LUCENCE

Comprehensive Profiling.

UNITED™ detects clinically-relevant genomic alterations in both DNA and RNA including microsatellite instability (MSI) and tumor mutational burden (TMB) biomarkers from FFPE tissue.

Co-developed and funded by SingHealth, A*STAR, Singapore General Hospital (SGH), National Cancer Centre Singapore (NCCS)[1] and Lucence.

572	71	2
DNA targets	**RNA targets**	**weeks**
SNVs, Indels, CNVs, TMB and MSI	Fusion and splice variant mutations	Turnaround Time

Benefits of UNITED™

- Improves therapy recommendations with comprehensive total nucleic acid (DNA+RNA) genomic analysis[2]
- Matches patients to FDA-approved targeted therapies[3] and available clinical trials
- Covers all solid tumor genes recommended by NCCN Guidelines[4], ICGC[5], and TCGA[6]

Cancer Types Covered

Multiple Solid Tumor Types Including Lung, Breast, Ovarian, Stomach, Liver, Prostate, Cholangiocarcinoma, Cervix, Colon, Nasopharyngeal and others

Suitable for

- Newly diagnosed patients
- Recurrent and metastatic disease
- Patients who are not responding well to current standard-of-care treatments

[1] Ng, CC-Y. et al. Front. Mol. Biosci. 2022. 9:963243. [2] Rodon, J. et al. Nat Med. 2019;25:751–758.
[3] Li, MM. et al. J Mol Diagn. 2017;19(1):4-23. [4] NCCN Clinical Practice Guidelines in Oncology. NCCN.
[5] Zhang, J. Nat Biotechnol. 2019;37:367-369. [6] The Cancer Genome Atlas Program. National Cancer Institute.

List of FDA-approved Matched Therapy

Cancer Type	Biomarker	FDA-approved Matched Therapy
Breast cancer	*BRCA1, BRCA2*	Olaparib, Talazoparib
	PIK3CA	Alpelisib
	ERBB2 (HER2)	Lapatinib, Margetuximab, Neratinib, Pertuzumab, Trastuzumab Emtansine, Trastuzumab, Tucatinib
Cholangiocarcinoma	*FGFR2*	Infigratinib, Pemigatinib
	IDH1	Ivosidenib
Colorectal cancer	*BRAF*	Cetuximab, Encorafenib
	RAS (Wild-type)	Cetuximab, Panitumumab
Gastric cancer	*ERBB2 (HER2)*	Trastuzumab Deruxtecan, Trastuzumab
GIST	*KIT*	Imatinib
Lymphoma	*ALK*	Crizotinib
Melanoma	*BRAF*	Binimetinib, Cobimetinib, Dabrafenib, Encorafenib, Trametinib, Vemurafenib
NSCLC	*ALK*	Alectinib, Brigatinib, Ceritinib, Crizotinib, Lorlatinib
	BRAF	Dabrafenib, Trametinib
	EGFR	Afatinib, Amivantamab-vmjw, Dacomitinib, Erlotinib, Gefitinib, Osimertinib
	ROS1	Crizotinib, Entrectinib
	RET	Pralsetinib, Selpercatinib
	MET	Tepotinib, Capmatinib
	KRAS	Sotorasib
Ovarian cancer	*BRCA1, BRCA2*	Nirapirib, Olaparib, Rucaparib
Pancreatic cancer	*BRCA1, BRCA2*	Olaparib
Prostate cancer	*BRCA1, BRCA2*	Olaparib, Rucaparib
Solid tumors	*TMB-H*	Pembrolizumab
	NTRK	Entrectinib, Larotrectinib
	MSI	Ipilimumab, Nivolumab, Pembrolizumab
Thyroid cancer	*RET*	Pralsetinib, Selpercatinib
Urothelial cancer	*FGFR2, FGFR3*	Erdafitinib

Test Specifications

Methodology	Ultra-deep next-generation sequencing
Genomic alterations profiled	SNVs, CNVs, indels, fusions, splice variants, MSI, and TMB
Sample requirement	FFPE tumor tissue
Turnaround time	2 weeks

	Sensitivity	Specificity
Single Nucleotide Variants (SNVs)	98%	100%
Insertions/Deletions (Indels)	98%	100%
Fusions	91.25%	100%
MSI-High	100%	100%

	R^2 Correlation to Whole Exome Sequencing
Tumor Mutational Burden (TMB)	98.6%

- Results tested at the stated mutant allele frequencies using reference standards, FFPE cell line samples, and FFPE clinical samples.
- Sensitivity and specificity reported for SNVs and Indels are at 5% VAF

Genes with Full Coding Sequence (CDS) Coverage

Single Nucleotide Variants (SNVs), Insertions/Deletions (Indels) and Copy Number Variations (CNVs)

