

## Appendix 1 1,021 cancer-related gene panel which used to detect genetic variation by next-generation sequencing in tissue and plasma ctDNA samples

### All exons

ABL1	ABL2	ACVR1B	AKT1	AKT2	AKT3	ALK	APC	AR	ARAF
ARID1A	ARID1B	ARID2	ASXL1	ATM	ATR	ATRX	AURKA	AURKB	AXIN1
AXIN2	AXL	B2M	BAP1	BARD1	BCL2	BCL2L1	BCOR	BLM	BMPR1A
BRAF	BRCA1	BRCA2	BRD4	BRIP1	BTK	C11orf30	CASP8	CBFB	CBL
CCND1	CCND2	CCND3	CCNE1	CD274	CDC73	CDH1	CDK12	CDK4	CDK6
CDK8	CDKN1A	CDKN1B	CDKN2A	CDKN2B	CDKN2C	CEBPA	CHEK1	CHEK2	CIC
CREBBP	CRKL	CSF1R	CTCF	CTNNA1	CTNNB1	CUL3	CYLD	DAXX	DDR1
DDR2	DICER1	DNMT3A	EGFR	ELAC2	EME2	EP300	EPAS1	EPCAM	EPHA2
EPHA3	EPHA5	EPHB2	EPHB6	ERBB2	ERBB3	ERBB4	ERCC1	ERCC3	ERG
ERRF1	ESR1	EXT1	EXT2	EZH2	FAM123B	FAM175A	FANCA	FANCC	FANCD2
FANCG	FANCM	FAS	FAT1	FAT2	FBXW7	FCGR2A	FCGR3A	FGFR1	FGFR2
FGFR3	FGFR4	FH	FLCN	FLT1	FLT3	FLT4	FOXA1	FOXL2	FOXP1
FUBP1	GAB2	GALNT12	GATA3	GNA11	GNAQ	GNAS	GRIN2A	HDAC1	HDAC4
HGF	HNF1A	HOXB13	HRAS	HSP90AA1	IDH1	IDH2	IFNG	IFNGR1	IGF1R
IL7R	INPP4B	IRF2	IRS2	JAK1	JAK2	JAK3	KDM5A	KDM5C	KDM6A
KDR	KEAP1	KIT	KRAS	LRP1B	MAP2K1	MAP2K2	MAP2K4	MAP3K1	MAPK1
MAX	MCL1	MDM2	MDM4	MED12	MEN1	MET	MITF	MLH1	MLH3
MLL	MLL2	MLL3	MPL	MRE11A	MS4A1	MSH2	MSH3	MSH6	MTOR
MUTYH	MYC	MYCL1	MYCN	MYD88	NBN	NCOR1	NDUFA13	NF1	NF2
NOTCH1	NOTCH2	NOTCH3	NOTCH4	NPM1	NRAS	NSD1	NTHL1	NTRK1	NTRK3
PALB2	PAX5	PBRM1	PCK1	PDCD1LG2	PDGFRA	PDGFRB	PKD1	PHF6	PIK3CA
PIK3CB	PIK3CG	PIK3R1	PIK3R2	PMS1	PMS2	POLD1	POLE	POT1	PPM1D
PRKAR1A	PTCH1	PTCH2	PTEN	PTPN11	RAD50	RAD51	RAD51B	RAD51C	RAD51D
RAF1	RARA	RB1	RBM10	RET	RHEB	RHOA	RICTOR	RINT1	RNASEL
RNF43	ROS1	RPS6KB1	RUNX1	SDHA	SDHAF2	SDHB	SDHC	SDHD	SERPINB3
SERPINB4	SETD2	SLX4	SMAD2	SMAD4	SMARCA4	SMARCB1	SMARCE1	SMO	SOX2
SOX9	SRC	STAG2	STAT3	STK11	SUFU	SYK	TBX3	TCF7L2	TET2
TGFBR2	TMEM127	TMPRSS2	TNFAIP3	TOP1	TOP2A	TP53	TP73	TSC1	TSC2
VEGFA	VHL	WT1	XPO1	XRCC2	XRCC3	ZFHX3	ZMAT3		

### Introns, promotor, rearrangement point regions

ALK	BCL2L11	BRAF	BRCA1	BRD4	CD74	EGFR	EML4	ERG	ETV6
EZR	FGFR1	FGFR2	FGFR3	KIF5B	KIT	MAML2	MET	MSH2	MYC
MYCL1	NCOA4	NOTCH2	NTRK1	NTRK2	NTRK3	PDGFRA	PMS2	PPARG	RAF1
RET	ROS1	RSPO2	SLC34A2	TERT	TFE3	TMPRSS2	TPM3		

