

**648 gene panel focused on actionable mutations by DNA sequencing**

- Specimen: tumor and matched normal (peripheral blood or saliva)
- Single nucleotide variants, indels, and copy number variants are detected in 648 genes
- Genomic rearrangements are detected on 22 genes by DNA sequencing (others detected by RNA sequencing)
- Microsatellite instability status and tumor mutational burden are included in the xT report
- Average coverage ~ 500x

**Full transcriptome by RNA sequencing**

- Specimen: tumor or heme
- Unbiased gene rearrangement detection from fusion transcripts are clinically validated
- Whole transcriptome RNA expression counts are analytically validated
- Sequenced at a minimum of 25 million reads, average 50 million reads

ABCB1	BLM**	CHEK2**	EPHB1	FGFR2	HLA-DMA	JAK3	MLH1**	PAX5	PTPN22	SLX4	TNF
ABCC3	BMPRIA**	CIC	EPHB2	FGFR3	HLA-DMB	JUN	MLH3	PAX7	PTPRD	SMAD2	TNFAIP3
ABL1	BRAF	CIITA	EPOR	FGFR4	HLA-DOA	KAT6A	MLLT3	PAX8	PTPRT	SMAD3	TNFRSF14
ABL2	BRCA1**	CKS1B	ERBB2	FH**	HLA-DOB	KDM5A	MN1	PBRM1	QKI	SMAD4**	TNFRSF17
ABRAXAS1	BRCA2**	CREBBP	(HER2)	FHIT	HLA-DPA1	KDM5C	MPL	PCBP1	RAC1	SMARCA1	TNFRSF9
ACTA2	BRD4	CRKL	ERBB3	FLCN**	HLA-DPB1	KDM5D	MRE11	PDCD1	RAD21	SMARCA4**	TOP1
ACVR1	BRIP1**	CRLF2	ERBB4	FLT1	HLA-DPB2	KDM6A	MS4A1	PDCD1LG2	RAD50	SMARCB1**	TOP2A
(ALK2)	BTG1	CSF1R	ERCC1	FLT3	HLA-DQA1	KDR	MSH2**	PDGFRA**	RAD51	SMARCE1	TP53**
ACVR1B	BTK	CSF3R	ERCC2	FLT4	HLA-DQA2	KEAP1	MSH3**	PDGFRB	RAD51B	SMC1A	TP63
AGO1	BUB1B	CTC1	ERCC3	FNTB	HLA-DQB1	KEL	MSH6**	PDK1	RAD51C**	SMC3	TPM1
AJUBA	C11orf65	CTCF	ERCC4	FOXA1	HLA-DQB2	KIF1B	MTAP	PHF6	RAD51D**	SMO	TPMT
