

FIGURE 1

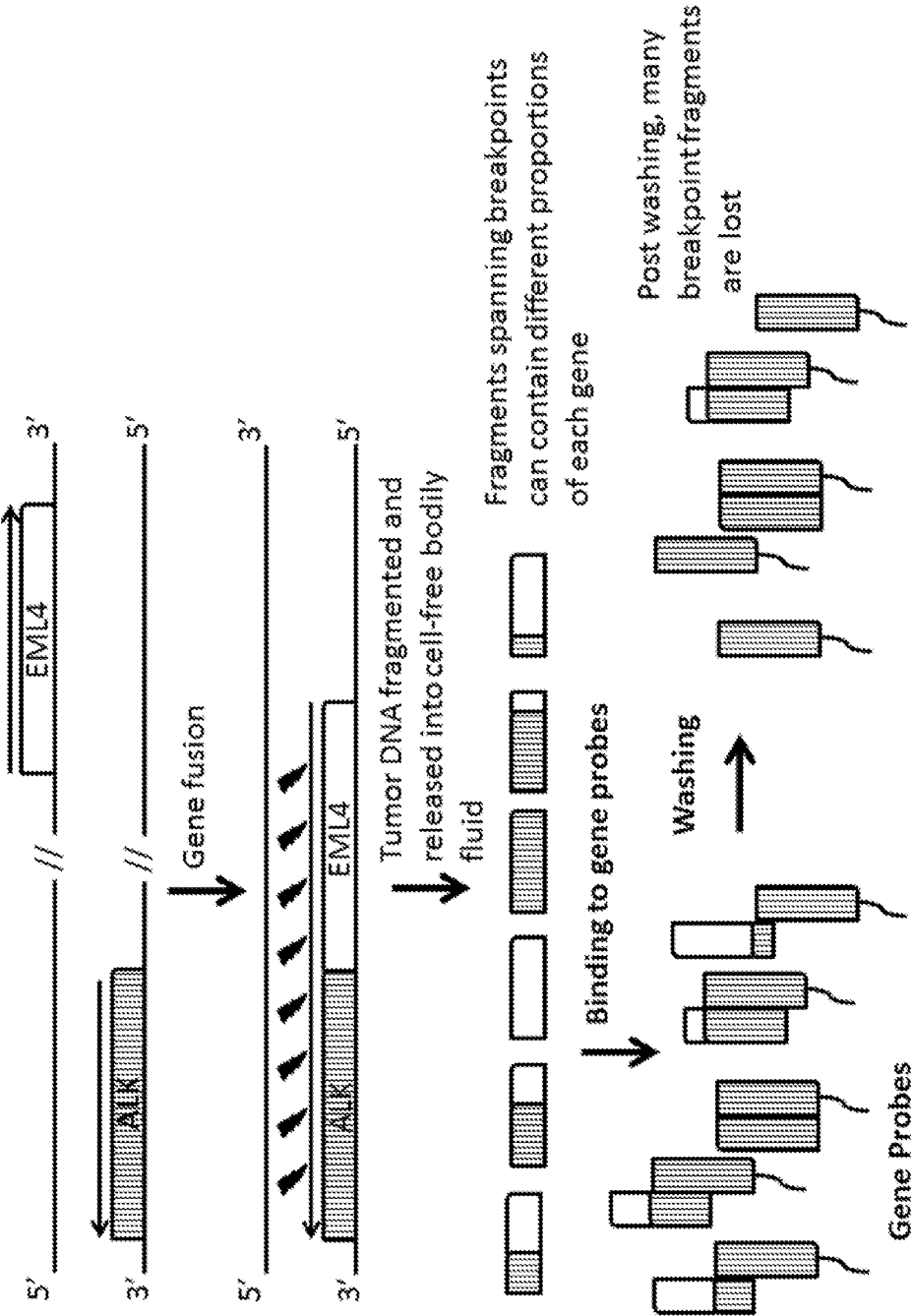


FIG. 2A

ACBD6/RRP15	KMT2A/ELL
ACSL3_ENST00000357430/ETV1	KMT2A/EP300
ACTB/GLI1	KMT2A/EPS15
AGPAT5/MCPH1	KMT2A/FOXO3
AGTRAP/BRAF	KMT2A/FOXO4
AKAP9_ENST00000356239/BRAF	KMT2A/FRYL
ARFIP1/FHDC1	KMT2A/GAS7
ARID1A/MAST2_ENST00000361297	KMT2A/GMPS
ASPCR1/TFE3	KMT2A/GPHN
ATG4C/FBXO38	KMT2A/KIAA0284_ENST00000414716
ATIC/ALK	KMT2A/KIAA1524
BBS9/PKD1L1	KMT2A/LASP1
BCR/ABL1	KMT2A/LPP
BCR/JAK2	KMT2A/MAPRE1
BRD3/NUTM1	KMT2A/MLLT1
BRD4_ENST00000263377/NUTM1	KMT2A/MLLT10
C2orf44/ALK	KMT2A/MLLT11
CANT1/ETV4	KMT2A/MLLT3
CARS/ALK	KMT2A/MLLT4_ENST00000392108
CCDC6/RET	KMT2A/MLLT6
CD74_ENST00000009530/NRG1	KMT2A/MYO1F
CD74_ENST00000009530/ROS1	KMT2A/NCKIPSD
CDH11/USP6_ENST00000250066	KMT2A/NRIP3
CDKN2D/WDFY2	KMT2A/PDS5A
CEP89/BRAF	KMT2A/PICALM
CHCHD7/PLAG1	KMT2A/PRRC1

CIC/DUX4L1	KMT2A/SARNP
CIC/FOXO4	KMT2A/SEPT2
CLCN6/BRAF	KMT2A/SEPT5
CLIP1/ROS1	KMT2A/SEPT6
CLTC/ALK	KMT2A/SEPT9_ENST00000427177
CLTC/TFE3	KMT2A/SH3GL1
CNBP/USP6_ENST00000250066	KMT2A/SORBS2
COL1A1/PDGFB	KMT2A/TET1
COL1A1/USP6_ENST00000250066	KMT2A/TOP3A
COL1A2/PLAG1	KMT2A/ZFYVE19
CRTC1/MAML2	KTN1/RET
CRTC3/MAML2	LJFR_ENST00000263409/PLAG1
CTAGE5/SIP1	LMNA/NTRK1_ENST00000392302
CTNNB1/PLAG1	LRIG3/ROS1
DCTN1/ALK	LSM14A/BRAF
DDX5_ENST00000540698/ETV4	MARK4/ERCC2
DNAJB1/PRKACA	MBOAT2/PRKCE
EIF3E/RSPO2	MBTD1_ENST00000586178/CXorf67_ENST00000342995
EIF3K/CYP39A1	MEAF6/PHF1
EML4/ALK	MKRN1/BRAF
EPC1/PHF1	MSN/ALK
ERC1/RET	MYB_ENST00000341911/NFIB_ENST00000397581
ERC1/ROS1	MYO5A/ROS1
ERO1L/FERMT2	NAB2/STAT6
ESRP1/RAF1	NACC2/NTRK2
ETV6/ITPR2	NCOA4_ENST00000452682/RET
ETV6/JAK2	NDRG1/ERG
ETV6/NTRK3	NF1/ACCN1

