Medullary Pancreatic Carcinoma Due to Somatic *POLE* Mutation

A Distinctive Pancreatic Carcinoma With Marked Long-Term Survival

SUPPLEMENTAL DIGITAL CONTENT

SUPPLEMENTAL TABLE 1. Immunohistochemistry, Methods, and List of Antibodies

Antibody Name	Clone	Dilution	Supplier
β-catenin	14	1:40	Cellmarque
BCL10	331.3	1:400	Santa Cruz
CD4	SP35	1:35	Cellmarque
CD8	M7103	1:100	Dako
CD10	56C6	1:80	Novocastra
Cytokeratin 7	OV-TL 12/30	1:6400	Biogenex
Granzyme B	GrB-7	1:300	Monosan
MLH1	G168-15	1:20	Pharmingen
MSH2	G219-1129	1:50	Cellmarque
MSH6	EPR3945	1:200	Abcam
PMS2	EPR3947	1:25	Cellmarque
p53	DO-7	1:6000	Dako
SMAD4	EP6184	1:800	Abcam

Immunohistochemistry was performed using standard conditions in the Benchmark Ultra autostainer (Ventana Medical Systems, Inc. A Member of the Roche Group, Tucson, Ariz.) with the listed antibodies.

SUPPLEMENTAL TABLE 2. DNA Sequencing and Microsatellite Analysis

Gene	Accession No.	Codon
AKT1	NM_005163.2	17
AKT2	NM_001626.5	17
AKT3	NM_181690.2	17
*ALK**	NM_004304.4	1059-1150, 1173-1278
ARAF	NM_001654.4	214
*BRAF**	NM_004333.4	455-488, 566-580, 594-605
CTNNB1	NM_001904.3	19-48
DDR2	NM_006182.2	503-856
*EGFR**	NM_005228.4	434-499, 688-875
*ERBB2**	NM_004448.3	310, 650-695, 737-883
FGFR1†	NM_001174063.1	
FGFR2†	NM_000141.4	
FGFR3†	NM_000142.4	
GNA11	NM_002067.4	183, 209
GNAQ	NM_002072.4	183, 209
GNAS	NM_000516.5	201, 227
HRAS	NM_005343.3	12, 13, 59, 61
IDH1	NM_005896.3	132
IDH2	NM_002168.3	140, 172
JAK2	NM_004972.3	617
*KIT**	NM_000222.2	412-513, 550-591, 640-787, 799-850
*KRAS**	NM_004985.4	12, 13, 59, 61, 117, 146
MAP2K1	NM_002755.3	28-231
MDM2†	NM_002392.5	
*MET**	NM_001127500.2	168, 375, 982-1027, 1230-1284, 1304, including exon 14 (-90, +20bp)
MTOR	NM_004958.3	1458-1489, 1789-1820, 1971-1995, 2194-2220, 2404-2433, 2484-2509
NRAS	NM_002524.4	12, 13, 59, 61, 117, 146
*PDGFRA**	NM_006206.5	552-595, 632-667, 824-848
*PIK3CA**	NM_006218.3	345, 420, 539-554, 1043-1050
POLE	NM_006231.3	268-491
PTEN	NM_000314.6	86-267, 276-342
RAF1	NM_002880.3	257-261
ROS1	NM_002944.2	1927-2189
TP53	NM_000546.5	>94% of the coding regions
Markers for MSI analysis	BAT25, BAT26, NR21, NR24 and NR27	

Genomic DNA was isolated from deparaffinized formalin-fixed paraffin-embedded tumor and normal tissue using standard procedures. Library preparation and sequencing using a single-molecule molecular inversion probe (smMIP)-based NextSeq 500 approach were performed as described previously,[1] with the listed gene panel.

Using a separate smMIP panel, 99% of the coding region of *SMAD4* (SMAD4 RefSeq NM_005359.5) was analyzed.

*For detection of point mutations and amplification.

†For amplification detection.

MSI, microsatellite instability.