AKT1	C3orf70	CTLA4	ERCC5	FOXL2	HLA-DRA	KIT**	MTHFD2	PHGDH	RAD54L	SOC51	TRAF3
AKT2	C8orf34	CTNNA1	ERCC6	FOXO1	HLA-DRB1	KLF4	MTHFR	PHLPP1	RAF1	SOD2	TRAF7
AKT3	CALR	CTNNB1	ERG	FOXO3	HLA-DRB5	KLHL6	MTOR	PHLPP2	RANBP2	SOX10	TSC1**
ALK	CARD11	CTRC	ERRFI1	FOXP1	HLA-DRB6	KLLN	MTRR	PHOX2B**	RARA	SOX2	TSC2**
AMER1	CARM1	CUL1	ESR1	FOXQ1	HLA-E	KMT2A	MUTYH**	PIAS4	RASA1	SOX9	TSHR
APC**	CASP8	CUL3	ETS1	FRS2	HLA-F	KMT2B	MYB	PIK3C2B	RB1**	SPEN	TUSC3
APLNLR	CASR	CUL4A	ETS2	FUBP1	HLA-G	KMT2C	MYC	PIK3CA	RBM10	SPINK1	TYMS
APOB	CBFB	CUL4B	ETV1	FUS	HNF1A	KMT2D	MYCL	PIK3CB	RECQL4	SPOP	U2AF1
AR	CBL	CUX1	ETV4	G6PD	HNF1B	KRAS	MYCN	PIK3CD	RET**	SPRED1	UBE2T
ARAF	CBLB	CXCR4	ETV5	GABRA6	HOXA11	L2HGDH	MYD88	PIK3CG	RHEB	SRC	UGT1A1
ARHGAP26	CBLC	CYLD	ETV6**	GALNT12	HOXB13	LAG3	MYH11	PIK3R1	RHOA	SRSF2	UGT1A9
ARHGAP35	CBR3	CYP11B1	EWSR1	GATA1	HRAS	LATS1	NBN**	PIK3R2	RICTOR	STAG2	UMPS
ARID1A	CCDC6	CYP2D6	EZH2	GATA2**	HSD11B2	LCK	NCOR1	RIN1	RINT1	STAT3	VEGFA
ARID1B	CCND1	CYP3A5	FAM46C	GATA3	HSD3B1	LDLR	NCOR2	PLCG1	RIT1	STAT4	VEGFB
ARID2	CCND2	CYSLTR2	FANCA	GATA4	HSD3B2	LEF1	NF1**	PLCG2	RNF139	STAT5A	VHL**
ARID5B	CCND3	DAXX	FANCB	GATA6	HSP90AA1	LMNA	NF2**	PML	RNF43	STAT5B	VSI1
ASNS	CCNE1	DDB2	FANCC	GEN1	HSPH1	LMO1	NFE2L2	PMS1	ROS1	STAT6	WEE1
ASPSCR1	CD19	DDR2	FANCD2	GLI1	IDH1	LRP1B	NFKBIA	PMS2**	RPL5	STK11**	WNK1
ASXL1	CD22	DDX3X	FANCE	GLI2	IDH2	LYN	NHP2	POLD1**	RPS15	SUFU**	WNK2
ATIC	CD274	DICER1**	FANCF	GNA11	IDO1	LZTR1	NKX2-1	POLE**	RPS6KB1	SUZ12	WRN
ATM**	(PD-1)	DIRC2	FANCG	GNA13	IFIT1	MAD2L2	NOTP10	POLH	RPTOR	SYK	WT1**
ATP7B	CD40	DIS3	FANCI	GNAQ1	IFIT2	MAF	NOTCH1	POLQ	RRM1	SYNE1	XPA