FIG. 2A (continued)

EWSR1/ATF1	NFIA/EHF
EWSR1/CREB1	NFIX_ENST00000360105/MAST1_ENST00000251472
EWSR1/DDIT3	NONO/TFE3
EWSR1/ERG	NOTCH1_ENST00000277541/GABBR2
EWSR1/ETV1	NPM1/ALK
EWSR1/ETV4	NTN1/ACLY
EWSR1/FEV	NUP107/LGR5
EWSR1/FLI1	OMD/USP6_ENST00000250066
EWSR1/NFATC1	PAX3/FOXO1
EWSR1/NFATC2	PAX3/NCOA1
EWSR1/NR4A3	PAX3/NCOA2
EWSR1/PATZ1	PAX5/JAK2
EWSR1/PBX1	PAX7/FOXO1
EWSR1/POU5F1	PAX8/PPARG
EWSR1/SMARCA5	PCM1/JAK2
EWSR1/SP3	PCM1/RET
EWSR1/WT1	PLA2R1/RBMS1
EWSR1/YY1	PLXND1/TMCC1
EWSR1/ZNF384	PPFIBP1/ALK
EWSR1/ZNF444_ENST00000337080	PPFIBP1/ROS1
EZR/ROS1	PRCC/TFE3
FAM131B_ENST00000443739/BRAF	PRKAR1A/RET
FBXL18/RNF216	PTPRK/RSP03
FCHSD1/BRAF	PWWP2A/ROS1
FGFR1/ZNF703	QKI/NTRK2
FGFR1_ENST00000447712/PLAG1	RAF1/DAZL
FGFR1_ENST00000447712/TACC1	RANBP2/ALK
FGFR3/BAIAP2L1	RBM14/PACS1

FIG. 2A (continued)

FGFR3/TACC3	RG22/SYCP1
FN1/ALK	RNF130/BRAF
FUS/ATF1	SDC4/ROS1
FUS/CREB3L1	SEC16A NM_014866.1/NOTCH1 ENST00000277541
FUS/CREB3L2	SEC31A/ALK
FUS/DDIT3	SEC31A/JAK2
FUS/ERG	SEPT8/AFF4
FUS/FEV	SPQ/TFE3
GATM/BRAF	SLC22A1/CUTA
GMDS/PDE8B	SLC26A6/PRKAR2A
GNAI1/BRAF	SLC34A2/ROS1
GOLGA5/RET	SLC45A3/BRAF
GOPC/ROS1	SLC45A3/ELK4
GPBP1L1/MAST2 ENST00000361297	SLC45A3/ERG
HACL1/RAF1	SLC45A3/ETV1
HAS2/PLAG1	SLC45A3/ETV5 ENST00000306376
HERPUD1/BRAF	SND1/BRAF
HEY1/NCOA2	SQSTM1/ALK
HIP1/ALK	SRGAP3/RAF1
HLA-A/ROS1	SS18/SSX1
HMGA2/ALDH2 ENST00000261733	SS18/SSX2
HMGA2/CCNB1IP1	SS18/SSX4
HMGA2/COX6C	SS18L1/SSX1
HMGA2/EBF1	SSBP2/JAK2
HMGA2/FHIT ENST00000476844	SSH2/SUZ12
HMGA2/LHFP	STIL/TAL1
HMGA2/LPP	STRN/ALK
HMGA2/NFIB ENST00000397581	SUSDI/ROD1

FIG. 2A (continued)

HMGA2/RAD51B	TADA2A_ENST00000394395/MAST1_ENST00000251472
HMGA2/WIF1_ENST00000286574	TAF15/NR4A3
HN1/USH1G	TCEA1_ENST00000521604/PLAG1
HNRNP A2B1/ETV1	TCF12/NR4A3
HOOK3/RET	TCF3/PBX1
IL6R/ATP8B2	TECTA/TBCEL
INTS4/GAB2	TFG/ALK
IRF2BP2/CDX1	TFG/NR4A3
JAZF1/PHF1	TFG/NTRK1_ENST00000392302
JAZF1/SUZ12	THRAP3/USP6_ENST00000250066
KIAA1549/BRAF	TMPRSS2/ERG
KIAA1598/ROS1	TMPRSS2/ETV1
KIF5B/ALK	TMPRSS2/ETV4
KIF5B/RET	TMPRSS2/ETV5_ENST00000306376
KLC1/ALK	TP53/NTRK1_ENST00000392302
KLK2/ETV1	TPM3/ALK
KLK2/ETV4	TPM3/NTRK1_ENST00000392302
KMT2A/ABI1	TPM3/ROS1
KMT2A/ABI2	TPM3_ENST00000368530/ROS1
KMT2A/ACTN4	TPM4/ALK
KMT2A/AFF1	TRIM24/RET
KMT2A/AFF3	TRIM27/RET
KMT2A/AFF4	TRIM33_ENST00000358465/RET
KMT2A/ARHGAP26	UBE2L3/KRAS
KMT2A/ARHGEF12	VCL/ALK
KMT2A/BTBD18	VTI1A/TCF7L2
KMT2A/CASC5	YWHAE_ENST00000264335/FAM22A_ENST00000381707
KMT2A/CASP8AP2	YWHAE_ENST00000264335/NUTM2B

FIG. 2A (continued)

KMT2A/CBL	ZC3H7B/BCOR	ENST00000378444
KMT2A/CREBBP	ZCCHC8/ROS1	
KMT2A/CT45A2	ZNF700/MAST1	ENST00000251472
KMT2A/DAB2IP	ZSCAN30/BRAF	
KMT2A/EEFSEC		

FIG. 2A (continued)