**Partial exons**

ABCA13	ABCB1	ABCC1	ABCC11	ABCC2	ABCG2	ACACA	ACIN1	ACTB	ACTG1
ACTG2	ACVR2A	ACVRL1	ADAM29	ADAMTS5	ADCY1	AFF1	AFF2	AFF3	AFF4
AHNAK	AKAP9	ALB	AMOT	ANGPT1	ANK3	ANKRD27	ANKRD30A	ANKRD30B	ANKRD36B
APEX1	APOBEC3B	ARAP3	ARFGEF1	ARFGEF2	ARHGAP26	ARHGAP29	ARHGAP35	ARID4B	ARNT
ASCL4	ASH1L	ASMTL	ASPM	ASTN1	ASXL2	ATIC	ATP12A	ATP11B	ATP1A1
ATP2B3	BAZ2B	BBS9	BCAS1	BCL11A	BCL11B	BCL2A1	BCL2L11	BCL3	BCL9
BCLAF1	BCORL1	BCR	BIRC2	BIRC3	BMPR2	BNC2	BPTF	BRD2	BRD3
BRSK1	BRWD1	BTLA	BUB1	C15orf23	C15orf55	C1QA	C1S	C3orf70	C7orf53
C8orf34	CACNA1D	CACNA1E	CADM2	CAMTA1	CAPN7	CARD11	CASP1	CASQ2	CBLB
CBR1	CBR3	CCDC168	CCNA1	CCNB3	CCT3	CCT5	CCT6B	CD22	CD33
CD5L	CDA	CDH11	CDH18	CDH23	CDK13	CHD1	CHD1L	CHD3	CHD4
CHD6	CHD8	CHD9	CHFR	CHI3L1	CHN1	CIITA	CKS1B	CLCC1	CLDN18
CLP1	CLSPN	CLTC	CNOT3	CNOT4	CNTN1	CNTN5	CNTNAP1	CNTNAP5	COL1A1
COL2A1	COL5A1	COL5A2	COL5A3	COPS2	CPS1	CREB3L1	CRIPAK	CRLF2	CRNKL1
CRTC1	CRYBG3	CSF1	CSF3R	CSMD1	CSMD3	CSNK1A1	CSNK1G3	CSNK2A1	CTLA4
CTNNA2	CTNND1	CUX1	CYBA	CYP19A1	CYP1B1	CYP1A1	CYP2A13	CYP2C19	CYP2C8
CYP2D6	CYP3A4	CYP3A5	DCC	DDX3X	DDX5	DEK	DHX35	DHX9	DIAPH1
DIS3L2	DLC1	DMD	DNAH6	DNAJC11	DNM2	DNMT1	DOCK2	DOCK7	DOT1L
DPYD	DRGX	DTX1	DUSP22	DYSF	EBF1	ECT2L	EEF1A1	EGR3	EIF2AK3
EIF2C3	EIF3A	EIF4G3	ELF1	ELF3	ELF4	ELL	ELMO1	ELN	EMID2
EPC1	EPHA1	EPHA4	EPHA7	EPHB1	EPHB4	EPOR	EPPK1	EPS15	ERBB2IP
ERCC2	ESR2	ETS1	ETV1	ETV5	ETV6	EWSR1	EZR	F8	FAM131B
FAM135B	FAM157B	FAM22A	FAM46C	FAM5C	FAP	FASLG	FAT3	FAT4	FCGR1A
FCGR2B	FCRL4	FGF10	FGF14	FGF23	FGF3	FGF4	FGF6	FKBP5	FLG
FLI1	FLNC	FMN2	FMR1	FN1	FNDC4	FOXA2	FOXO3	FOXQ1	FRG1
FRMPD4	FUS	FXR1	FYN	FZD1	G3BP1	G3BP2	GABRA6	GATA2	GFRAL
GIGYF1	GKN2	GLB1L3	GLI1	GLI2	GLI3	GMPS	GNA12	GNA13	GNG2
GPC3	GPR124	GPX1	GRB7	GRM3	GSK3B	GSTM5	GSTP1	GUSB	H3F3A
H3F3C	HCLS1	HCN1	HDAC9	HECW1	HERC2	HEY1	HIP1	HIST1H1C	HIST1H1D
HIST1H1E	HIST1H2AC	HIST1H2AG	HIST1H2AL	HIST1H2AM	HIST1H2BC	HIST1H2BD	HIST1H2BJ	HIST1H2BK	HIST1H2BO
HIST1H3B	HIST1H4I	HLF	HMCN1	HNRPD	HOXA11	HOXA13	HOXA3	HOXA9	HOXC13
HOXD11	HOXD13	HSD3B1	HSD3B2	HSP90AB1	HSPA8	HSPD1	HSPH1	ICK	IFITM1
IFITM3	IGF2	IGF2R	IGLL5	IGSF10	IKBKE	IKZF1	IKZF2	IKZF3	IL1RAPL1
IL21R	IL6	IL6ST	IMPG1	ING1	INHBA	INPP4A	INPP5D	INPPL1	IRF4
IRF6	ITGB3	ITK	ITSN1	JARID2	KALRN	KAT6A	KAT6B	KCNJ5	KCNQ2
KDM2B	KDM3B	KEL	KIF5B	KLB	KLF4	KLHL6	KLK1	KRTAP5-5	L3MBTL1