A

ABCB1
ABCC3
ABCG2
ABI1
ABL1
ABL2
ACVR1
ACVR1B
ACVR2A
ADGRB3
AFDN
AFF1
AFF3
AIM2
AKT1
AKT2
AKT3
ALK
AMER1
APC
AR
ARAF
ARHGAP26
ARID1A
ARID1B
ARID2
ARNT
ASXL1
ATF1
ATIC
ATM
ATR
ATRX
AURKA
AURKB
AXIN1
AXIN2
AXL

B

B2M
BAP1
BARD1
BAX
BCL10
BCL11A
BCL11B
BCL2
BCL2L11
BCL3
BCL6
BCL9
BCOR
BCORL1
BCR
BIRC3
BIRC5
BLM
BMPR1A
BRAF
BRCA1
BRCA2
BRD3
BRD4
BRIP1
BTG1
BTK
BUB1B

C

CALR
CARD11
CASP8
CBFB
CBL
CBLB
CCND1
CCND2
CCND3
CCNE1
CD274 (PD-L1)
CD44
CD74
CD79A
CD79B
CDC73
CDH1
CDH11
CDK12
CDK4
CDK6
CDK8
CDKN1A
CDKN1B
CDKN2A
CDKN2B
CDKN2C
CDX2
CEBPA
CHD4
CHEK1
CHEK2
CIC
CIP2A
CNBP
COL1A1
CRBN
CREB1
CREBBP
CRKL
CRLF2
CRTC1
CSF1R
CSF3R
CSMD3
CTCF
CTLA4
CTNNA1
CTNNB1
CUX1
CXCR4
CYLD
CYP2D6

D

DAXX
DCC
DDB2
DDIT3
DDR1
DDR2
DDX11
DDX3X
DDX5
DEK
DICER1
DIS3L2
DLC1
DNAJB1
DNMT1
DNMT3A
DNMT3B
DPYD
DROSHA
DYRK1B

E

EGF
EGFR
EIF1AX
EIF4A2
EML4
EP300
EPAS1
EPCAM
EPHA2
EPHA3
EPHB4
ERBB2 (HER2)
ERBB3
ERBB4
ERCC1
ERCC2
ERCC3
ERCC4
ERCC5
ERG
ERRFI1
ESR1
ETV1
ETV4
ETV5
ETV6
EWSR1
EXT1
EXT2
EZH1
EZH2
EZR

F

FANCA
FANCC
FANCD2
FANCE
FANCF
FANCG
FANCL
FANCM
FAS
FAT1
FAT4
FBXO11
FBXW7
FCGR2A
FCGR3A
FES
FGF19
FGF2
FGF3
FGF4
FGFR1
FGFR2
FGFR3
FGFR4
FH
FLCN
FLI1
FLNA
FLT1
FLT3
FLT4
FOXA1
FOXL2
FOXO1
FOXO3
FOXO4
FOXP1
FRK
FRS2
FUBP1

G

G6PD
GATA1
GATA2
GATA3
GLI1
GLI2
GNA11
GNAQ
GNAS
GOPC
GPC3
GREM1
GRIN2A
GRM3
GSTP1

H

H3-3A
H3-3B
H3C2
HDAC1
HDAC2
HEY1
HGF
HIF1A
HLA-A
HLA-C
HLF
HNF1A
HOOK3
HOXB13
HRAS
HSP90AA1
HSP90AB1
HSPH1

I

ID1
ID2
ID3
IDH1
IDH2
IGF1R
IGF2
IKBKB
IKBKE
IKZF1
IL2
IL21R
IL6ST
IL7R
INPP4B
IRF4
IRS2
ITK

J

JAK1
JAK2
JAK3
JUN

K

KAT6A
KAT6B
KDM4C
KDM5A
KDM5C
KDM6A
KDR
KEAP1
KIF5B
KIT
KLF4
KLF6
KMT2A
KMT2C
KMT2D
KNL1
KRAS

L

LATS1
LATS2
LCK
LEPR
LIFR
LMO1
LPP
LRP1B
LTK
LZTR1

M

MAF
MAFB
MALT1
MAML2
MAP2K1 (MEK1)
MAP2K2 (MEK2)
MAP2K4
MAP3K1
MAP3K13
MAP3K9
MAPK1
MAX
MCL1
MDM2
MDM4
*MED12^*
MEN1
MERTK
MET
MITF
MKI67
MLH1
MLLT10
MLLT3
MMP2
MMP9
MN1
MPL
MRE11
MSH2
MSH3
MSH6
MSI2
MST1R
MTAP
MTHFR
MTOR
MUC1
MUC16
MUTYH
MYB
MYC
MYCL
MYCN
MYD88
MYH11
MYH9
MYOD1

N

NBN
NCOA1
NCOA2
NCOA3
NCOA4
NCOR1
NCOR2
NF1
NF2
NFE2L2
NFKB2
NIN
NISCH
NKX2-1
NOTCH1
NOTCH2
NOTCH3
NOTCH4
NPM1
NRAS
NRG1
NSD1
NSD2

LUCENCE

NSD3
NT5C2
NTHL1
NTRK1
NTRK2
NTRK3
NUAK2
NUMA1
NUP214
NUP98
NUTM1

P

P2RY8
PAK1
PALB2
PARP1
PAX3
PAX5
PAX7
PAX8
PBRM1
PBX1
PDCD1LG2
PDE4DIP
PDGFB
PDGFRA
PDGFRB
PDPK1
PER1
PGR
PHF6
PHOX2B
PICALM
PIK3CA
PIK3CB
PIK3CD
PIK3CG
PIK3R1
PIK3R2
PIM1
PLAG1
PLCG1
PLCG2
PLK1
PML
PMS2
POLB
POLD1
POLE
POLQ
POLR2A
POT1
POU5F1
PPARG
PPM1D
PPP2R1A
PPP2R1B
PPP6C
PRDM1
PREX2
PRF1
PRKAA1
PRKAA2
PRKAR1A
PRKCB
PRRX1
PSIP1
PTCH1
PTEN
PTGS2
PTK2
PTPN11
PTPRB
PTPRC
PTPRD
PTPRK
PTPRT

Q

QKI

R

RAC1
RAD21
RAD50
RAD51
RAD51B
RAD51C
RAD51D
RAD54L
RAF1
RANBP2
RARA[2]
RASA1
RB1
RBM10
RECQL4
REL
RET
RHEB
RHOA
RHOH
RICTOR
RIT1
RNF213
RNF43
ROS1
RPS6
RRM1
RSPO2
RSPO3
RUNX1
RUNX1T1

S

SBDS
SDC4
SDHA
SDHAF2
SDHB
SDHC
SDHD
SEM1
SETBP1
SETD2
SF3B1
SGK1
SH2B3
SLC34A2
SLC45A3
SLCO1B1
SMAD2
SMAD3
SMAD4
SMARCA1
SMARCA4
SMARCB1
SMARCD1
SMARCE1
SMO
SOCS1
SOX10
SOX2
SOX9
SPEN
SPOP
SRC
SRSF2
SSX1
STAG2
STAG3
STAT3
STAT5A
STAT5B
STK11
SUFU
SUZ12
SYK

T

TAL1
TBL1XR1
TBX3
TCF12
TCF3
TCF7L2
TCL1A
TENT5C
TERT[#]
TET1
TET2
TFE3
TFEB
TGFBR2
TLX1
TMEM127
TMPRSS2
TNFAIP3
TNFRSF14
TNK2
TOP1
TOP2A
TP53
TP63
TPMT
TPR
TRAF7
TRIM24
TRIM33
TRIP11
TRRAP
TSC1
TSC2
TSHR
TTK
TYMS

U

U2AF1
UBR5
UGT1A1

V

VEGFA
VHL

W

WAS
WEE1
WRN
WT1
WWTR1

X

XPA
XPC
XPO1
XRCC1
XRCC2

Z

ZEB1
ZFHX3
ZFP36L2
ZNF384
ZNF521
ZRSR2

^ Exon 1 and 2 only. # Hotspots only. [2] Exon 5-9 only.

RNA Analysis for Fusions and Splice Variants

ABL1
AFF1
AKT3
ALK
ASPSCR1
BRAF
CBFA2T3
CCDC6
CD274 (PD-L1)
CRLF2
CRTC1
DNAJB1
EGFR
EML4
ERBB4
ERG
ESR1
ETV1
ETV6
EWSR1
FGFR1
FGFR2
FGFR3
FIP1L1
FLI1
FOXO1
FUS
GLIS2
JAK2
JAZF1
KIF5B
KMT2A
LPP
MET
NAB2
NOTCH1
NOTCH2
NPM1
NRG1
NTRK1
NTRK2
NTRK3
NUP214
NUTM1
PAX3
PAX7
PAX8
PBX1
PDGFB
PDGFRA
PDGFRB
PML
PPARG
PRKACA
PRKAR1A
RAF1
RARA
RET
ROS1
RUNX1
SET
SSX1
SSX2
STAT6
STIL
SUZ12
TAL1
TCF3
TMPRSS2
TPM3
YAP1

Lucence Service Laboratory 211 Henderson Road #04-01/02, Henderson Industrial Park, Singapore 159552

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