FIG. 2B

Fusion gene Pairs

No	Panel Gene	Partner Gene	No	Panel Gene	Partner Gene	No	Panel Gene	Partner Gene
1	ALK	AT1C	44	RET	ERC1	87	FGFR3	TACC3
2	ALK	C2orf44	45	RET	FKBP15	88	FGFR3	TNIP2
3	ALK	C2orf61	46	RET	GOLGA5	89	FGFR3	TPRG1
4	ALK	CAMKMT	47	RET	HOOK3	90	FGFR3	WHSC1
5	ALK	CARS	48	RET	KIF5B	91	ROS1	CCDC6
6	ALK	CENPF	49	RET	KTNI	92	ROS1	CD72
7	ALK	CLTC	50	RET	NCOA4	93	ROS1	CD74
8	ALK	CLIP4	51	RET	PCM1	94	ROS1	CEP85L
9	ALK	COL4A3	52	RET	PRKAR1A	95	ROS1	CLIP1
10	ALK	DCTN1	53	RET	SPECC1L	96	ROS1	CLTC
11	ALK	EIF2AK3	54	RET	SQSTM1	97	ROS1	ERC1
12	ALK	EML4	55	RET	TBL1XR1	98	ROS1	EZR
13	ALK	FANCL	56	RET	TRIM24	99	ROS1	HLA-A
14	ALK	FN1	57	RET	TRIM27	100	ROS1	KDEL2
15	ALK	GTF2IRD1	58	RET	TRIM33	101	ROS1	KIAA1598
16	ALK	HIP1	59	FGFR2	AFF3	102	ROS1	LRIG3

17	ALK	KCNQ5	60	FGFR2	AHCYL1	103	ROS1	MYO5A
18	ALK	KIF5B	61	FGFR2	BICC1	104	ROS1	PPFIBP1
19	ALK	KLC1	62	FGFR2	C10ORF68	105	ROS1	PWWP2A
20	ALK	MPRI	63	FGFR2	CASP7	106	ROS1	RUNX1
21	ALK	MSN	64	FGFR2	CCAR2	107	ROS1	SDC4
22	ALK	MYH9	65	FGFR2	CCDC6	108	ROS1	SLC34A2
23	ALK	NPM1	66	FGFR2	CD44	109	ROS1	SLC35F1
24	ALK	PPFIBP1	67	FGFR2	CIT	110	ROS1	TFG
25	ALK	PPM1B	68	FGFR2	KIAA1598	111	ROS1	TMEM106B
26	ALK	PPP1CB	69	FGFR2	MGEA5	112	ROS1	TPM3
27	ALK	PRKAR1A	70	FGFR2	NCALD	113	ROS1	TTC28
28	ALK	PTPN3	71	FGFR2	OFD1	114	ROS1	YWHAE
29	ALK	RANBP2	72	FGFR2	PPAPDC1A	115	ROS1	ZCCHC8
30	ALK	RNF213	73	FGFR2	PPHLN1	116	NTRK1	CD74
31	ALK	SEC31A	74	FGFR2	RASAL2	117	NTRK1	IRF2BP2
32	ALK	SOC5	75	FGFR2	SLC45A3	118	NTRK1	LMNA

FIG. 2B (continued)

33	ALK	SQSTM1	76	FGFR2	TACC2	119	NTRK1	MPRI
34	ALK	STK32B	77	FGFR2	TACC3	120	NTRK1	NFASC
35	ALK	STRN	78	FGFR2	TXLNB	121	NTRK1	PEAR1
36	ALK	TFG	79	FGFR2	USP10	122	NTRK1	PLEKHA6
37	ALK	TPM1	80	FGFR2	VCL	123	NTRK1	QKI
38	ALK	TPM3	81	FGFR3	ADD1	124	NTRK1	RABGAP1L
39	ALK	TPM4	82	FGFR3	AES	125	NTRK1	SQSTM1
40	ALK	VCL	83	FGFR3	BAIAP2L1	126	NTRK1	SSBP2
41	RET	AFAP1	84	FGFR3	ELAVL3	127	NTRK1	TFG
42	RET	AKAP13	85	FGFR3	ETV6	128	NTRK1	TP53
43	RET	CCDC6	86	FGFR3	JAKMIP1	129	NTRK1	TPM3

FIG. 2B (continued)

FIG. 3

ACBD6
ACCN1
ACLY
ACSL3_ENST00000357430
ACTB
AFF4
AGPAT5
AGTRAP
AKAP9_ENST00000356239
ALDH2_ENST00000261733
ALK
ARFIP1
ARID1A
ASPSCR1
ATF1
ATG4C
ATIC
ATP8B2
BAIAP2L1
BBS9
BCOR_ENST00000378444
BCR
BRAF
BRD3
BRD4_ENST00000263377
C2orf44
CANT1
CARS
CCDC6

CCNB1IP1
CD74_ENST00000009530
CDH11
CDKN2D
CDX1
CEP89
CHCHD7
CIC
CLCN6
CLIP1
CLTC
CNBP
COL1A1
COL1A2
COX6C
CREB1
CREB3L1
CREB3L2
CRTC1
CRTC3
CTAGE5
CTNNB1
CUTA
CXorf67_ENST00000342995
CYP39A1
DAZL
DCTN1
DDIT3
DDX5_ENST00000540698
DUX4L1
EBF1
EHF

FIG. 3 (continued)

EIF3E
EIF3K
ELK4
EML4
EPC1
ERC1
ERCC2
ERG
ERO1L
ESRP1
ETV1
ETV4
ETV5_ENST00000306376
ETV6
EWSR1
EZR
FAM131B_ENST00000443739
FAM22A_ENST00000381707
FBXL18
FBXO38
FCHSD1
FERMT2
FEV
FGFR1
FGFR1_ENST00000447712
FGFR3
FHDC1
FHIT_ENST00000476844
FLI1
FN1
FOXO1
FOXO4

FIG. 3 (continued)

FUS
GAB2
GABBR2
GATM
GLI1
GMD5
GNAI1
GOLGA5
GOPC
GPBP1L1
HACL1
HAS2
HERPUD1
HEY1
HIP1
HLA-A
HMGGA2
HN1
HNRNPA2B1
HOOK3
IL6R
INTS4
IRF2BP2
ITPR2
JAK2
JAZF1
KIAA1549
KIAA1598
KIF5B
KLC1
KLK2
KRAS

FIG. 3 (continued)

KTN1
LGR5
LHFP
LIFR_ENST00000263409
LMNA
LPP
LRIG3
LSM14A
MAML2
MARK4
MAST1_ENST00000251472
MAST2_ENST00000361297
MBOAT2
MBTD1_ENST00000586178
MCPH1
MEAF6
MKRN1
MSN
MYB_ENST00000341911
MYO5A
NAB2
NACC2
NCOA1
NCOA2
NCOA4_ENST00000452682
NDRG1
NF1
NFATC1
NFATC2
NFIA
NFIB_ENST00000397581
NFIX_ENST00000360105

FIG. 3 (continued)

NONO
NOTCH1_ENST00000277541
NPM1
NR4A3
NRG1
NTN1
NTRK1_ENST00000392302
NTRK2
NTRK3
NUP107
NUTM1
NUTM2B
OMD
PACS1
PATZ1
PAX3
PAX5
PAX7
PAX8
PBX1
PCM1
PDE8B
PDGFB
PHF1
PKD1L1
PLA2R1
PLAG1
PLXND1
POU5F1
PPARG
PPFIBP1
PRCC

