RAD51B, RAD51C, RAD51D, RAD54L, RAF1, RB1, RET, RHER, RHOA, RIT1, RO51, SETD2, SF3B1, SMAD4, SMARCB1, SMO, SPOP, SRC, STK11, TERT, TP53, TSC1, TSC2, VHL	

## HRR Genes Liquid Biopsy Panel (Breast, Ovarian, Prostate and Pancreatic Cancer)

Test Code	Test Name	Gene list (SNVs and InDels)	Gene list (Fusions)
MGM2455 TAT: 14 Working	Liquid Biopsy NGS test (SNVs and Indels) -15 Homologous Recombination Repair (HRR) pathway genes including BRCA1/2	No. of Genes Covered: 15  ATM, BARD1, BRCA1, BRCA2, BRIP1, CDK12, CHEK1, CHEK2, FANCL, PALB2, PPP2R2A, RAD51B, RAD51C, RAD51D, RAD54L	NA
Days	Total Genes Covered: 15		

#### **Breast Cancer**

Test Code	Test Name	Gene list (SNVs and InDels)	Gene list (Fusions)
MGM2732 TAT: 14 Working Days	ESR1 gene testing by NGS -Liquid Biopsy (Hot Spot Mutations) Total Genes Covered: 1 Liquid Biopsy NGS test	No. of Genes Covered : 1  ESR1  No. of Genes Covered : 15	
MGM2455 TAT: 14 Working Days	(SNVs and Indels) -15 Homologous Recom- bination Repair (HRR) pathway genes including BRCA1/2	ATM, BARD1, BRCA1, BRCA2, BRIP1, CDK12, CHEK1, CHEK2, FANCL, PALB2, PPP2R2A, RAD51B, RAD51C, RAD51D, RAD54L	NA
MGM455 TAT: 14 Working Days	Oncotrack Ultima - Liquid Biopsy test by NGS (SNVs & InDels) Total Genes Covered: 118	No. of Genes Covered: 118  ABL1, ABL2, AKT1, ALK, APC, AR, ARAF, ARID1A, ARID1B, ATM, ATR, ATRX, BAP1, BARD1, BRAF, BRCA1, BRCA2, BRIP1, C11orf65, CCND1, CDH1, CDK12, CDK4, CDKN2A, CDX2, CHEK1, CHEK2, CSF1R, CTNNB1, DDR2, EGFR, ERBB2, ERBB3, ERBB4, ERCC2, ESR1, EZH2, FANCL, FBXW7, FGFR1, FGFR2, FGFR3, FGFR4, FLT3, FOXA1, FOXL2, GATA3, GNA11, GNAQ, GNAS, HNF1A, HRAS, IDH1, IDH2, INPP4B, JAK1, JAK2, JAK3, KDM5C, KDM6A, KEAP1, KIT, KRAS, MAP2K1, MAP2K2, MAPK1, MET(Exon 14 skipping mutations), MLH1, MPL, MSH2, MSH6, MTOR, MUTYH, MYC, MYCN, MYDB8, NF1, NF2, NOTCH1, NPM1, NRAS, NTRK1, NTRK3, PALB2, PBRM1, PDGFRA, PIK3CA, PMS2, POLD1, POLE, PPP2R2A, PTCH1, PTEN, PTPN11, RAD51B, RAD51C, RAD51D, RAD54L, RAF1, RB1, RET, RHER, RHOA, RIT1, ROS1, SETD2, SF3B1, SMAD4, SMARCB1, SMO, SPOP, SRC, STK11, TERT, TP53, TSC1, TSC2, VHL	
MGM2649 TAT: 14 Working Days	Minimal Residual Disease (MRD) by NGS in Solid Tumours (Liquid Biopsy) Total Genes Covered: 118	No. of Genes Covered: 118  ABL1, ABL2, AKT1, ALK, APC, AR, ARAF, ARID1A, ARID1B, ATM, ATR, ATRX, BAP1, BARD1, BRAF, BRCA1, BRCA2, BRIP1, C11orf65, CCND1, CDH1, CDK12, CDK4, CDKN2A, CDX2, CHEK1, CHEK2, CSF1R, CTNNB1, DDR2, EGFR, ERBB2, ERBB3, ERBB4, ERCC2, ESR1, EZH2, FANCL, FBXW7, FGFR1, FGFR2, FGFR3, FGFR4, FLT3, FOXA1, FOXL2, GATA3, GNA11, GNAQ, GNAS, HNF1A, HRAS, IDH1, IDH2, INPP4B, JAK1, JAK2, JAK3, KDM5C, KDM6A, KEAP1, KIT, KRAS, MP2K1, MAPZK2, MAPK1, MET, MLH1, MPL, MSH2, MSH6, MTOR, MUTYH, MYC, MYCN, MYD88, NF1, NF2, NOTCH1, NPM1, NRAS, NTRK1, NTRK3, PALB2, PBRM1, PDGFRA, PIRS3CA, PMS2, POLD1, POLE, PPP2R2A, PTCH1, PTEN, PTPN11, RAD51B, RAD51C, RAD51D, RAD54L, RAF1, RB1, RET, RHEB, RHOA, RIT1, RO51, SETD2, SF3B1, SMAD4, SMARCB1, SMO, SPOP, SRC, STK11, TERT, TP53, TSC1, TSC2, VHL	NA