ATR	CD70	DIS3L2	FANCL	GNAS	IFIT3	MAFB	NOTCH2	POT1	RSF1	TAF1	XPC
ATRX	CD79A	DKC1	FANCM	GPC3	IFNAR1	MAGI2	NOTCH3	POU2F2	RUNX1**	TANC1	XPO1
AURKA	CD79B	DNM2	FAS	GPS2	IFNAR2	MALT1	NOTCH4	PPARA	RUNX1T1	TAP1	XRCC1
AURKB	CDC73	DNMT3A	FAT1	GREM1	IFNGR1	MAP2K1	NPM1	PPARD	RXRA	TAP2	XRCC2
AXIN1	CDH1**	DOT1L	FBXO11	GRIN2A	IFNGR2	MAP2K2	NQO1	PPARG	SCG5	TARBP2	XRCC3
AXIN2**	CDK12	DPYD	FBXW7	GRM3	IFNL3	MAP2K4	NRAS	PPM1D	SDHA**	TBC1D12	YEATS4
AXL	CDK4**	DYNC2H1	FCGR2A	GSTP1	IKBKE	MAP3K1	NRG1	PPP1R15A	SDHAF2**	TBL1XR1	ZFH3
B2M	CDK6	EBF1	FCGR3A	H19	IKZF1	MAP3K7	NSD1	PPP2R1A	SDHB**	TBX3	ZMYM3
BAP1**	CDK8	ECT2L	FDPS	H3F3A	IL10RA	MAPK1	NSD2	PPP2R2A	SDHC**	TCF3	ZNF217
BARD1**	CDKN1A	EGF	FGF1	HAS3	IL15	MAX**	NT5C2	PPP6C	SDHD**	TCF7L2	ZNF471
BCL10	CDKN1B	EGFR**	FGF10	HAVCR2	IL2RA	MC1R	NTHL1**	PRCC	SEC23B	TCL1A	ZNF620
BCL11B	CDKN1C	EGLN1	FGF14	HDAC1	IL6R	MCL1	NTRK1	PRDM1	SEMA3C	TERT*	ZNF750
BCL2	CDKN2A**	E1F1AX	FGF2	HDAC2	IL7R	MDM2	NTRK2	PREX2	SETBP1	TET2	ZNRF3
BCL2L1	CDKN2B	ELF3	FGF23	HDAC4	ING1	MDM4	NTRK3	PRKAR1A**	SETD2	TFE3	ZRSR2
BCL2L11	CDKN2C	ELOC	FGF3	HGF	INPP4B	MED12	NUDT15	PRKDC	SF3B1	TFEB	
BCL6	CEBPA**	(TCEB1)	FGF4	HIF1A	IRF1	MEF2B	NUP98	PRKN	SGK1	TFEC	
BCL7A	CEP57	EMSY	FGF5	HIST1H1E	IRF2	MEN1**	OLIG2	PRSS1	SH2B3	TGFBR1	
BCLAF1	CFTR	ENG	FGF6	HIST1H3B	IRF4	MET**	P2RY8	PTCH1**	SHH	TGFBR2	
BCOR	CHD2	EP300	FGF7	HIST1H4E	IRS2	MGMT	PAK1	PTCH2	SLC26A3	TIGIT	
BCORL1	CHD4	EPCAM**	FGF8	HLA-A	ITPKB	MIB1	PALB2**	PTEN**	SLC47A2	TMEM127**	
BCR	CHD7	EPHA2	FGF9	HLA-B	JAK1	MITF	PALLD	PTPN11	SLC9A3R1	TMEM173	
BIRC3	CHEK1	EPHA7	FGFR1	HLA-C	JAK2	MKI67	PAX3	PTPN13	SLIT2	TMPPRSS2	