LAMA2	LCP1	LEF1	LGALS8	LIFR	LPHN2	LPP	LRP2	LRP4	LRP5
LRP6	LRRC7	LRRK2	LYN	LZTS1	MACF1	MAD1L1	MAGI2	MAGOH	MAML2
MAML3	MAP3K13	MAPK3	MCC	MCM3	MDH2	MECOM	MEF2C	MGA	MIB1
MIOS	MKI67	MKL1	MLL4	MLL3	MLL6	MMP2	MMP11	MN1	MNDA
MNX1	MPO	MSH4	MSN	MSR1	MTHFR	MTRR	MUC5B	MYB	MYBL2
MYH10	MYH11	MYH14	MYH9	MYO3A	NAP1L1	NAV3	NBPF1	NCAM2	NCF2
NCF4	NCK1	NCOA2	NCOR2	NCSTN	NDRG1	NEB	NFATC4	NFE2L2	NFE2L3
NIN	NKX3-1	NLRC3	NOD1	NOS3	NQO1	NR1I2	NR2F2	NR4A2	NRP2
NRXN1	NTM	NTRK2	NUMA1	NUP107	NUP210	NUP98	OBSCN	OGDH	OMD
OPCML	OR11G2	OR2T4	OR4A15	OR4C6	OR5L2	OR6F1	P2RY8	P4HB	PABPC1
PABPC3	PAG1	PAK1	PAK3	PARK2	PARP1	PASK	PAX3	PAX7	PBX1
PC	PCDH18	PCLO	PCSK6	PCSK7	PDCD1	PDCD11	PDE4DIP	PDGFB	PDILT
PER1	PGR	PHF1	PIK3C2A	PIK3C2B	PIK3C2G	PIK3R3	PIP5K1A	PKD1L2	PKHD1
PLAC8	PLAG1	PLCB1	PLCG1	PLCG2	PLK1	PLXNA1	PLXNB2	POLQ	POLR2B
POM121	POM121L12	POTEG	POU2AF1	PPP1R17	PPP2R1A	PPP6C	PRAM1	PRDM1	PRDM16
PREX2	PRF1	PRKAA1	PRKCB	PRKCI	PRKDC	PRRX1	PRX	PSG2	PSIP1
PSMB1	PSMB5	PTGS1	PTGS2	PTK2	PTPN13	PTPN2	PTPRB	PTPRD	PTPRF
PTPRJ	PTPRK	PTPRO	PTPRT	PTPRU	RAB35	RAC1	RAC2	RAD21	RAD54B
RANBP2	RASA1	RASGRP1	RBL1	RECQL4	REL	RELN	RFC1	RGS3	RHOH
RHOT1	RIT1	RNF213	ROBO1	ROBO2	ROBO3	ROCK1	RPGR	RPL22	RPTOR
RSPO2	RSPO3	RUNX1T1	RUNX2	RXRA	RYR1	RYR2	SBDS	SCUBE2	SEC31A
SEMA3A	SEMA3E	SEMA6A	SERP2	SERPINA7	SETBP1	SETDB1	SF1	SF3A1	SF3A3
SF3B1	SFPQ	SGCZ	SH3PXD2A	SHH	SI	SIN3A	SLC16A1	SLC1A2	SLC22A16
SLC22A18	SLC22A2	SLC22A3	SLCO1B3	SLIT1	SLIT2	SMAD3	SMC1A	SMC1B	SMURF2
SNCAIP	SNTG1	SNX29	SOD2	SOS1	SOX10	SOX17	SPEN	SPOP	SPRR3
SPSB4	SPTA1	SRD5A2	SRGAP1	SRGAP3	SRSF2	SRSF7	SSX1	STAG1	STAT1
STAT5A	SUCLG1	SUCLG2	SULT1A1	SUZ12	SVEP1	SYNCRIP	SYNE1	TAF1	TAF15
TAF1L	TAL1	TBL1XR1	TBX15	TBX22	TCEB1	TCERG1	TCF12	TCF3	TCF4
TCL1A	TCP11	TEC	TENM3	TERT	TFDP1	TFDP2	TFE3	TGFBR1	TGFBR3
TGM2	THBS1	THBS2	THRAP3	TJP1	TLE1	TLL2	TLR4	TLX3	TMEM132D
TNN	TNPO1	TOP2B	TP53BP1	TP63	TPM3	TPR	TRAF5	TRERF1	TRIM24
TRIM58	TRIO	TRPC5	TRRAP	TSHR	TSHZ2	TSHZ3	TTF1	TTL	TUBA3C
TUBB3	TUSC3	TXNIP	TYMS	TYR	TYRP1	U2AF1	UBE2D2	UBR5	UGT1A1
UMPS	UPF3B	USH2A	USP6	USP8	VDAC2	VEZF1	VIM	WASF3	WDR90
WDTC1	WHSC1	WHSC1L1	WIPF1	WNK1	WNT5A	WSCD2	WWOX	WWP1	WWP2
XBP1	XPC	XRCC1	YBX1	YY1AP1	ZBTB16	ZC3H11A	ZFP36L1	ZFP36L2	ZFPM2
ZIC3	ZNF217	ZNF384	ZNF521	ZNF638	ZNF750	ZNF804B	ZNF814		