Methodology: Next Generation Sequencing
Sample Type: Peripheral blood in Streck tube (10ml X 2)
Depth: 20000X | Limit of Detection: 0.2% VAF

## **Small NGS panels**

Test Code	Test Name	Gene list (SNVs and InDels)	Gene list (Fusions)
MGM1678*	PIK3CA - therascreen® - Liquid biopsy	No. of Genes Covered : 1	
TAT: 6 Working Days	Total Genes Covered: 1 Limit of Detection: 1.82 - 7.07%	PIK3CA (11 hotspot mutations)	
MGM1677  TAT: 14  Working  Days	PIK3CA gene mutation analysis by NGS- Liquid Biopsy  Total Genes Covered: 1 Limit of Detection: 0.2% VAF	No. of Genes Covered: 1 PIK3CA (11 hotspot mutations) Depth: 20000X	NA NA
MGM403  TAT: 12  Working  Days	OncoTrack - Liquid Biopsy NGS test (EGFR, KRAS, NRAS, BRAF)  Total Genes Covered: 4 Limit of Detection: 0.2% VAF	No. of Genes Covered : 4 EGFR, KRAS, NRAS, BRAF Depth: 20000X	
MGM482  TAT: 10  Working  Days	OncoFocus Express - Liquid Biopsy NGS test for EGFR gene mutations  Total Genes Covered: 1 Limit of Detection: 0.2% VAF	No. of Genes Covered : 1 EGFR (Exon 18, 19, 20, 21) Depth: 20000X	
MGM481 TAT: 12 Working Days	OncoFocus -Liquid Biopsy NGS test for EGFR gene mutations  Total Genes Covered: 1 Limit of Detection: 0.2% VAF		NA
MGM420 TAT: 12 Working Days	OncoSelect - Liquid Biopsy NGS test for EGFR TKI resistance Total Genes Covered: 2 Limit of Detection: 0.2% VAF	No. of Genes Covered: 2 EGFR (T790M and C797S) Depth: 20000X	