SUPPLEMENTAL METHODS

Tumor Mutational Burden Analysis

Tumor mutational burden (TMB) was determined using the TruSight™ Oncology 500 kit (early access program, Illumina, Inc., San Diego, Calif) according to the manufacturer's protocol. 40 ng DNA was used as input. The kit makes use of a hybrid-based capture technology using probes for 523 cancer-related genes (1.94 Mb). The TMB was determined using the bioinformatic pipeline provided by Illumina. This pipeline identifies all variants (single nucleotide variants and indels) in the coding region with a VAF >5%, and subsequently removes germline variants, driver mutations and synonymous variants. Finally, the number of remaining variants is divided by the target region covered with more than 50 unique reads (based on unique molecular identifiers) to determine the number of nonsynonymous mutations/Mb. Mutational signature analysis was performed as described previously.[2] The MPC described in the current paper is represented as UPN40 in Kroeze et al.[2] In Figure 5 of the Kroeze et al study, the high contribution of signature 10a and 10b is demonstrated.[2]

SUPPLEMENTAL TABLE 3. The Complete List of Tumor-Specific Somatic Variants

Gene	Hgvsg	Hgvsc	Hgvsp	% Variation (VAF)	COSMIC IDs (COSMIC v86)
JAK2	9:g.5055687G>A	ENST00000381652.3_2.1:c.955G>A	ENSP00000371067.3:p.Asp319Asn	48,97959184	COSM179108
FGFR2	10:g.123241363T>G	ENST00000360144.7_2.1:c.*323A>C		46,66666667	
CDC73	1:g.193099338G>A	ENST00000367435.3_2.1:c.272G>A	ENSP00000356405.3:p.Arg91Gln	26,61290323	COSM274461
FGF2	4:g.123815751G>T	ENST00000264498.7_2.1:c.*2200G>T		26,31578947	
TERT	5:g.1295228G>T			25	
RPS6KB1	17:g.58027159_58027163del	ENST00000225577.8_2.1:c.*3010_*3014del		22,5	
ERG	21:g.39752799T>C	ENST00000288319.11_2.1:c.*2526A>G		21,83908046	
NTRK3	15:g.88520638A>G	ENST00000317501.7_2.1:c.*1938T>C		21,21212121	
SETD2	3:g.47161694C>A	ENST00000409792.3_2.1:c.4432G>T	ENSP00000386759.3:p.Glu1478Ter	21,17647059	COSM1045472; COSM1045473
RET	10:g.43622949A>T	ENST00000340058.5_2.1:c.*747A>T		20,96774194	
PPARG	3:g.12414340A>C	ENST00000287820.10_2.1:c.83-6863A>C		20,3539823	
BRCA2	13:g.32906606A>C	ENST00000380152.7_2.1:c.991A>C	ENSP00000369497.3:p.Lys331Gln	20	
NTRK2	9:g.87492250G>A	ENST00000304053.10_2.1:c.*5518G>A		19,78609626	
NRG1	8:g.32077742T>A	ENST00000519301.5_1.1:c.38-375604T>A		19,58762887	
ETV1	7:g.13980557T>C	ENST00000242066.9_2.1:c.182-1686A>G		19,56521739	
CTNNA1	5:g.138240092C>T	ENST00000302763.11_2.1:c.1351C>T	ENSP00000304669.7:p.Arg451Ter	19,37984496	COSM274692
PIK3C3	18:g.39647366C>T	ENST00000262039.8_2.1:c.2538C>T	ENSP00000262039.3:p.Phe846=	19,13043478	
RAD50	5:g.131939002A>C	ENST00000378823.7_2.1:c.2218A>C	ENSP00000368100.4:p.Ile740Leu	18,98734177	
ETV1	7:g.14007913G>A	ENST00000242066.9_2.1:c.181+18350C>T		18,96551724	
SNCAIP	5:g.121787269C>T	ENST00000261367.11_2.1:c.2868C>T	ENSP00000261367.7:p.Ser956=	18,95424837	
SOX2	3:g.181431062G>A	ENST00000325404.2_2.1:c.914G>A	ENSP00000323588.1:p.Gly305Asp	18,6746988	
PTCH1	9:g.98211513C>T	ENST00000331920.10_2.1:c.3642G>A	ENSP00000332353.6:p.Thr1214=	18,56540084	
ATM	11:g.108115600C>T	ENST00000278616.8_2.1:c.748C>T	ENSP00000278616.4:p.Arg250Ter	18,4	COSM173211; COSM1135092
KDM5C	X:g.53226187G>A	ENST00000375379.7_2.1:c.2662C>T	ENSP00000364528.3:p.Arg888Cys	18,33333333	COSM6909205; COSM6909206; COSM6909207
GNAS	20:g.57429095G>A	ENST00000371099.6_2.1:c.775G>A	ENSP00000360140.2:p.Ala259Thr	18,30357143	COSM2764846
AR	X:g.66837786G>A	ENST00000374690.8_3.1:c.1617-25312G>A		18,24324324	
IGF1R	15:g.99250946T>G	ENST00000268035.10_2.1:c.250T>G	ENSP00000268035.6:p.Tyr84Asp	18,22916667	
PAX3	2:g.223075998C>T	ENST00000336840.10_2.1:c.1173+8861G>A		18,18181818	
NRAS	1:g.115254575A>C	ENST00000369535.4_2.1:c.290+1846T>G		18,03278689	
SPTA1	1:g.158612202T>G	ENST00000368147.8_2.1:c.4736A>C	ENSP00000357129.4:p.Lys1579Thr	17,91044776	
LRP1B	2:g.141113956A>G	ENST00000389484.7_2.1:c.11485T>C	ENSP00000374135.3:p.Cys3829Arg	17,82945736	
MSH2	2:g.47639587G>T	ENST00000233146.6_2.1:c.680G>T	ENSP00000233146.2:p.Arg227Ile	17,64705882	
MET	7:g.116435978G>T	ENST00000318493.10_2.1:c.4027G>T	ENSP00000317272.6:p.Glu1343Ter	17,46987952	
MET	7:g.116413278G>T	ENST00000318493.10_2.1:c.3082+1235G>T		17,41935484	
MLLT3	9:g.20413989C>T	ENST00000380338.8_2.1:c.855G>A	ENSP00000369695.4:p.Pro285=	17,36111111	COSM3906514
STAG1	3:g.136057274G>A	ENST00000236698.9_2.1:c.3580C>T	ENSP00000236698.5:p.Arg1194Ter	17,34104046	COSM6401575

