Next-Generation Sequencing Gene List

Next-Generation Sequencing – Genomic Signatures (DNA)									
Microsatellite Instability (MSI)					Tumor Mutational Burden (TMB)*				
Next-Generation Sequencing – Point Mutations and Indels (DNA)									
ABI1	BRD4	CRLF2	FOXO4	HOXC11	KLF4	MUC1	PATZ1	RNF213	TBL1XR1
ABL1	BTG1	DDB2	FSTL3	HOXC13	KLK2	MUTYH	PAX8	RPL10	TCEA1
ACKR3	BTK	DDIT3	GATA1	HOXD11	LASP1	MYCL (MYCL1)	PDE4DIP	SEPT5	TCL1A
AKT1	C15orf65	DNM2	GATA2	HOXD13	LMO1	NBN	PHF6	SEPT6	TFE3
AMER1 (FAM123B)	CBLC	DNMT3A	GNA11	HRAS	LMO2	NDRG1	PHOX2B	SFPQ	TFPT
AR	CD79B	EIF4A2	GPC3	IKBKE	MAFB	NKX2-1	PIK3CG	SLC45A3	THRAP3
ARAF	CDH1	ELF4	HEY1	INHBA	MAX	NONO	PLAG1	SMARCA4	TLX3
ATP2B3	CDK12	ELN	HIST1H3B	IRS2	MECOM	NOTCH1	PMS1	SOCS1	TMPRSS2
ATRX	CDKN2B	ERCC1	HIST1H4I	JUN	MED12	NRAS	POU5F1	SOX2	UBR5
BCL11B	CDKN2C	ETV4	HLF	KAT6A (MYST3)	MKL1	NUMA1	PPP2R1A	SPOP	VHL
BCL2	CEBPA	FAM46C	HMGN2P46	KAT6B	MLLT11	OLIG2	PRF1	SRC	WAS
BCL2L2	CHCHD7	FANCF	HNF1A	KCNJ5	MN1	OMD	PRKDC	SSX1	ZBTB16
BCOR	CNOT3	FEV	HOXA11	KDM5C	MPL	P2RY8	RAD21	STAG2	ZRSR2
BCORL1	COL1A1	FOXL2	HOXA13	KDM6A	MSN	PAFAH1B2	RECQL4	TAL1	
BRD3	COX6C	FOXO3	HOXA9	KDSR	MTCP1	PAK3	RHOH	TAL2	
Next-Generation Sequencing – Point Mutations, Indels and Copy Number Alterations* (DNA)									
ABL2	BRAF	COPB1	ERG	FUBP1	KLHL6	MYC	PER1	RUNX1	TFEB
ACSL3	BRCA1	CREB1	ESR1	FUS	KMT2A (MLL)	MYCN	PICALM	RUNX1T1	TFG
ACSL6	BRCA2	CREB3L1	ETV1	GAS7	KMT2C (MLL3)	MYD88	PIK3CA	SBDS	TFRC
ADGRA2	BRIP1	CREB3L2	ETV5	GATA3	KMT2D (MLL2)	MYH11	PIK3R1	SDC4	TGFBR2
AFDN	BUB1B	CREBBP	ETV6	GID4 (C17orf39)	KNL1	MYH9	PIK3R2	SDHAF2	TLX1
AFF1	CACNA1D	CRKL	EWSR1	GMPS	KRAS	NACA	PIM1	SDHB	TNFAIP3
AFF3	CALR	CRTC1	EXT1	GNA13	KTN1	NCKIPSD	PML	SDHC	TNFRSF14
AFF4	CAMTA1	CRTC3	EXT2	GNAQ	LCK	NCOA1	PMS2	SDHD	TNFRSF17
AKAP9	CANT1	CSF1R	EZH2	GNAS	LCP1	NCOA2	POLE	SEPT9	TOP1
AKT2	CARD11	CSF3R	EZR	GOLGA5	LGR5	NCOA4	POT1	SET	TP53
AKT3	CARS	CTCF	FANCA	GOPC	LHFPL6	NF1	POU2AF1	SETBP1	TPM3
ALDH2	CASP8	CTLA4	FANCC	GPHN	LIFR	NF2	PPARG	SETD2	TPM4
ALK	CBFA2T3	CTNNA1	FANCD2	GRIN2A	LPP	NFE2L2	PRCC	SF3B1	TPR
APC	CBFB	CTNNB1	FANCE	GSK3B	LRIG3	NFIB	PRDM1	SH2B3	TRAF7
ARFRP1	CBL	CYLD	FANCG	H3F3B	LRP1B	NFKB2	PRDM16	SH3GL1	TRIM26
ARHGAP26	CBLB	CYP2D6	FANCL	HERPUD1	LYL1	NFKBIA	PRKAR1A	SLC34A2	TRIM27
ARHGEF12	CCDC6	DAXX	FAS	HGF	MAF	NIN	PRRX1	SMAD2	TRIM33
ARID1A	CCNB1IP1	DDR2	FBXO11	HIP1	MALT1	NOTCH2	PSIP1	SMAD4	TRIP11
ARID2	CCND1	DDX10	FBXW7	HMGA1	MAML2	NPM1	PTCH1	SMARCB1	TRRAP
ARNT	CCND2	DDX5	FCRL4	HMGA2	MAP2K1 (MEK1)	NSD1	PTEN	SMARCE1	TSC1
ASPSCR1	CCND3	DDX6	FGF10	HNRNPA2B1	MAP2K2 (MEK2)	NSD2	PTPN11	SMO	TSC2
ASXL1	CCNE1	DEK	FGF14	HOOK3	MAP2K4	NSD3	PTPRC	SNX29	TSHR
ATF1	CD274 (PDL1)	DICER1	FGF19	HSP90AA1	MAP3K1	NT5C2	RABEP1	SOX10	TTL
ATIC	CD74	DOT1L	FGF23	HSP90AB1	MCL1	NTRK1	RAC1	SPECC1	U2AF1
ATM	CD79A	EBF1	FGF3	IDH1	MDM2	NTRK2	RAD50	SPEN	USP6
ATP1A1	CDC73	ECT2L	FGF4	IDH2	MDM4	NTRK3	RAD51	SRGAP3	VEGFA
ATR	CDH11	EGFR	FGF6	IGF1R	MDS2	NUP214	RAD51B	SRSF2	VEGFB
AURKA	CDK4	ELK4	FGFR1	IKZF1	MEF2B	NUP93	RAF1	SRSF3	VTI1A
AURKB	CDK6	ELL	FGFR1OP	IL2	MEN1	NUP98	RALGDS	SS18	WDCP
AXIN1	CDK8	EML4	FGFR2	IL21R	MET	NUTM1	RANBP17	SS18L1	WIF1
AXL	CDKN1B	EMSY	FGFR3	IL6ST	MITF	PALB2	RAP1GDS1	STAT3	WISP3
BAP1	CDKN2A	EP300	FGFR4	IL7R	MLF1	PAX3	RARA	STAT4	WRN
BARD1	CDX2	EPHA3	FH	IRF4	MLH1	PAX5	RB1	STAT5B	WT1
BCL10	CHEK1	EPHA5	FHIT	ITK	MLLT1	PAX7	RBM15	STIL	WWTR1
BCL11A	CHEK2	EPHB1	FIP1L1	JAK1	MLLT10	PBRM1	REL	STK11	XPA
BCL2L11	CHIC2	EPS15	FLCN	JAK2	MLLT3	PBX1	RET	SUFU	XPC
BCL3	CHN1	ERBB2 (HER2/NEU)	FLI1	JAK3	MLLT6	PCM1	RICTOR	SUZ12	XPO1
BCL6	CIC	ERBB3 (HER3)	FLT1	JAZF1	MNX1	PCSK7	RMI2	SYK	YWHAE
BCL7A	CIITA	ERBB4 (HER4)	FLT3	KDM5A	MRE11	PDCD1 (PD1)	RNF43	TAF15	ZMYM2
BCL9	CLP1	ERC1	FLT4	KDR (VEGFR2)	MSH2	PDCD1LG2 (PDL2)	ROS1	TCF12	ZNF217
BCR	CLTC	ERCC2	FNBP1	KEAP1	MSH6	PDGFB	RPL22	TCF3	ZNF331
BIRC3	CLTCL1	ERCC3	FOXA1	KIAA1549	MSI2	PDGFRA	RPL5	TCF7L2	ZNF384
BLM	CNBP	ERCC4	FOXO1	KIF5B	MTOR	PDGFRB	RPN1	TET1	ZNF521
BMPR1A	CNTRL	ERCC5	FOXP1	KIT	MYB	PDK1	RPTOR	TET2	ZNF703