**Methodology:** Next Generation Sequencing **Sample Type:** Peripheral blood in Streck tube (10ml X 2)

## OncoTrack CGP ( Liquid Biopsy )

<u>3L1</u>	CALR	DNAJB1	FGF14	HIST1H3A	KEAP1	MYCL	PIK3CD	RHOA	SUFU
3L2	CARD11	DNMT1	FGF19	HIST1H3B	KEL	MYCN	PIK3CG	RICTOR	SUZ12
VR1	CASP8	DNMT3A	FGF2	HIST1H3C	KIF5B	MYD88	PIK3R1	RIT1	SYK
VR1B	CBFB	DNMT3B	FGF23	HIST1H3D	KIT	MYOD1	PIK3R2	RNF43	TAF1
T1	CBL	DOT1L	FGF3	HIST1H3E	KLF4	NAB2	PIK3R3	ROS1	TBX3
(T2	CCND1	E2F3	FGF4	HIST1H3F	KLHL6	NBN	PIM1	RPS6KA4	TCEB1
(T3	CCND2	EED	FGF5	HIST1H3G	KMT2B	NCOA3	PLCG2	RPS6KB1	TCF3
<u>.K</u>	CCND3	EGFL7	FGF6	HIST1H3H	KMT2C	NCOR1	PLK2	RPS6KB2	TCF7L2
.OX12B	CCNE1	<u>EGFR</u>	FGF7	HIST1H3I	KMT2D	NEGR1	PMAIP1	RPTOR	TERC
IKRD11	CD274	EIF1AX	FGF8	HIST1H3J	KRAS	NF1	PMS1	RUNX1	TERT
IKRD26	CD276	EIF4A2	FGF9	HIST2H3A	LAMP1	NF2	PMS2	RUNX1T1	TET1
PC .	CD74	EIF4E	FGFR1	HIST2H3C	LATS1	NFE2L2	PNRC1	RYBP	TET2
?	CD79A	EML4	FGFR2	HIST2H3D	LATS2	NFKBIA	POLD1	SDHA	TFE3
RAF	CD79B	EP300	FGFR3	HIST3H3	LMO1	NKX2-1	POLE	SDHAF2	TFRC
RFRP1	CDC73	EPCAM	FGFR4	HLA-A	LRP1B	NKX3-1	PPARG	SDHB	TGFBR1
RID1A	CDH1	EPHA3	FH	HLA-B	LYN	NOTCH1	PPM1D	SDHC	TGFBR2
RID1B	CDK12	EPHA5	FLCN	HLA-C	LZTR1	NOTCH2	PPP2R1A	SDHD	TMEM127
RID2	CDK4	EPHA7	FLI1	HNF1A	MAGI2	NOTCH3	PPP2R2A	SETBP1	TMPRSS2
RID5B	CDK6	EPHB1	FLT1	HNRNPK	MALT1	NOTCH4	PPP6C	SETD2	TNFAIP3
SXL1	CDK8	ERBB2	FLT3	HOXB13	MAP2K1	NPM1	PRDM1	SF3B1	TNFRSF1
SXL2	CDKN1A	ERBB3	FLT4	HRAS	MAP2K2	NRAS	PREX2	SH2B3	TOP1
ГМ	CDKN1B	ERBB4	FOXA1	HSD3B1	MAP2K4	NRG1	PRKAR1A	SH2D1A	TOP2A
TR	CDKN2A	ERCC1	FOXL2	HSP90AA1	MAP3K1	NSD1	PRKCI	SHQ1	TP53
'RX	CDKN2B	ERCC2	FOXO1	ICOSLG	MAP3K13	NTRK1	PRKDC	SLIT2	TP63
URKA	CDKN2C	ERCC3	FOXP1	ID3	MAP3K14	NTRK2	PRSS8	SLX4	TRAF2
JRKB	CEBPA	ERCC4	FRS2	IDH1	MAP3K4	NTRK3	PTCH1	SMAD2	TRAF7
XIN1	CENPA	ERCC5	FUBP1	IDH2	MAPK1	NUP93	PTEN	SMAD3	TSC1
KIN2	CHD2	ERG	FYN	IFNGR1	MAPK3	NUTM1	PTPN11	SMAD4	TSC2
KL	CHD4	ERRFI1	GABRA6	IGF1	MAX	PAK1	PTPRD	SMARCA4	TSHR
2M	CHEK1	ESR1	GATA1	IGF1R	MCL1	PAK3	PTPRS	SMARCB1	U2AF1
AP1	CHEK1	ETS1	GATA1	IGF2	MDC1	PAK7	PTPRT	SMARCD1	VEGFA
ARD1	CIC	ETV1	GATA3	IKBKE	MDM2	PALB2	QKI	SMC1A	VHL
BC3	CREBBP	ETV4	GATA4	IKZF1	MDM2 MDM4	PARK2	RAB35	SMC3	VTCN1
CL10	CREBBP	ETV5	GATA4 GATA6	IL10	MED12	PARP1	RAC1	SMO	WISP3
CL2	CRLF2	ETV6	GEN1	ILTR	MEF2B	PAX3	RAD21	SNCAIP	WT1
CL2L1			GEN I	INHA		PAX5	RAD50		XIAP
CL2L1	CSF1R CSF3R	EWSR1 EZH2	GLI1	INHA	MEN1	PAX5	RAD50 RAD51	SOCS1	XPO1
					MET			SOX10	
CL2L2	CSNK1A1	FAM123B FAM175A	GNA11	INPP4A INPP4B	MGA MITF	PAX8	RAD51B RAD51C	SOX17	XRCC2 YAP1
CL6	CTCF		GNA13			PBRM1		SOX2	
COR	CTLA4	FAM46C	GNAQ	INSR	MLH1	PDCD1	RAD51D	SOX9	YES1
CORL1	CTNNA1	FANCA	GNAS	IRF2	MLL	PDCD1LG2	RAD52	SPEN	ZBTB2
CR	CTNNB1	FANCC	GPR124	IRF4	MLLT3	PDGFRA	RAD54L	SPOP	ZBTB7A
RC3	CUL3	FANCD2	GPS2	IRS1	MPL	PDGFRB	RAF1	SPTA1	ZFHX3
М	CUX1	FANCE	GREM1	IRS2	MRE11A	PDK1	RANBP2	SRC	ZNF217
IPR1A	CXCR4	FANCF	GRIN2A	JAK1	MSH2	PDPK1	RARA	SRSF2	ZNF703
RAE	CYLD	FANCG	GRM3	JAK2	MSH3	PGR	RASA1	STAG1	ZRSR2
RCA1	DAXX	FANCI	GSK3B	JAK3	MSH6	PHF6	RB1	STAG2	
CA2	DCUN1D1	FANCL	H3F3A	JUN	MST1	PHOX2B	RBM10	STAT3	
2D4	DDR2	FAS	H3F3B	KAT6A	MST1R	PIK3C2B	RECQL4	STAT4	
IP1	DDX41	FAT1	H3F3C	KDM5A	MTOR	PIK3C2G	REL	STAT5A	
G1	DHX15	FBXW7	HGF	KDM5C	MUTYH	PIK3C3	<u>RET</u>	STAT5B	
К	DICER1	FGF1	HIST1H1C	KDM6A	MYB	PIK3CA	RFWD2	STK11	
1orf30	DIS3	FGF10	HIST1H2BD	KDR	MYC	PIK3CB	RHEB	STK40	