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SUPPLEMENTAL TABLE 3. *(Continued)*

Gene	Hgvsg	Hgvsc	Hgvsp	% Variation (VAF)	COSMIC IDs (COSMIC v86)
EPHA5	4:g.66467369G>A	ENST00000273854.7_3.1:c.900C>T	ENSP00000273854.3:p.Gly300=	17,27272727	
SMO	7:g.128845480G>A	ENST00000249373.7_2.1:c.777G>A	ENSP00000249373.3:p.Ser259=	17,05882353	COSM4829505
MLLT3	9:g.20414054T>A	ENST00000380338.8_2.1:c.790A>T	ENSP00000369695.4:p.Lys264Ter	17,00680272	
SH2B3	12:g.111885567C>T	ENST00000341259.6_2.1:c.1344C>T	ENSP00000345492.2:p.Leu448=	16,89189189	
KDM5C	X:g.53239703C>A	ENST00000375379.7_2.1:c.1639G>T	ENSP00000364528.3:p.Glu547Ter	16,88311688	
GRIN2A	16:g.9857021G>A	ENST00000330684.3_1.1:c.4380C>T	ENSP00000332549.3:p.Ile1460=	16,82242991	COSM3513409
NRG1	8:g.32613974G>A	ENST00000287842.7_1.1:c.872G>A	ENSP00000287842.4:p.Arg291Gln	16,66666667	COSM2958996; COSM2958997; COSM5757211; COSM6729597
SMAD2	18:g.45391449C>A	ENST00000262160.10_4.1:c.711G>T	ENSP00000262160.6:p.Leu237Phe	16,66666667	
RICTOR	5:g.38949456A>G	ENST00000296782.9_2.1:c.4208+2T>C		16,52173913	
PAX7	1:g.19074508A>G	ENST00000420770.6_2.1:c.*3085A>G		16,48351648	
RET	10:g.43613790C>T	ENST00000340058.5_2.1:c.2285-31C>T		16,47727273	
XPO1	2:g.61715367C>T	ENST00000401558.6_2.1:c.2246G>A	ENSP00000384863.2:p.Arg749Gln	16,37931034	COSM286575
EGFR	7:g.55269212T>G	ENST00000275493.6_2.1:c.3114+164T>G		16,32653061	
ERG	21:g.39753723G>A	ENST00000288319.11_2.1:c.*1602C>T		16,31578947	
CTNNA1	5:g.138223321A>C	ENST00000302763.11_2.1:c.1286A>C	ENSP00000304669.7:p.Lys429Thr	16,2601626	
FGF6	12:g.4548827T>G	ENST00000228837.2_2.1:c.450+4472A>C		16,25	
EGFR	7:g.55268211C>T	ENST00000275493.6_2.1:c.2946+105C>T		16,23376623	
PRKDC	8:g.48827975C>T	ENST00000314191.6_3.1:c.2530G>A	ENSP00000313420.3:p.Glu844Lys	16,07142857	
PRKCI	3:g.170013719C>T	ENST00000295797.4_2.1:c.1438C>T	ENSP00000295797.4:p.Arg480Cys	15,94202899	COSM78349
KRAS	12:g.25379432A>G	ENST00000256078.8_2.1:c.291-725T>C		15,92920354	
GNAS	20:g.57484420C>T	ENST00000265620.11_2.1:c.556C>T	ENSP00000265620.7:p.Arg186Cys	15,92356688	COSM27887; COSM123397
CCND3	6:g.41916808C>T	ENST00000372988.8_2.1:c.-45-8485G>A		15,74074074	
MYB	6:g.135533230T>G	ENST00000316528.12_2.1:c.2065-5772T>G		15,68627451	
CSF3R	1:g.36939382G>T	ENST00000331941.6_2.1:c.468C>A	ENSP00000332180.5:p.Phe156Leu	15,6626506	
KRAS	12:g.25362805C>T	ENST00000311936.7_2.1:c.491G>A	ENSP00000308495.3:p.Arg164Gln	15,6626506	COSM41307
NUP93	16:g.56878418G>A	ENST00000308159.9_2.1:c.2357G>A	ENSP00000310668.5:p.Arg786Gln	15,6462585	COSM6944930
PAK5	20:g.9543605C>T	ENST00000353224.9_2.1:c.1549G>A	ENSP00000322957.5:p.Asp517Asn	15,60283688	COSM3405307
PAX8	2:g.113988067G>A	ENST00000263334.9_2.1:c.1088-3234C>T		15,56886228	
AKT3	1:g.243664223T>G	ENST00000263826.9_2.1:c.*4328A>C		15,55555556	
CUX1	7:g.101892250G>A	ENST00000292535.11_2.1:c.4446G>A	ENSP00000292535.7:p.Ala1482=	15,51724138	COSM6638263
ANKRD26	10:g.27342230T>G	ENST00000376087.4_2.1:c.1635+19A>C		15,38461538	
BRCA1	17:g.41244176G>T	ENST00000354071.7_2.1:c.3372C>A	ENSP00000326002.7:p.Phe1124Leu	15,38461538	
ETV1	7:g.14012128C>T	ENST00000242066.9_2.1:c.181+14135G>A		15,38461538	
CHEK2	22:g.29100312T>G	ENST00000328354.10_2.1:c.847-758A>C		15,25423729	
LATS1	6:g.150004331G>T	ENST00000253339.9_2.1:c.1894C>A	ENSP00000253339.5:p.Gln632Lys	15,2	
TMPRSS2	21:g.42837511A>G	ENST00000332149.9_3.1:c.*558T>C		15,18987342	

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SUPPLEMENTAL TABLE 3. *(Continued)*