FIG. 3 (continued)

PRKAR1A
PRKAR2A
PRKE
PTRK
PWWP2A
QKI
RAD51B
RAF1
RANBP2
RBM14
RBMS1
RET
RGS22
RNF130
RNF216
ROD1
ROS1
RRP15
RSPO2
RSPO3
SDC4
SEC16A_NM_014866.1
SEC31A
SEPT8
SFPQ
SIP1
SLC22A1
SLC26A6
SLC34A2
SLC45A3
SMARCA5
SND1

FIG. 3 (continued)

SP3
SQSTM1
SRGAP3
SS18
SS18L1
SSBP2
SSH2
SSX1
SSX2
SSX4
STAT6
STRN
SUSD1
SUZ12
SYCP1
TACC1
TACC3
TADA2A_ENST00000394395
TAF15
TBCEL
TCEA1_ENST00000521604
TCF12
TCF3
TCF7L2
TECTA
TFE3
TFG
THRAP3
TMCC1
TMPRSS2
TP53
TPM3

FIG. 3 (continued)

TPM3_ENST00000368530
TPM4
TRIM24
TRIM27
TRIM33_ENST00000358465
UBE2L3
USH1G
USP6_ENST00000250066
VCL
VTI1A
WDFY2
WIF1_ENST00000286574
WT1
YWHAE_ENST00000264335
YY1
ZC3H7B
ZCCHC8
ZNF384
ZNF444_ENST00000337080
ZNF700
ZNF703
ZSCAN30

FIG. 3 (continued)

Figure 4A

Mutation ID	5' Partner Gene				3' Partner Gene				No. of Mutations	Mutation Frequency
	Gene Name	Last Observed Exon	Inferred Breakpoint	Inserted Sequence	Gene Name	First Observed Exon	Inferred Breakpoint	Inserted Sequence		
COSF463	EML4	13	1751	-	ALK	20	4080	-	170	.25%
COSF474	EML4	6	929+220	-	ALK	20	4080	-	93	13.68%
COSF465	EML4	20	2504	-	ALK	20	4080	-	48	7.06%
COSF734	EML4	6	929	-	ALK	20	4080	-	31	4.56%
COSF488	EML4	18	2318+654	y	ALK	20	4080-172	-	4	.59%
COSF1545	EML4	6	929	-	ALK	20	4080-18	-	2	.29%
COSF1376	EML4	18	2318	-	ALK	20	4080	-	2	.29%
COSF480	EML4	2	470	-	ALK	20	4080-117	-	2	.29%
COSF475	EML4	15	2029	-	ALK	20	4080	-	2	.29%
COSF733	EML4	17	2229	y	ALK	20	4080	-	1	.15%
COSF1063	EML4	13	1751	-	ALK	20	4080-69	-	1	.15%
COSF1065	EML4	14	1903	-	ALK	20	4080	-	1	.15%
COSF1128	EML4	14	1903	-	ALK	20	4080	-	1	.15%
COSF1297	EML4	6	929	-	ALK	20	3975	-	1	.15%
COSF1368	EML4	17	2229+2522	-	ALK	20	4126	-	1	.15%
COSF1540	EML4	13	1751	-	ALK	20	4080-90	-	1	.15%
COSF1542	EML4	14	1903	-	ALK	20	4080-123	-	1	.15%
COSF1543	EML4	2	470	-	ALK	20	4080	-	1	.15%
COSF731	EML4	20	2504	-	ALK	20	4080-18	-	1	.15%
COSF493	EML4	6	929+805	y	ALK	20	4080-115	-	1	.15%
COSF491	EML4	14	1903	y	ALK	20	4129	-	1	.15%
COSF490	EML4	20	2504+182	-	ALK	20	4080-67	-	1	.15%

Mutation ID	5' Partner Gene				3' Partner Gene				No. of Mutations	Mutation Frequency
	Gene Name	Last Observed Exon	Inferred Breakpoint	Inserted Sequence	Gene Name	First Observed Exon	Inferred Breakpoint	Inserted Sequence		
COSF489	EML4	13	1751+447	-	ALK	20	4080-161	-	1	.15%
COSF476	EML4	6	929+(7320)	-	ALK	20	4080	-	1	.15%
COSF464	EML4	20	2504+545	-	ALK	20	4080-232	-	1	.15%
COSF462	EML4	13	1751+(3600)	-	ALK	20	4080-297	-	1	.15%
COSF410	EML4	13	1751+1485	-	ALK	20	4080-1254	-	1	.15%
COSF414	EML4	13	1751+2575	-	ALK	20	4080-203	-	1	.15%
COSF473	EML4	?	?	-	ALK	?	?	-	307	45%
Total Mutations									680	100%

FIG. 4A (continued)

Figure 4B

Mutation ID	5' Partner Gene				3' Partner Gene				No. of Mutations	Mutation Frequency
	Gene Name	Last Observed Exon	Inferred Breakpoint	Inserted Sequence	Gene Name	First Observed Exon	Inferred Breakpoint	Inserted Sequence		
COSF1272	CCDC6	1	535	-	RET	12	2369	-	583	98.65%
COSF1516	CCDC6	2	685	-	RET	12	2369	-	3	.51%
COSF1532	CCDC6	1	535+1111	-	RET	12	4080-232	-	1	.17%
COSF1533	CCDC6	1	535+1054	-	RET	12	2369-?	-	1	.17%
COSF1518	CCDC6	8	1462+848	-	RET	11	2237	-	1	.17%
COSF1480	CCDC6	?	?	-	RET	?	?	-	2	0%
Total Mutations									591	100%

Figure 4C

Mutation ID	5' Partner Gene				3' Partner Gene				No. of Mutations	Mutation Frequency
	Gene Name	Last Observed Exon	Inferred Breakpoint	Inserted Sequence	Gene Name	First Observed Exon	Inferred Breakpoint	Inserted Sequence		
COSF125	TMPRSS2	1(utr)	79	-	ERG	4	312	-	476	20.82%
COSF128	TMPRSS2	2	150	-	ERG	4	312	-	38	1.66%
COSF123	TMPRSS2	1(utr)	79	-	ERG	2(utr)	124	-	27	1.18%
COSF126	TMPRSS2	1(utr)	79	-	ERG	5	530	-	21	.92%
COSF127	TMPRSS2	2	150	-	ERG	2(utr)	124	-	7	.31%
COSF736	TMPRSS2	2	150	-	ERG	3	226	-	4	.17%
COSF130	TMPRSS2	3	373	-	ERG	4	312	-	3	.13%
COSF135	TMPRSS2	3	373	-	ERG	2(utr)	124	-	3	.13%
COSF124	TMPRSS2	1(utr)	79	-	ERG	3	226	-	3	.13%
COSF116	TMPRSS2	5	580	-	ERG	4	312	-	3	.13%
COSF129	TMPRSS2	2	150	-	ERG	5	530	-	3	.13%
COSF139	TMPRSS2	1(utr)	79+?	-	ERG	4	312	-	1	.04%
COSF138	TMPRSS2	1(utr)	79	-	ERG	4	312	-	1	.04%
COSF118	TMPRSS2	4	460	-	ERG	4	312	-	1	.04%
COSF121	TMPRSS2	?	?	-	ERG	?	?	-	1695	74%
Total Mutations									2286	100%