#### **Liquid Biopsy Case Studies**

Biopsy material is degraded/damaged/insufficient and difficulty in obtaining biopsy material



**60-year-old Female** Adenocarcinoma lung | Tissue Biopsy was not feasible Test performed - OncoTrack Ultima

Gene	CDS variant details	Amino acid change/ Exon No.	Overall Depth/Mutan Allele Percentage	FDA Approved drugs against variant
ERBB2	c.2313_2324dup (ENST00000269571 .10)	p.Tyr772_Ala77 5dup/Exon20	3248X/1.4%	Trasuzumab Deruxtecan

The OncoTrack Ultima test successfully identified actionable mutation for which an FDA drug is available. This helps the clinician take appropriate treatment decisions.

#### Tissue material insufficient



#### 47-year-old male | case of NSCLC (ADCC); stage4

Due to limited tissue amount, only EGFR test was performed & found to be negative.

Test performed: LungTrack Advance

**Treated with:** First line chemotherapy (Carboplatin + Paclitaxel) and progressed after 4 cycles; now started on second line chemotherapy.

LungTrack Advance Test was performed to identify actionable driver mutations

Result - POSITIVE CLINICALLY RELEVANT VARIANT/S DETECTED							
AMP Classification CDS variant details Interpretation Treatment Recommendations Treatment Response							
EZR/ROS1(FUSION)	Total Read depth - 76x						
Tier I	NA	Oncogenic	Crizotinib, Entrectinib	Effective			
TP53 p.Ala84ArgfsTer40 (FRAMESHIFT-INS) Variant Allele Frequency - 3.79%							
Tier II	c.248_249dup (ENST00000269305.9)	Oncogenic	NA	NA NA			

#### EZR/ROS1

FDA approved Targeted therapy indicated (crizotinib, entrectinib)

#### **TP53**

Frame shift insertion oncogenic mutation was detected; indicative of poor prognosis.

#### Therapeutic response monitoring - Detection of resistance



#### 62-year-old male

Diagnosed with Adenocarcinoma lung cancer 3 years ago.

Test performed: LungTrack Advance

**Treated using** EGFR TKIs & progressed. Test performed to determine resistance mechanism.

Gene	CDS variant details	Amino acid change/ Exon No.	Overall Depth/Mutan Allele Percentage	FDA Approved drugs against variant	Drug response
EGFR	c.2237_2255 delinsT(ENST00 000275493.2)	p.Glu746_Ser752 delinsVal/Exon 19	925904X/16 %	Osimertinib/Gefit inib/Erlotinib/Afat inib/Dacomitinib	Sensitive to EGFR TKIs
EGFR	c.2369C>T(ENST 00000275493.2)	p.Thr790Met /Exon 20	123188X/14 .9%	Osimertinib (Tagrisso):Third generation TKI	Resistance to first /second generation TKIs

LungTrack Advance successfully identified resistance mutation in the cfDNA of the patient

Resistance mutation acquired by patient after treatment

#### Liquid biopsy test for HRR gene testing



#### 56-year-old Male

Prostatic acinar adenocarcinoma, grade 5

Test Performed: HRR Track and HRR somatic mutation panel

Genomic alteration	Nucleotide change	Depth / VAF	AMP Classification^	Interpretation	Treatment Recommendation
BRCA2 p.Gly3153Al afsTer10	c.9458del (ENST0000038 0152.8)	2720X / 46%	Tier 1	Deleterious	Confers sensitivity to PARP inhibitors

HRR track Liquid Biopsy test identified pathogenic mutation in BRCA2 gene at 46% VAF which can be useful for treatment decisions.

HRR somatic mutation panel on Tissue Biopsy also detected same mutation at 65.6t%. Germline confirmation is under process

#### Talk to the Experts:









