Indications for use xT-DNA

The Tempus xT-DNA is a next generation sequencing-based in vitro diagnostic device intended for use in the detection of single nucleotide variants (SNVs) and insertion and deletion alterations (INDELs) in 648 genes using DNA isolated from formalin-fixed paraffin embedded (FFPE) tumor tissue specimens from previously diagnosed cancer patients. The xT-DNA assay is a single-site assay performed at Tempus Labs, Inc.

Limitations

The Tempus xT-DNA assay is intended to provide tumor gene alteration profiling to be used by qualified health care professionals in accordance with professional guidelines in oncology for patients with solid malignant neoplasms, however such additional tumor profiling results are not prescriptive or conclusive for labeled use of any specific therapeutic product.

Contradictions

There are no known contraindications.

Warnings and Precautions

Alterations reported may include somatic (not inherited) or germline (inherited) variants; however, the test does not distinguish between germline and somatic alterations. The test does not provide information about susceptibility to cancer. Biopsy may pose a risk to the patient when archival tissue is not available for use with the assay. The patient's physician should determine whether the patient is a candidate for biopsy.

Product Description

Tempus xT-DNA is a targeted panel of 648 genes enriched for clinically relevant genes and most commonly mutated cancer driver genes with additional genes of emerging clinical significance focused on immediately actionable mutations. Tempus works directly with oncologists and pathologists to obtain tumor samples. Once a physician and patient determine that Tempus testing is the right next step, the test can be ordered by the physician.

Our kits include everything needed for specimen collection, including easy-to-follow instructions, specimen guidelines, and packaging for convenient and fast shipping to our lab. Ordering physicians receive a comprehensive report for each patient that highlights key findings, including actionable treatments, that can be immediately translated into cancer patient care.

Ordering a Test

Tempus xT-DNA assay can be ordered using the Tempus requisition found in the Tempus CE Clinical Trials Solid Tumor Collection Kit. The requisition should be fully completed, include at least two patient identifiers, and be signed by the ordering physicians or another authorized medical professional. The Tempus CE Clinical Trials Solid Tumor Collection Kit contains all necessary instructions to package and submit samples for testing.

Results/Reports

CE Marked Results:

Tempus' xT-DNA assay is CE marked for detection of somatic single nucleotide variants (SNVs) and insertion and deletion alterations (INDELs) using DNA in solid tumors. SNV and INDEL variant types include HGVS nomenclature that describes the position and alteration; nomenclature may include coding (c.), and/or protein (p.), and/or genomic (g.) descriptors.

Professional Services:

Copy number variants (CNVs) and rearrangements detected from DNA are not included in the CE mark. Copy number variants are reported as an amplification (Copy Number Gain) or a deletion (Copy Number Loss). DNA fusions can be identified on the initial clinical report as a Chromosomal Rearrangement.

Procedure

The Tempus xT-DNA oncology assay is a 648-gene hybrid capture next generation sequencing (NGS) panel designed to detect actionable oncologic targets in solid tumor samples. This includes coverage for single nucleotide variants (SNVs) and insertion-deletion (INDEL) events using DNA extracted from formalin-fixed, paraffin embedded (FFPE) tumor samples. xT-DNA library preparation is performed using IDT unique dual-index adapters, followed by hybrid capture with custom-designed IDT xGen Lockdown probes. The final library is sequenced on an Illumina NovaSeq 6000 instrument. The clinical report provides doctors with diagnostic, prognostic, therapeutic evidence and clinical trial options based on the molecular results of the test.

xT-DNA Performance Characteristics

Validation Summary

The Tempus xT-DNA next generation sequencing assay is designed to detect actionable oncologic targets by sequencing tumor samples. The xT-DNA assay covers 648 genes spanning ~3.6mB of genomic space. From DNA sequencing, somatic insertions and deletions (INDELs) and single nucleotide variants (SNVs) are detected. The assay requires specimens with a tumor content of 20% post macrodissection. An FFPE tumor sample is sequenced, performed at 500x depth of coverage. Performance specifications are listed on Table 1 below. These results establish high sensitivity and specificity for the xT-DNA assay.

Table 1

Variant Class	Limit of Detection	Sensitivity (%)	Specificity (%)
Single Nucleotide Variants (SNV)	5% VAF	98.2	99.95
Insertions and Deletions (INDEL)	5% VAF	91.8	99.9

TEMPUS SPECIMEN GUIDELINES

To ensure accurate molecular profiling, please follow the specimen guidelines below when submitting tumor samples.

TISSUE REQUIREMENTS

- Patient material, labeled with two identifiers
- Tumor samples should be from the most recent procedure, if adequate for testing, **should be less than 6 years old**
- FFPE Fixation Requirements
  - 10% formalin fixation (neutral buffered) for 6–72 hours, paraffin embedded
  - No decalcification of the samples is preferred (EDTA is accepted)
- Tumor required to be at least 20%* of the sample by ratio of tumor nuclei to benign nuclei
- Optimal tumor size = 25 mm^2, minimum = 5 mm^2

BLOCKS *Preferred collection method

1 **FFPE block with greatest tumor content**

1 **H&E stained slide, optional**

If you would like us to evaluate quality, please send multiple blocks with a return address.

OR

SLIDES

10 **FFPE unstained slides for NGS 5µm sections on positively charged, unbaked slides**

1 **Terminal H&E stained slide**

**Submit 10 additional slides if tissue size is <25 mm2

Tempus CE Clinical Trials Solid Tumor Collection Kit

Components

FedEx shipping envelope

Biohazard bag

Sticker seal

2 Slide Cases

(each case can hold 10 slides)

Requisition form

Gene List

ABCB1	BLM	CHEK2**	EPHB1	FGFR2	HLA-C	JAK1	MIB1	PAK1	PTCH1	SH2B3	TFEC
ABCC3	BMPR1A**	CIC	EPHB2	FGFR3	HLA-DMA	JAK2	MITF	PALB2**	PTCH2	SHH	TGFBR1
ABL1	BRAF	CIITA	EPOR	FGFR4	HLA-DMB	JAK3	MKI67	PALLD	PTEN**	SLC26A3	TGFBR2
ABL2	BRCA1**	CKS1B	ERBB2 (HER2)	FH**	HLA-DOA	JUN	MLH1**	PAX3	PTPN11	SLC4A2	TGIT
ABRAXAS1	BRCA2**	CREBBP	ERBB3	FHIT	HLA-DOB	KAT6A	MLH3	PAX5	PTPN13	SLC9A3R1	TMEM127
ACTA2	BRD4	CRKL	ERBB4	FLCN**	HLA-DPA1	KDM5A	MLLT3	PAX7	PTPN22	SLIT2	TMEM173
ACVR1 (ALK2)	BRIP1**	CRLF2	ERCC1	FLT1	HLA-DPB1	KDM5C	MN1	PAX8	PTPRD	SLX4	TMPRSS2
ACVR1B	BTG1	CSF1R	ERCC2	FLT3	HLA-DPB2	KDM5D	MPL	PBRM1	PTPRT	SMAD2	TNF
AGO1	BTK	CSF3R	ERCC3	FLT4	HLA-DQA1	KDM6A	MRE11	PCBP1	QKI	SMAD3	TNFAIP3
AJUBA	BUB1B	CTC1	ERCC4	FNTB	HLA-DQA2	KDR	MS4A1	PCDH1	RAC1	SMAD4**	TNFRSF14
AKT1	C11orf65	CTCF	ERCC5	FOXA1	HLA-DQB1	KEAP1	MSH2**	PDCD1LG2	RAD21	SMARCA1	TNFRSF17
AKT2	C3orf70	CTLA4	ERCC6	FOXL2	HLA-DQB2	KEL	MSH3**	PDGFRA	RAD50	SMARCA4	TNFRSF9
AKT3	C8orf34	CTNNA1	ERG	FOXO1	HLA-DRA	KIF1B	MSH6**	PDGFRB	RAD51	SMARCB1	TOP1
ALK	CALR	CTNNB1	ERRFI1	FOXO3	HLA-DRB1	KIT	MTAP	PDK1	RAD51B	SMARCE1	TOP2A
AMER1	CARD11	CTRC	ESR1	FOXP1	HLA-DRB5	KLF4	MTHFD2	PHF6	RAD51C**	SMC1A	TP53**
APC**	CARM1	CUL1	ETS1	FOXQ1	HLA-DRB6	KLHL6	MTHFR	PHGDH	RAD51D**	SMC3	TP63
APLNR	CASP8	CUL3	ETS2	FRS2	HLA-E	KLLN	MTOR	PHLPP1	RAD54L	SMO	TPMT
APOB	CASR	CUL4A	ETV1	FUBP1	HLA-F	KMT2A	MTRR	PHLPP2	RAF1	SOCS1	TPMT
AR	CBFB	CUL4B	ETV4	FUS	HLA-G	KMT2B	MUTYH**	PHOX2B	RANBP2	SOD2	TRAF3	
ARAF	CBL	CUX1	ETV5	G6PD	HNF1A	KMT2C	MYB	PIK3A4	RARA	SOX10	TRAF7	
ARHGAP26	CBLB	CXCR4	ETV6**	GABRA6	HNF1B	KMT2D	MYC	PIK3C2B	RASA1	SOX2	TSC1**	
ARHGAP35	CBLC	CYLD	EWSR1	GALNT12	HOXA11	KRAS	MYCL	PIK3CA	RB1**	SOX9	TSC2**	
ARID1A	CBR3	CYP1B1	EZH2	GATA1	HOXB13	L2HGDH	MYCN	PIK3CB	RBM10	SPEN	TSHR	
ARID1B	CCDC6	CYP2D6	FAM46C	GATA2**	HRAS	LAG3	MYD88	PIK3CD	RECQL4	SPINK1	TUSC3	
ARID2	CCND1	CYP3A5	FANCA	GATA3	HSD11B2	LATS1	MYH11	PIK3CG	RET**	SPOP	TYMS	
ARID5B	CCND2	CYSLTR2	FANCB	GATA4	HSD3B1	LCK	NBN**	PIK3R1	RHEB	SPRED1	U2AF1	
ASNS	CCND3	DAXX	FANCC	GATA6	HSD3B2	LDLR	NCOR1	PIK3R2	RHOA	SRC	UBE2T	
ASPSCR1	CCNE1	DDB2	FANCD2	GEN1	HSP90AA1	LEF1	NCOR2	PIM1	RICTOR	SRSF2	UGT1A1	
ASXL1	CD19	DDR2	FANCE	GLI1	HSPH1	LMNA	NF1	PLCG1	RINT1	STAG2	UGT1A9	
ATIC	CD22	DDX3X	FANCF	GLI2	IDH1	LMO1	NF2**	PLCG2	RIT1	STAT3	UMPS	
ATM**	CD274 (PD-L1)	DICER1	FANCG	GNA11	IDH2	LRP1B	NFE2L2	PML	RNF139	STAT4	VEGFA	
ATP1B	CD40	DIRC2	FANCI	GNA13	IDO1	LYN	NFKBIA	PMS1	RNF43	STAT5A	VEGFB	
ATR	CD70	DIS3	FANCL	GNAQ	IFIT1	LZTR1	NHP2	PMS2**	ROS1	STAT5B	VHL**	
ATRX	CD79A	DIS3L2	FANCM	GNAS	IFIT2	MAD2L2	NKX2-1	POLD1**	RPL5	STAT6	VSIR	
AURKA	CD79B	DKC1	FAS	GPC3	IFIT3	MAF	NOP10	POLE**	RPS15	STK11**	WEE1	
AURKB	CDC73	DNM2	FAT1	GPS2	IFNAR1	MAFB	NOTCH1	POLH	RPS6KB1	SUFU	WNK1	
AXIN1	CDH1**	DNMT3A	FBXO11	GREM1	IFNAR2	MAGI2	NOTCH2	POLQ	RPTOR	SUZ12	WNK2	
AXIN2**	CDK12	DOT1L	FBXW7	GRIN2A	IFNGR1	MALT1	NOTCH3	POT1	RRM1	SYK	WRN	
AXL	CDK4	DPYD	FCGR2A	GRM3	IFNGR2	MAP2K1	NOTCH4	POU2F2	RSF1	SYNE1	WT1**	
B2M	CDK6	DYNC2H1	FCGR3A	GSTP1	IFNL3	MAP2K2	NPM1	PPARA	RUNX1**	TAF1	XBA	
BAP1	CDK8	EBF1	FDPS	H19	IKBKE	MAP2K4	NQO1	PPARD	RUNX1T1	TANC1	XPC	
BARD1	CDKN1A	ECT2L	FGF1	H3F3A	IKZF1	MAP3K1	NRAS	PPARG	RXRA	TAP1	XPO1	
BCL10	CDKN1B	EGF	FGF10	HAS3	IL10RA	MAP3K7	NRG1	PPM1D	SC05	TAP2	XRCC1	
BCL11B	CDKN1C	EGFR**	FGF14	HAVCR2	IL15	MAPK1	NSD1	PPP1R15A	SDHA	TARBP2	XRCC2	
BCL2	CDKN2A **	EGLN1	FGF2	HDAC1	IL2RA	MAX	NSD2	PPP2R1A	SDHAF2**	TBC1D12	XRCC3	
BCL2L1	CDKN2B	EIF1AX	FGF23	HDAC2	IL6R	MC1R	NT5C2	PPP2R2A	SDHB **	TBL1XR1	YEATS4	
BCL2L11	CDKN2C	ELF3	FGF3	HDAC4	IL7R	MCL1	NTHL1	PPP6C	SDHC**	TBX3	ZFHX3	
BCL6	CEBPA**	ELOC (TCEB1)	FGF4	HGF	ING1	MDM2	NTRK1	PRCC	SDHD**	TCF3	ZMYM3	
BCL7A	CEP57	EMSY	FGF5	HIF1A	INPP4B	MDM4	NTRK2	PREM1	SEC23B	TCF7L2	ZNF217	
BCLAF1	CFTR	ENO1	FGF6	HIST1H1E	IRF1	MED12	NTRK3	PREX2	SEMA3C	TCL1A	ZNF471	
BCOR	CHD2	EP300	FGF7	HIST1H3B	IRF2	MEF2B	NUDT15	PRKAR1A	SETBP1	TERT*	ZNF620	
BCORL1	CHD4	EPCAM**	FGF8	HIST1H4E	IRF4	MEN1**	NUP98	PRKDC	SETD2	TET2	ZNF750	
BCR	CHD7	EPHA2	FGF9	HLA-A	IRS2	MET	OLIG2	PRKN	SF3B1	TFE3	ZNRF3	
BIRC3	CHEK1	EPHA7	FGFR1	HLA-B	ITPKB	MGMT	P2RY8	PRSS1	SGK1	TFEB	ZRSR2	

* Includes promoter region

**Genes in which incidental germline findings are reported