Figure 4D

Mutation ID	5' Partner Gene				3' Partner Gene				No. of Mutations	Mutation Frequency
	Gene Name	Last Observed Exon	Inferred Breakpoint	Inserted Sequence	Gene Name	First Observed Exon	Inferred Breakpoint	Inserted Sequence		
COSF1492	NCOA4_ENST0000452682	8	1014	-	RET	12	2369	-	351	97.23%
COSF1341	NCOA4_ENST0000452682	7	870+196	-	RET	12	2369-1570	-	3	.83%
COSF1531	NCOA4_ENST0000452682	8	1014+21	-	RET	12	2369-1591	-	1	.28%
COSF1499	NCOA4_ENST0000452682	8	996	-	RET	12	2369-7	-	1	.28%
COSF1501	NCOA4_ENST0000452682	8	1014+1186	-	RET	11	2273	-	1	.28%
COSF1502	RET	11	2271	-	NCOA4_ENST0000452682	9	1015-490	-	1	.28%
COSF1495	RET	11	2368+?	-	NCOA4_ENST0000452682	8	871-7	-	1	.28%
COSF1493	NCOA4_ENST0000452682	7	870+42	-	RET	12	2369-1673	-	1	.28%
COSF1497	RET	11	2368+?	-	NCOA4_ENST0000452682	9	1015	-	1	.28%
Total Mutations									361	100%

Figure 4E

Mutation ID	5' Partner Gene				3' Partner Gene				No. of Mutations	Mutation Frequency
	Gene Name	Last Observed Exon	Inferred Breakpoint	Inserted Sequence	Gene Name	First Observed Exon	Inferred Breakpoint	Inserted Sequence		
COSF1233	KIF5B	15	2183	-	RET	12	2327	-	36	59.02%
COSF1231	KIF5B	16	2372+476	-	RET	12	2327-436	-	7	11.48%
COSF1610	KIF5B	16	2372	-	RET	12	2327	-	3	4.92%
COSF1254	KIF5B	22	2897	-	RET	12	2327	-	3	4.92%
COSF1235	KIF5B	23	3002	-	RET	12	2327	-	2	3.28%
COSF1242	KIF5B	24	3219+372	-	RET	8	1713-416	-	1	1.64%
COSF1256	KIF5B	15	2183	-	RET	11	2177	-	1	1.64%
COSF1263	KIF5B	24	3219	-	RET	11	2070	-	1	1.64%
COSF1242	KIF5B	24	3219+372	-	RET	7	1317-416	-	1	1.64%
COSF1241	KIF5B	23	3002+152	y	RET	12	2327-12	-	1	1.64%
COSF1239	KIF5B	15	2183+2335	-	RET	12	2327-1785	-	1	1.64%
COSF1238	KIF5B	15	2183+550	y	RET	12	2327-741	-	1	1.64%
COSF1237	KIF5B	15	2183+2204	-	RET	12	2327-318	-	1	1.64%
COSF1240	KIF5B	16	2372+334	-	RET	12	2327-450	-	1	1.64%
COSF1252	KIF5B	?	?	-	RET	?	?	-	2	3%
Total Mutations									61	100%

Figure 4F

Mutation ID	5' Partner Gene				3' Partner Gene				No. of Mutations	Mutation Frequency
	Gene Name	Last Observed Exon	Inferred Breakpoint	Inserted Sequence	Gene Name	First Observed Exon	Inferred Breakpoint	Inserted Sequence		
COSF1059	KIF5B	24	3219	-	ALK	20	4080	-	4	40%
COSF1382	KIF5B	15	2183	-	ALK	20	4080	-	2	20%
COSF1258	KIF5B	17	2490	-	ALK	20	4080	-	2	20%
COSF1061	KIF5B	15	2183+2477	-	ALK	19	4005	-	1	10%
COSF1485	KIF5B	?	?	-	ALK	?	?	-	1	10%
Total Mutations									10	100%

Figure 4G

Mutation ID	5' Partner Gene				3' Partner Gene				No. of Mutations	Mutation Frequency
	Gene Name	Last Observed Exon	Inferred Breakpoint	Inserted Sequence	Gene Name	First Observed Exon	Inferred Breakpoint	Inserted Sequence		
COSF166	EWSR1	7	1112	-	FLI1	6	920	-	736	54.04%
COSF168	EWSR1	7	1112	-	FLI1	5	854	-	345	25.33%
COSF170	EWSR1	10	1364	-	FLI1	6	920	-	41	3.01%
COSF172	EWSR1	10	1364	-	FLI1	5	854	-	33	2.42%
COSF177	EWSR1	7	1112	-	FLI1	8	1046	-	15	1.1%
COSF181	EWSR1	7	1112	-	FLI1	7	986	-	9	.66%
COSF185	EWSR1	10	1364	-	FLI1	8	1046	-	4	.29%
COSF178	EWSR1	9	1331	-	FLI1	4	650	-	4	.29%
COSF184	EWSR1	9	1331	-	FLI1	7	986	-	3	.22%
COSF228	EWSR1	7	1112	-	FLI1	9	1094	-	3	.22%
COSF1303	EWSR1	10	1364	-	FLI1	7	986	-	2	.15%
COSF183	EWSR1	8	1293	-	FLI1	7	986	-	1	.07%
COSF205	EWSR1	8	1293	-	FLI1	6	920	-	1	.07%
COSF179	EWSR1	?	?	-	FLI1	?	?	-	165	12%
Total Mutations									1362	100%

Figure 4H

Mutation ID	5' Partner Gene				3' Partner Gene				No. of Mutations	Mutation Frequency
	Gene Name	Last Observed Exon	Inferred Breakpoint	Inserted Sequence	Gene Name	First Observed Exon	Inferred Breakpoint	Inserted Sequence		
COSF155	EWSR1	7	1112	-	ERG	8	967	-	27	22.13%
COSF154	EWSR1	7	1112	-	ERG	11	1141	-	15	12.3%
COSF161	EWSR1	7	1112	-	ERG	9	1036	-	5	4.1%
COSF162	EWSR1	10	1364	-	ERG	8	967	-	4	3.28%
COSF156	EWSR1	?	1112	-	ERG	10	1093	-	3	2.46%
COSF159	EWSR1	?	?	-	ERG	?	?	-	68	56%
Total Mutations									122	100%