Gene	Hgvsg	Hgvsc	Hgvsp	% Variation (VAF)	COSMIC IDs (COSMIC v86)
ANKRD11	16:g.89350021T>G	ENST00000301030.8_2.1:c.2929A>C	ENSP00000301030.4:p.Lys977Gln	15,13944223	
DNMT1	19:g.10250769C>T	ENST00000340748.8_3.1:c.3711G>A	ENSP00000345739.3:p.Ser1237=	15	COSM6647722; COSM6647723
NRG1	8:g.32600436C>T	ENST00000520407.5_1.1:c.*150C>T		14,81481481	
ATRX	X:g.76938028C>T	ENST00000373344.9_2.1:c.2720G>A	ENSP00000362441.4:p.Arg907Gln	14,75409836	COSM5417529; COSM6984669
SDHA	5:g.235382G>A	ENST00000264932.10_2.1:c.1188G>A	ENSP00000264932.6:p.Thr396=	14,66666667	COSM1067099
FAT1	4:g.187510153C>T	ENST00000441802.6_2.1:c.13360G>A	ENSP00000406229.2:p.Glu4454Lys	14,5631068	COSM275097; COSM1206555
PLCG2	16:g.81888101C>T	ENST00000359376.7_2.1:c.246C>T	ENSP00000352336.4:p.Phe82=	14,47368421	COSM3512750; COSM3512751
FGF14	13:g.102912197C>A	ENST00000376131.8_2.1:c.208+141624G>T		14,38848921	
FAT1	4:g.187510252C>T	ENST00000441802.6_2.1:c.13261G>A	ENSP00000406229.2:p.Asp4421Asn	14,36464088	
BCL2L11	2:g.111883441T>G	ENST00000308659.12_2.1:c.214+1725T>G		14,28571429	
ETV1	7:g.14017753C>A	ENST00000242066.9_2.1:c.181+8510G>T		14,28571429	
FLT1	13:g.29008317A>C	ENST00000282397.8_2.1:c.554T>G	ENSP00000282397.4:p.Ile185Ser	14,28571429	
TP53	17:g.7578212G>A	ENST00000269305.8_2.1:c.637C>T	ENSP00000269305.4:p.Arg213Ter	14,28571429	COSM10654; COSM99615; COSM99616; COSM99617; COSM99618; COSM1638393; COSM3378350; COSM6503267
TFE3	X:g.48886426C>T	ENST00000315869.7_2.1:c.*1243G>A		14,28571429	
FANCC	9:g.97873825C>T	ENST00000289081.7_2.1:c.1249G>A	ENSP00000289081.3:p.Glu417Lys	14,21319797	COSM1111387
TOP2A	17:g.38566926C>T	ENST00000423485.5_2.1:c.1203+435G>A		14,20118343	
SMARCD1	12:g.50490648G>T	ENST00000394963.8_2.1:c.1285G>T	ENSP00000378414.4:p.Glu429Ter	14,19354839	
ETV1	7:g.13985219T>C	ENST00000242066.9_2.1:c.182-6348A>G		14,16666667	
ROS1	6:g.117657896C>A	ENST00000368507.7_2.1:c.5230+439G>T		14	
PMS1	2:g.190728885T>G	ENST00000409823.7_2.1:c.2156T>G	ENSP00000387125.3:p.Phe719Cys	13,97849462	
SETD2	3:g.47059132C>T	ENST00000409792.3_2.1:c.7529G>A	ENSP00000386759.3:p.Arg2510His	13,95348837	COSM1137041; COSM1137042
IGF1R	15:g.99500662G>A	ENST00000268035.10_2.1:c.4095G>A	ENSP00000268035.6:p.Ser1365=	13,95348837	
TSPAN31	12:g.58141118C>T	ENST00000257910.7_2.1:c.*45C>T		13,88888889	
ARID2	12:g.46287315C>T	ENST00000334344.10_2.1:c.5260C>T	ENSP00000335044.6:p.Arg1754Ter	13,76811594	COSM1628614
BCL2L11	2:g.111884231A>G	ENST00000308659.12_2.1:c.214+2515A>G		13,69863014	
CHD2	15:g.93521585G>A	ENST00000394196.8_1.1:c.2699G>A	ENSP00000377747.4:p.Arg900Gln	13,69047619	

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SUPPLEMENTAL TABLE 3. *(Continued)*