Next-Generation Sequencing – Gene Fusions (RNA)								Variant Transcripts (RNA)
AKT3	EGFR	ESR1	MAST1	NOTCH2	PDGFRA	RAF1	TFE3	EGFR vIII
ALK	EWSR1	ETV1	MAST2	NRG1	PDGFRB	RELA	TFEB	
ARHGAP26	FGR	ETV4	MET	NTRK1	PIK3CA	RET	THADA	
AXL	FGFR1	ETV5	MSMB	NTRK2	PKN1	ROS1	TMPRSS2	
BRAF	FGFR2	ETV6	MUSK	NTRK3	PPARG	RSPO2		MET Exon 14 Skipping
BRD3	FGFR3	INSR	MYB	NUMBL	PRKCA	RSPO3		
BRD4	ERG	MAML2	NOTCH1	NUTM1	PRKCB	TERT		

** Not available in New York State.*

To order or learn more, visit **www.CarisMolecularIntelligence.com.**
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CARIS LIFE SCIENCES

CARIS MOLECULAR INTELLIGENCE®
ENABLING PRECISION MEDICINE

Comprehensive Tumor Profiling

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The Caris Molecular Intelligence® comprehensive tumor profiling approach to assess DNA, RNA and proteins reveals a molecular blueprint to guide more precise and individualized treatment decisions from among 60+ FDA-approved therapies.

DNA
Mutations, Indels & Copy Number Alterations

RNA
Fusions & Variant Transcripts

Protein
Immunohistochemistry

Technical Specifications

Sufficient tumor must be present to complete all analysis. If you have any questions, please contact Client Services at (888) 979-8669.

Technical Information	IHC	CISH	FISH
Sample Requirements *(see requisition for full details)*	1 unstained slide at 4µm thickness from FFPE block, with evaluable tumor present, per IHC test	1 unstained slide at 4µm thickness from FFPE block, with at least 20-100 evaluable tumor cells present, per CISH test	2 unstained slides at 4µm thickness from FFPE block, with at least 100 evaluable cells present and 10% tumor, per FISH test
Sensitivity/Specificity	>95%	>95%	>95%

Technical Information	Next-Generation Sequencing	
	Mutations and Copy Number Alterations (DNA)	Fusions (RNA)
Sample Requirements	FFPE block or 10 unstained slides with a minimum of 20% malignant origin. Needle biopsy is also acceptable (4-6 cores).	FFPE block or 2-5 unstained slides with a minimum of 20% malignant origin. Needle biopsy is also acceptable (4-6 cores).
Tumor Enrichment (when necessary)	Microdissection to isolate and increase the number of cancer cells to improve test performance and increase the chance for successful testing from small tumor samples	
PPV	>99%	>98%
Sensitivity	> 95% for base substitutions at ≥ 5% mutant allele frequency; > 95% for indels at ≥ 5% mutant allele frequency; >90% for copy number alterations (amplifications ≥ 6 copies)	>97%
Average Depth of Coverage (DNA) Average Depth/Count (RNA)	>750X	>30,000 Unique RNA Fragments
Number of Genes	589 genes	53 genes
Genomic Signatures	Microsatellite Instability (MSI), Tumor Mutational Burden (TMB)	–

Caris Molecular Intelligence® Associations List

The list below details the biomarkers assessed, technology platforms utilized and associated therapies or clinical trials. **Biomarkers and therapy associations may vary by the tumor type submitted.** The current and definitive list menu can be found online at www.CarisMolecularIntelligence.com/profiling-menu. *Individual assay results are always included with the final report.*