Figure 4I

Mutation ID	5' Partner Gene				3' Partner Gene				No. of Mutations	Mutation Frequency
	Gene Name	Last Observed Exon	Inferred Breakpoint	Inserted Sequence	Gene Name	First Observed Exon	Inferred Breakpoint	Inserted Sequence		
COSF1201	CD74_ENST00000009530	6	627	-	ROS1	34	5757	-	32	84.21%
COSF1203	CD74_ENST00000009530	6	627	-	ROS1	32	5448	-	3	7.89%
COSF1619	CD74_ENST00000009530	?	?	-	ROS1	?	?	-	3	8%
Total Mutations									38	100%

Figure 4J

Mutation ID	5' Partner Gene				3' Partner Gene				No. of Mutations	Mutation Frequency
	Gene Name	Last Observed Exon	Inferred Breakpoint	Inserted Sequence	Gene Name	First Observed Exon	Inferred Breakpoint	Inserted Sequence		
COSF1220	PAX8	10	1355	-	PPARG	2	216	-	22	25.58%
COSF1224	PAX8	8	1064	-	PPARG	2	216	-	7	8.14%
COSF1218	PAX8	9	1253	-	PPARG	2	216	-	4	4.65%
COSF1225	PAX8	7	943	-	PPARG	2	216	-	1	1.16%
COSF1216	PAX8	?	?	-	PPARG	?	?	-	52	60%
Total Mutations									86	100%

Figure 4K

Mutation ID	5' Partner Gene				3' Partner Gene				No. of Mutations	Mutation Frequency
	Gene Name	Last Observed Exon	Inferred Breakpoint	Inserted Sequence	Gene Name	First Observed Exon	Inferred Breakpoint	Inserted Sequence		
COSF199	NPM1	5	487	-	ALK	20	4080	-	301	94.36%
COSF448	NPM1	5	487+192	-	ALK	20	4080-616	-	1	.31%
COSF449	NPM1	5	487+201	-	ALK	20	4080-24	-	1	.31%
COSF450	NPM1	5	487+230	-	ALK	20	4080-1134	-	1	.31%
COSF451	NPM1	5	487+295	-	ALK	20	4080-954	-	1	.31%
COSF458	NPM1	5	487+897	-	ALK	20	4080-1511	-	1	.31%
COSF453	NPM1	5	487+443	-	ALK	20	4080-1040	-	1	.31%
COSF454	NPM1	5	487+546	-	ALK	20	4080-583	-	1	.31%
COSF455	NPM1	5	487+726	-	ALK	20	4080-660	-	1	.31%
COSF456	NPM1	5	487+778	-	ALK	20	4080-208	-	1	.31%
COSF457	NPM1	5	487+865	-	ALK	20	4080-629	-	1	.31%
COSF201	NPM1	5	487	-	ALK	20	4080	-	1	.31%
COSF452	NPM1	5	487+358	-	ALK	20	4080-1128	-	1	.31%
COSF420	NPM1	?	?	-	ALK	?	?	-	6	2%
Total Mutations									319	100%

Figure 4L

Mutation ID	5' Partner Gene				3' Partner Gene				No. of Mutations	Mutation Frequency
	Gene Name	Last Observed Exon	Inferred Breakpoint	Inserted Sequence	Gene Name	First Observed Exon	Inferred Breakpoint	Inserted Sequence		
COSF482	KIAA1549	15	5097	-	BRAF	9	1202	-	318	53.45%
COSF484	KIAA1549	14	4779	-	BRAF	9	1202	-	105	17.65%
COSF486	KIAA1549	15	5097	-	BRAF	11	1376	-	39	6.55%
COSF1229	KIAA1549	17	5302	-	BRAF	10	1239	-	4	.67%
COSF1227	KIAA1549	14	4779	-	BRAF	11	1376	-	3	.5%
COSF1477	KIAA1549	14	4779+34	-	BRAF	10	1239	-	1	.17%
COSF510	KIAA1549	17	5302	-	BRAF	10	1239	-	1	.17%
COSF1284	KIAA1549	15	5097	-	BRAF	10	1239	-	1	.17%
COSF1472	KIAA1549	18	5448	-	BRAF	9	1202	-	1	.17%
COSF1475	KIAA1549	12	4401	-	BRAF	9	1202	-	1	.17%
COSF512	KIAA1549	18	5448	-	BRAF	9	1202	-	1	.17%
COSF588	KIAA1549	?	?	-	BRAF	?	?	-	120	20%
Total Mutations									595	100%

Figure 4M

Mutation ID	5' Partner Gene				3' Partner Gene				No. of Mutations	Mutation Frequency
	Gene Name	Last Observed Exon	Inferred Breakpoint	Inserted Sequence	Gene Name	First Observed Exon	Inferred Breakpoint	Inserted Sequence		
COSF501	SS18	10	1286	-	SSX2	6	439	-	334	93.3%
COSF587	SS18	10	1286+?	-	SSX2	6	439-?	-	5	1.4%
COSF530	SS18	10	1286+9829	-	SSX2	6	439	-	2	.56%
COSF567	SS18	10	1286	y	SSX2	6	439-1995	-	1	.28%
COSF579	SS18	10	1286+1984	-	SSX2	6	439-684	-	1	.28%
COSF580	SSX2	5	438+280	-	SS18	11	1287-12012	-	1	.28%
COSF583	SS18	10	1286+1455	-	SSX2	6	439-1412	-	1	.28%
COSF584	SS18	10	1286+4538	-	SSX2	6	439-606	-	1	.28%
COSF585	SSX2	5	438+420	-	SS18	11	1287-12550	-	1	.28%
COSF586	SSX2	5	438+1318	-	SS18	11	1287-9312	-	1	.28%
COSF524	SSX2	4	388+1711	-	SS18	11	1287-12732	-	1	.28%
COSF523	SS18	10	1286+701	-	SSX2	5	389-6	-	1	.28%
COSF517	SS18	10	1286	-	SSX2	4	313	-	1	.28%
COSF574	SS18	10	1286+10808	-	SSX2	4	293	-	1	.28%
COSF576	SSX2	?	?	-	SS18	?	?	-	6	2%
Total Mutation									358	100%

Figure 4N

Mutation ID	5' Partner Gene				3' Partner Gene				Mutation Frequency	
	Gene Name	Last Observed Exon	Inferred Breakpoint	Inserted Sequence	Gene Name	First Observed Exon	Inferred Breakpoint	Inserted Sequence		No. of Mutations
COSF504	SS18	10	1286	-	SSX1	6	467	-	569	95.95%
COSF514	SS18	10	1286	-	SSX1	5	417	-	1	.17%
COSF519	SS18	10	1286	-	SSX1	6	467-103	-	1	.17%
COSF581	SS18	10	1286+8793	-	SSX1	6	467-7	-	1	.17%
COSF528	SS18	9	1152	-	SSX1	4	321	-	1	.17%
COSF577	SS18	10	1286+1941	-	SSX1	6	467-1313	-	1	.17%
COSF578	SSX1	5	466+575	-	SS18	11	1287-12019	-	1	.17%
COSF506	SS18	9	1152	-	SSX1	5	417	-	1	.17%
COSF521	SS18	10	1286	y	SSX1	4	321	-	1	.17%
COSF575	SSX1	?	?	-	SS18	?	?	-	15	3%
COSF515	SS18	?	?	-	SSX1	?	?	-	1	0%
Total Mutations									593	100%

Figure 4O

Mutation ID	5' Partner Gene				3' Partner Gene				No. of Mutations	Mutation Frequency
	Gene Name	Last Observed Exon	Inferred Breakpoint	Inserted Sequence	Gene Name	First Observed Exon	Inferred Breakpoint	Inserted Sequence		
COSF1197	SLC34A2	4	429	-	ROS1	32	5448	-	8	66.6%
COSF1260	SLC34A2	13	2076	-	ROS1	32	5448	-	1	8.33%
COSF1618	SLC34A2	?	?	-	ROS1	?	?	-	3	25%
Total Mutations									12	100%

Figure 4P

Mutation ID	5' Partner Gene				3' Partner Gene				No. of Mutations	Mutation Frequency
	Gene Name	Last Observed Exon	Inferred Breakpoint	Inserted Sequence	Gene Name	First Observed Exon	Inferred Breakpoint	Inserted Sequence		
COSF248	PAX3	7	1539	-	FOXO1	2	1016	-	357	92.49%
COSF906	FOXO1	1	1015	-	PAX3	8	1540	-	6	1.55%
COSF343	PAX3	?	?	-	FOXO1	?	?	-	23	6%
Total Mutations									386	100%

Figure 4Q

Mutation ID	5' Partner Gene				3' Partner Gene				No. of Mutations	Mutation Frequency
	Gene Name	Last Observed Exon	Inferred Breakpoint	Inserted Sequence	Gene Name	First Observed Exon	Inferred Breakpoint	Inserted Sequence		
COSF1512	PRKARIA	7	825	-	RET	12	2369	-	30	100%
Total Mutations									30	100%

Figure 4R

Mutation ID	5' Partner Gene				3' Partner Gene				Mutation Frequency
	Gene Name	Last Observed Exon	Inferred Breakpoint	Inserted Sequence	Gene Name	First Observed Exon	Inferred Breakpoint	Inserted Sequence	
COSF1268	EZR	10	1259	-	ROS1	34	5757	-	85.71%
COSF1396	EZR	10	1259+207	-	ROS1	34	1259+210	-	14.29%
Total Mutation									100%
									7

Figure 4S

Mutation ID	5' Partner Gene				3' Partner Gene				Mutation Frequency
	Gene Name	Last Observed Exon	Inferred Breakpoint	Inserted Sequence	Gene Name	First Observed Exon	Inferred Breakpoint	Inserted Sequence	
COSF115	TMPRSS2	2	150	-	ETV1	6	850	-	20%
COSF134	TMPRSS2	2	150	-	ETV1	7	904	-	10%
COSF122	TMPRSS2	?	?	-	ETV1	?	?	-	70%
Total Mutations									100%
									10

Figure 4T

Mutation ID	5' Partner Gene				3' Partner Gene				No. of Mutations	Mutation Frequency
	Gene Name	Last Observed Exon	Inferred Breakpoint	Inserted Sequence	Gene Name	First Observed Exon	Inferred Breakpoint	Inserted Sequence		
COSF572	ETV6	5	1283	-	NTRK3	15	1908	-	118	81.38%
COSF1535	ETV6	4	737	-	NTRK3	14	1719	-	15	10.34%
COSF1537	ETV6	5	1283	-	NTRK3	14	1719	-	1	.69%
COSF824	ETV6	4	737	-	NTRK3	15	1908	-	1	.69%
COSF889	NTRK3	14	1907	-	ETV6	6	1284	-	1	.69%
COSF495	ETV6	?	?	-	NTRK3	?	?	-	9	6%
Total Mutations									145	100%

Figure 4U

Mutation ID	5' Partner Gene				3' Partner Gene				No. of Mutations	Mutation Frequency
	Gene Name	Last Observed Exon	Inferred Breakpoint	Inserted Sequence	Gene Name	First Observed Exon	Inferred Breakpoint	Inserted Sequence		
COSF288	PAX7	?	1753	-	FOXO1	2	1016	-	98	98.99%
COSF344	PAX7	?	?	-	FOXO1	?	?	-	1	1%
Total Mutations									99	100%

FIGURE 5A

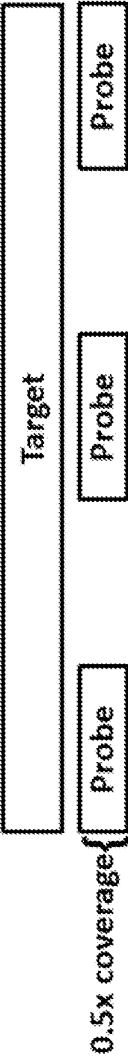
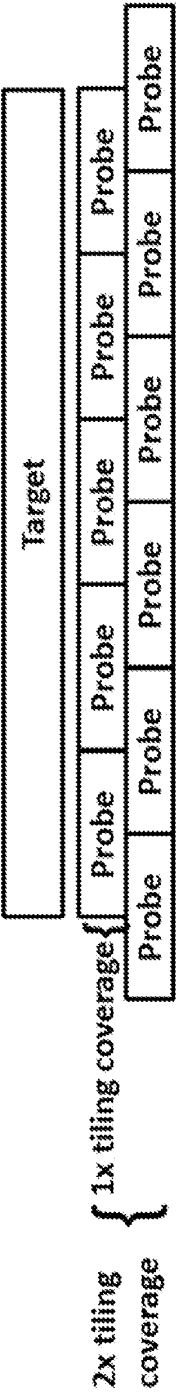