**GENE REARRANGEMENTS BY DNA SEQUENCING†**

ABL1	EGFR**	FGFR3	NTRK2	PML	TFE3
ALK	ETV6**	MYB	NTRK3	RARA	TMPPRSS2
BCR	EWSR1	NRG1	PAX8	RET	
BRAF	FGFR2	NTRK1	PDGFRA	ROS1	

\* Includes promoter region

\*\* Genes in which incidental germline findings are reported

In addition to reporting on somatic variants, when a normal sample is provided, Tempus reports germline incidental findings on a limited set of variants associated with inherited cancer syndromes within genes selected based on recommendations from the American College of Medical Genetics (ACMG), the National Comprehensive Cancer Network (NCCN), and/or published literature.

† Exons and select intronic regions only. Detailed list provided upon request.

## Germline Incidental Findings Gene List

APC	APC-associated conditions	POLD1*	Polymerase proofreading-associated polyposis
ATM	Ataxia-Telangiectasia, Breast cancer susceptibility, Pancreatic cancer susceptibility	POLE*	Polymerase proofreading-associated polyposis
AXIN2	Oligodontia-colorectal cancer syndrome	PRKAR1A	Carney complex
BAP1	BAP1 tumor predisposition syndrome	PTCH1	Gorlin syndrome, Basal cell nevus syndrome
BARD1	Breast cancer susceptibility	PTEN	PTEN hamartoma tumor syndrome
BLM	Bloom syndrome	RAD51C	Ovarian cancer susceptibility, Breast cancer susceptibility, Fanconi anemia
BMPR1A	Juvenile polyposis	RAD51D	Ovarian cancer susceptibility, Breast cancer susceptibility
BRCA1	Hereditary breast and ovarian cancer	RB1	Retinoblastoma
BRCA2	Hereditary breast and ovarian cancer, Fanconi anemia	RET	Multiple endocrine neoplasia type 2, Familial medullary thyroid cancer
BRIP1	Ovarian cancer susceptibility, Fanconi anemia	RUNX1	Acute myeloid leukemia susceptibility
CDH1	Hereditary diffuse gastric cancer, Breast cancer susceptibility	SDHA	Hereditary paraganglioma-pheochromocytoma syndrome
CDK4	Melanoma susceptibility	SDHAF2	Hereditary paraganglioma-pheochromocytoma syndrome
CDKN2A	Melanoma-pancreatic cancer syndrome	SDHB	Hereditary paraganglioma-pheochromocytoma syndrome
CEBPA	Acute myeloid leukemia susceptibility	SDHC	Hereditary paraganglioma-pheochromocytoma syndrome
CHEK2	Breast cancer susceptibility, Colon cancer susceptibility	SDHD	Hereditary paraganglioma-pheochromocytoma syndrome
DICER1	DICER1 tumor predisposition syndrome	SMAD4	Juvenile polyposis, Hereditary hemorrhagic telangiectasia
EGFR*	Lung cancer susceptibility, TKI resistance	SMARCA4	Rhabdoid tumor predisposition syndrome
EPCAM*	Lynch syndrome	SMARCB1	Rhabdoid tumor predisposition syndrome, Schwannomatosis
ETV6	Leukemia susceptibility, thrombocytopenia susceptibility	STK11	Peutz-Jeghers syndrome
FH	Hereditary leiomyomatosis and renal cell cancer	SUFU	Gorlin syndrome, Basal cell nevus syndrome
FLCN	Birt-Hogg-Dube syndrome	TMEM127	Hereditary paraganglioma-pheochromocytoma syndrome
GATA2	GATA2 deficiency with susceptibility to myeloid malignancies	TP53	Li-Fraumeni syndrome
KIT	Familial gastrointestinal stromal tumor	TSC1	Tuberous sclerosis complex
MAX	Hereditary paraganglioma-pheochromocytoma syndrome	TSC2	Tuberous sclerosis complex
MEN1	Multiple endocrine neoplasia type 1	VHL	Von Hippel-Lindau syndrome
MET	Hereditary papillary renal cell carcinoma	WT1	WT1-related Wilms tumor
MLH1	Lynch syndrome, Constitutional mismatch repair deficiency		
MSH2	Lynch syndrome, Constitutional mismatch repair deficiency		
MSH3	MSH3-associated polyposis		
MSH6	Lynch syndrome, Constitutional mismatch repair deficiency		
MUTYH	MUTYH-associated polyposis		
NBN	Nijmegen breakage syndrome, Breast cancer susceptibility		
NF1	Neurofibromatosis type 1		
NF2	Neurofibromatosis type 2		
NTHL1	NTHL1 tumor syndrome, NTHL1-associated polyposis		
PALB2	Breast cancer susceptibility, Pancreatic cancer susceptibility, Ovarian cancer susceptibility, Fanconi anemia		
PDGFRA	Familial gastrointestinal stromal tumor, GIST-plus syndrome		
PHOX2B	Neuroblastoma susceptibility		
PMS2	Lynch syndrome, Constitutional mismatch repair deficiency		

This list is composed of genes associated with inherited cancer syndromes included on the xT panel and selected based on recommendations from the American College of Medical Genetics (ACMG), the National Comprehensive Cancer Network (NCCN) and/or published literature.

The primary focus of the xT panel is somatic reporting. Tempus also offers a separately ordered validated germline hereditary cancer panel through GeneDx.

**\*Special reporting** – EGFR: p.T790M, p.L792H, p.C797G, p.C797S (resistance alterations only); EPCAM: Large deletions only; POLD1: Exonuclease domain only; POLE: Exonuclease domain only.