Agent	Biomarker	Platform
afatinib (assoc. in NSCLC only)	**EGFR**	NGS Mutation
	ERBB2 (Her2)	NGS Mutation
afatinib + cetuximab (combination assoc. in NSCLC only)	**EGFR T790M**	NGS Mutation
alectinib, brigatinib, ceritinib	**ALK**	IHC; NGS Fusion Analysis (RNA)
avelumab (assoc. in Merkel cell only)	**PD-L1**	IHC
cabozantinib	**MET**	NGS Fusion Analysis (RNA)
	RET	NGS Fusion Analysis (RNA)
carboplatin, cisplatin, oxaliplatin	**ATM**	NGS Mutation
	BRCA1	NGS Mutation
	BRCA2	NGS Mutation
ceritinib	**ROS1**	NGS Mutation (DNA) & Fusion Analysis (RNA)
cetuximab, panitumumab[1] (assoc. in CRC only)	**BRAF**	NGS Mutation
	KRAS	NGS Mutation
	NRAS	NGS Mutation
	PIK3CA	NGS Mutation
	PTEN	IHC
cetuximab	**EGFR**	NGS CNA
crizotinib	**ALK**	IHC; NGS Mutation (DNA) & Fusion Analysis (RNA)
	MET	NGS Mutation, CNA & Fusion Analysis (RNA)
	ROS1	NGS Fusion Analysis (RNA)
dabrafenib, cobimetinib, vemurafenib[1]	**BRAF**	NGS Mutation
dabrafenib + trametinib	**BRAF**	NGS Mutation (AnaplasticThyroid only)
dacarbazine, temozolomide	**MGMT-Methylation**	Pyrosequencing
	IDH1 (assoc. in High Grade Glioma only)	NGS Mutation
doxorubicin, liposomal-doxorubicin, epirubicin	**TOP2A**	CISH (Breast only)
durvalumab (assoc. in NSCLC only)	**PD-L1**	IHC
encorafenib + binimetinib	**BRAF**	NGS Mutation (Melanoma only)
enzalutamide, bicalutamide	**AR** (assoc. in TNBC only)	IHC
erlotinib, gefitinib (assoc. in NSCLC only)	**EGFR**	NGS Mutation
	KRAS	NGS Mutation
	PIK3CA	NGS Mutation
	cMET	NGS CNA (DNA)
	PTEN	IHC

Agent	Biomarker	Platform
everolimus, temsirolimus	**ER** (assoc. in Breast only)	IHC
	PIK3CA (excluding CRC)	NGS Mutation
exemestane + everolimus, fulvestrant, palbociclib combination therapy	**ER**	IHC
	ESR1	NGS Mutation
hormone therapies[2]	**AR**	IHC
	ER	IHC
	PR	IHC
imatinib	**KIT**	NGS Mutation
	PDGFRA	NGS Mutation
irinotecan + (cetuximab or panitumumab) + vemurafenib (assoc. in CRC only)	**BRAF V600E**	NGS Mutation
lapatinib, neratinib, pertuzumab, T-DM1	**ERBB2 (Her2)**	NGS CNA (DNA)
larotrectinib[3]	**NTRK1/2/3**	Fusion Analysis (RNA)
atezolizumab, nivolumab, pembrolizumab (assoc. in Bladder, CUP, Gastric, Kidney, Melanoma, NSCLC only)	**PD-L1**	IHC
nivolumab, pembrolizumab	**MSI**	NGS Mutation
nivolumab + ipilimumab (assoc. in CRC only)		
nivolumab (assoc. in CRC only), pembrolizumab	**MMR Deficiency**	IHC
niraparib, olaparib, rucaparib	**ATM** (assoc. in Prostate only)	NGS Mutation
	BRCA1[1]	
	BRCA2[1]	
osimertinib (assoc. in NSCLC only)	**EGFR T90M, EGFR L858R and Exon 19del**	NGS Mutation
palbociclib, abemaciclib, ribociclib (assoc. in Breast only)	**ER**	IHC
	ERBB2 (Her2)	IHC
sunitinib (assoc. in GIST only)	**KIT**	NGS Mutation
trametinib[1] (assoc. in Melanoma and Lung)	**BRAF**	NGS Mutation
trastuzumab	**ERBB2 (HER2)**	CISH, IHC, NGS Mutation *(NSCLC only)*, CNA (DNA)
	PTEN (assoc. in Breast only)	IHC
	PIK3CA (assoc. in Breast only)	NGS Mutation
vandetanib	**RET**	NGS Mutation (DNA) & Fusion Analysis (RNA)

IHC: Immunohistochemistry **CISH:** Chromogenic *in situ* Hybridization **NGS:** Next-Generation Sequencing **CNA:** Copy Number Alteration by NGS

Note: in certain instances, some biomarkers included in MI Profile or genes ordered individually will not associate with commercially available cancer therapies or clinical trials.

[1] *In CRC, cetuximab/panitumumab, vemurafenib/dabrafenib, and trametinib may be reported in combination.*
[2] *Hormone therapies may include: tamoxifen, toremifene, fulvestrant, letrozole, anastrozole, exemestane, megestrol acetate, leuprolide, goserelin, bicalutamide, flutamide, abiraterone, enzalutamide, triptorelin, abarelix, degarelix.*
[3] *TRK IHC may be performed in some tumor types. Positive results will be reflexed to fusion analysis.*

Biomarker Analysis by Tumor Type

The information below details the biomarkers analyzed by technology for the tumor type submitted. Before ordering testing services, please refer to the profile menu online (www.CarisMolecularIntelligence.com/profiling-menu) to view the most up-to-date listing of biomarkers that will be performed. Tests may vary if insufficient tumor samples are submitted.