FIGURE 5B



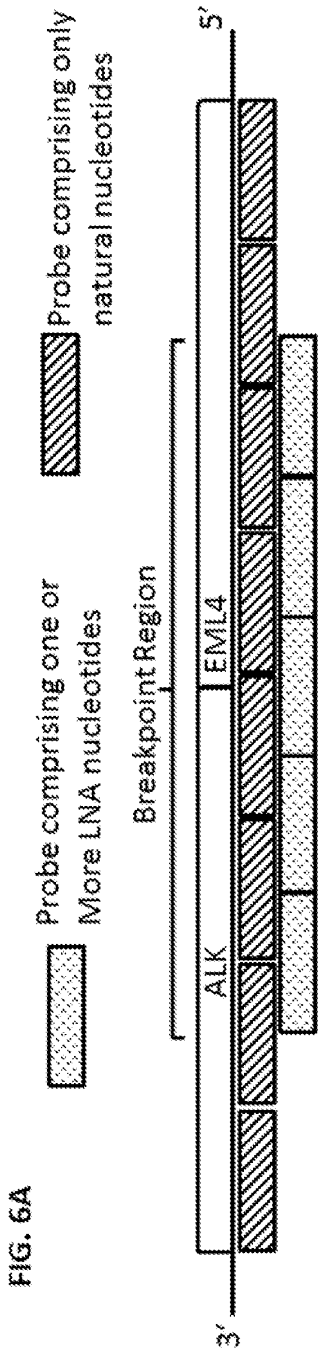
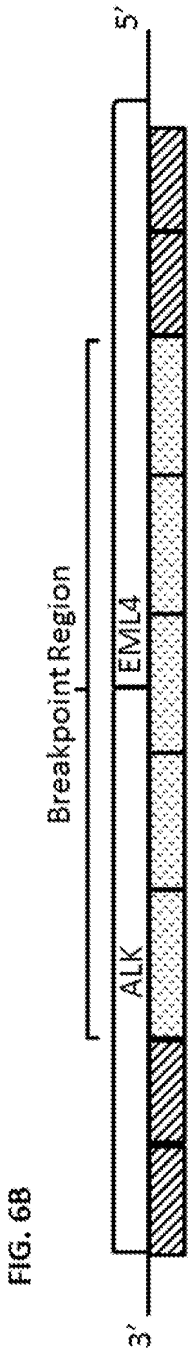
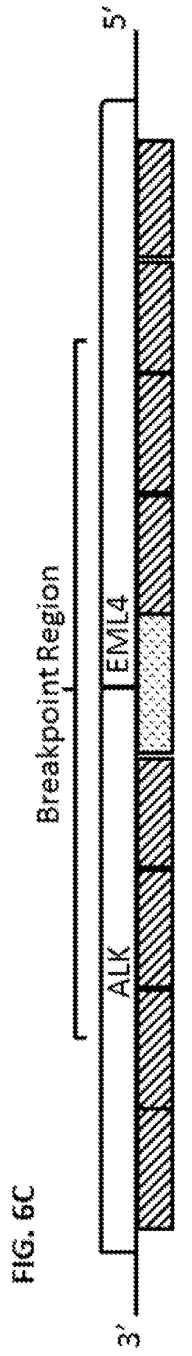
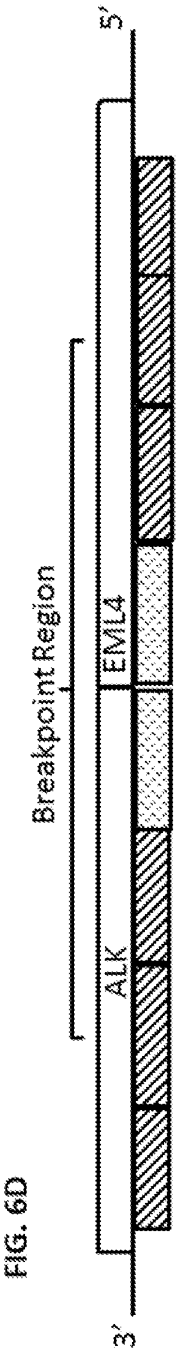


FIG. 7

68 Gene Panel

Genes with Complete Exon and Partial Intron Coverage

<i>APC</i>	<i>AR</i>	<i>ARID1A</i>	<i>BRAF</i>	<i>BRCA1</i>	<i>BRCA2</i>	<i>CCND1</i>	<i>CCND2</i>	<i>CCNE1</i>
<i>CDK4</i>	<i>CDK6</i>	<i>CDKN2A</i>	<i>CDKN2B</i>	<i>EGFR*</i>	<i>ERBB2</i>	<i>FGFR1</i>	<i>FGFR2</i>	<i>HRAS</i>
<i>KIT</i>	<i>KRAS</i>	<i>MET</i>	<i>MYC</i>	<i>NF1</i>	<i>NRAS</i>	<i>PDGFRA</i>	<i>PIK3CA</i>	<i>PTEN</i>
<i>RAF1</i>	<i>TP53</i>							

Genes in bold are those that are also analyzed for copy number variations (CNVs).

*Includes indels in Exon 19 and 20

Genes with Critical Exon Coverage

<i>AKT1</i>	<i>ALK</i>	<i>ARAF</i>	<i>ATM</i>	<i>CDH1</i>	<i>CTNNB1</i>	<i>ESR1</i>	<i>EZH2</i>	<i>FBXW7</i>
<i>FGFR3</i>	<i>GATA3</i>	<i>GNA11</i>	<i>GNAQ</i>	<i>GNAS</i>	<i>HNF1A</i>	<i>IDH1</i>	<i>IHD2</i>	<i>JAK2</i>
<i>JAK3</i>	<i>MAP2K1</i>	<i>MAP2K2</i>	<i>MLH1</i>	<i>MPL</i>	<i>NFE2L2</i>	<i>NOTCH1</i>	<i>NPM1</i>	<i>NTRK1</i>
<i>PTPN11</i>	<i>RET</i>	<i>RHEB</i>	<i>RHOA</i>	<i>RIT1</i>	<i>ROS1</i>	<i>SMAD4</i>	<i>SMO</i>	<i>SRC</i>
<i>STK11</i>	<i>TERT</i>	<i>VHL</i>						

Rearrangements

<i>ALK</i>	<i>NTRK1</i>	<i>RET</i>	<i>ROS1</i>
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*Includes promoter region

FIG. 8

Gene	chromosome	start	stop	length (bps)	Exons Covered
ALK	chr2	29446405	29446655	250	intron 19
ALK	chr2	29446062	29446197	135	intron 20
ALK	chr2	29446198	29446404	206	20
ALK	chr2	29447353	29447473	120	intron 19
ALK	chr2	29447614	29448316	702	intron 19
ALK	chr2	29448317	29448441	124	19
ALK	chr2	29449366	29449777	411	intron 18
ALK	chr2	29449778	29449950	172	18

FIG. 9