MI Profile™					
Tumor Type	Immunohistochemistry (IHC)	Next-Generation Sequencing (NGS) *(see reverse for gene list)*			Other
		DNA	Genomic Signatures (DNA)	RNA	
Bladder	MMR, PD-L1	Mutation, CNA Analysis	MSI, TMB	Fusion Analysis	
Breast	AR, ER, Her2/Neu, MMR, PD-L1, PR, PTEN, TRKA/B/C	Mutation, CNA Analysis	MSI, TMB		Her2, TOP2A *(Chromogenic in situ Hybridization)*
Cancer of Unknown Primary	MMR, PD-L1, TRKA/B/C	Mutation, CNA Analysis	MSI, TMB		
Cervical	ER, MMR, PD-L1, PR, TRKA/B/C	Mutation, CNA Analysis	MSI, TMB		
Cholangiocarcinoma/Hepatobiliary	Her2/Neu, MMR, PD-L1	Mutation, CNA Analysis	MSI, TMB	Fusion Analysis	Her2 *(Chromogenic in situ Hybridization)*
Colorectal and Small Intestinal	MMR, PD-L1, PTEN, TRKA/B/C	Mutation, CNA Analysis	MSI, TMB		
Endometrial	ER, MMR, PD-L1, PR, PTEN, TRKA/B/C	Mutation, CNA Analysis	MSI, TMB		
Esophageal SCC	Her2/Neu, MMR, PD-L1, TRKA/B/C	Mutation, CNA Analysis	MSI, TMB		
Gastric	Her2/Neu, MMR, PD-L1, TRKA/B/C	Mutation, CNA Analysis	MSI, TMB		Her2 *(Chromogenic in situ Hybridization)*
GIST	MMR, PD-L1, PTEN, TRKA/B/C	Mutation, CNA Analysis	MSI, TMB		
Glioma	MMR, PD-L1	Mutation, CNA Analysis	MSI, TMB	Fusion Analysis	MGMT Methylation *(Pyrosequencing)*
Head & Neck	MMR, PD-L1, TRKA/B/C	Mutation, CNA Analysis	MSI, TMB		
Kidney	MMR, PD-L1, TRKA/B/C	Mutation, CNA Analysis	MSI, TMB		
Melanoma	MMR, PD-L1, TRKA/B/C	Mutation, CNA Analysis	MSI, TMB		
Merkel Cell	MMR, PD-L1, TRKA/B/C	Mutation, CNA Analysis	MSI, TMB		
Neuroendocrine/Small Cell Lung	MMR, PD-L1, TRKA/B/C	Mutation, CNA Analysis	MSI, TMB		
Non-Small Cell Lung	ALK, MMR, PD-L1, PTEN	Mutation, CNA Analysis	MSI, TMB	Fusion Analysis	
Ovarian	ER, MMR, PD-L1, PR, TRKA/B/C	Mutation, CNA Analysis	MSI, TMB		
Pancreatic	MMR, PD-L1, TRKA/B/C	Mutation, CNA Analysis	MSI, TMB		
Prostate	AR, MMR, PD-L1, TRKA/B/C	Mutation, CNA Analysis	MSI, TMB		
Salivary Gland	AR, Her2/Neu, MMR, PD-L1	Mutation, CNA Analysis	MSI, TMB	Fusion Analysis	
Sarcoma	MMR, PD-L1, TRKA/B/C	Mutation, CNA Analysis	MSI, TMB		
Thyroid	MMR, PD-L1	Mutation, CNA Analysis	MSI, TMB	Fusion Analysis	
Uterine Serous	ER, Her2/Neu, MMR, PD-L1, PR, PTEN, TRKA/B/C	Mutation, CNA Analysis	MSI, TMB		Her2 *(Chromogenic in situ Hybridization)*
Other Tumors	MMR, PD-L1, TRKA/B/C	Mutation, CNA Analysis	MSI, TMB		

MMR = Mismatch Repair proteins: MLH1, MSH2, MSH6, PMS2

For PD-L1 IHC testing, Dako antibody 22c3 is run for all NSCLC, Cervical, Gastric and Gastroesophageal Junction (GEJ) cancers. 22c3 will be added to Bladder cancers with a CPS score, run side-by-side with SP142. Dako antibody 22c3 is available upon request for other tumor types. For TRK IHC positive results, reflex Fusion testing will be performed.