Gene	Hgvsg	Hgvsc	Hgvsp	% Variation (VAF)	COSMIC IDs (COSMIC v86)
PIK3CA	3:g.178916854G>A	ENST00000263967.3_2.1:c.241G>A	ENSP00000263967.3:p.Glu81Lys	13,63636364	COSM27502; COSM271871
SLIT2	4:g.20620555G>A	ENST00000273739.9_2.1:c.4552G>A	ENSP00000273739.5:p.Glu1518Lys	13,63636364	COSM3602890; COSM7094272
ETV1	7:g.13993941T>G	ENST00000242066.9_2.1:c.182-15070A>C		13,59223301	
ETS1	11:g.128354838C>A	ENST00000319397.6_2.1:c.610G>T	ENSP00000324578.5:p.Asp204Tyr	13,55932203	
FGFR2	10:g.123239600C>T	ENST00000346997.6_3.1:c.2296-65G>A		13,5483871	
PTPRT	20:g.40911144G>A	ENST00000356100.6_2.1:c.2161C>T	ENSP00000348408.2:p.Arg721Cys	13,53383459	COSM2156344; COSM3405085
RAD51D	17:g.33428330C>T	ENST00000335858.11_2.1:c.457G>A	ENSP00000338408.6:p.Gly153Arg	13,51351351	
BRCA2	13:g.32893693T>C	ENST00000380152.7_2.1:c.316+231T>C		13,46153846	
TMPRSS2	21:g.42870728C>T	ENST00000332149.9_3.1:c.-56-612G>A		13,37579618	
GEN1	2:g.17962509G>A	ENST00000317402.11_2.1:c.2030G>A	ENSP00000318977.7:p.Arg677Gln	13,33333333	COSM6670476
MAP2K1	15:g.66729108G>A	ENST00000307102.9_2.1:c.316G>A	ENSP00000302486.4:p.Ala106Thr	13,33333333	COSM4166155
PIK3C2G	12:g.18435196A>C	ENST00000266497.9_2.1:c.181A>C	ENSP00000266497.5:p.Asn61His	13,19444444	
ERBB2	17:g.37868208C>T	ENST00000269571.9_2.1:c.929C>T	ENSP00000269571.4:p.Ser310Phe	13,19444444	COSM48358; COSM5174142
LAMP1	13:g.113959969G>A	ENST00000332556.4_2.1:c.62-831G>A		13,17829457	
EMSY	11:g.76169273C>T	ENST00000334736.7_2.1:c.292C>T	ENSP00000334130.3:p.Arg98Ter	13,17365269	
RFWD2	1:g.176153821A>G	ENST00000308769.12_2.1:c.415T>C	ENSP00000310943.8:p.Cys139Arg	13,08411215	
MAP3K4	6:g.161529837C>T	ENST00000348824.11_2.1:c.4020C>T	ENSP00000297332.10:p.Phe1340=	13,07692308	COSM3024266; COSM3024267
PIK3R3	1:g.46521491C>T	ENST00000262741.9_3.1:c.917G>A	ENSP00000262741.5:p.Arg306Gln	13,04347826	COSM169023; COSM5744198
LATS1	6:g.150004302G>T	ENST00000253339.9_2.1:c.1923C>A	ENSP00000253339.5:p.Phe641Leu	12,90322581	COSM275825; COSM275826; COSM4875919
ATM	11:g.108203492C>T	ENST00000278616.8_2.1:c.7792C>T	ENSP00000278616.4:p.Arg2598Ter	12,90322581	COSM922742; COSM1585338
LRP1B	2:g.140995828C>T	ENST00000389484.7_2.1:c.13453G>A	ENSP00000374135.3:p.Gly4485Arg	12,90322581	
MAGI2	7:g.77973236T>C	ENST00000354212.8_2.1:c.1267A>G	ENSP00000346151.4:p.Thr423Ala	12,83783784	
BCL6	3:g.187447053G>T	ENST00000232014.8_2.1:c.1140C>A	ENSP00000232014.4:p.Phe380Leu	12,8342246	
FAT1	4:g.187540073C>T	ENST00000441802.6_2.1:c.7667G>A	ENSP00000406229.2:p.Arg2556Gln	12,82051282	
BRIP1	17:g.59761290C>A	ENST00000259008.6_2.1:c.3117G>T	ENSP00000259008.2:p.Glu1039Asp	12,66666667	
NSD1	5:g.176638070C>A	ENST00000347982.8_3.1:c.1863C>A	ENSP00000343209.4:p.Phe621Leu	12,58741259	
PTEN	10:g.89624260A>C	ENST00000371953.7_2.1:c.34A>C	ENSP00000361021.3:p.Asn12His	12,57142857	
AKT3	1:g.243736287C>A	ENST00000263826.9_2.1:c.760G>T	ENSP00000263826.5:p.Glu254Ter	12,5	COSM6935165; COSM6935166; COSM6935167
MST1	3:g.49723149C>T	ENST00000449682.2_2.1:c.1267G>A	ENSP00000414287.2:p.Glu423Lys	12,5	COSM6985085

(Continued on next page)

SUPPLEMENTAL TABLE 3. *(Continued)*

Gene	Hgvsg	Hgvsc	Hgvsp	% Variation (VAF)	COSMIC IDs (COSMIC v86)
CTNNA1	5:g.138253548G>A	ENST00000302763.11_2.1:c.1507G>A	ENSP00000304669.7:p.Asp503Asn	12,5	COSM3609084
ROS1	6:g.117639632T>G	ENST00000368507.7_2.1:c.5923-217A>C		12,5	
PGR	11:g.100962530G>A	ENST00000263463.9_1.1:c.1867C>T	ENSP00000263463.5:p.Arg623Cys	12,5	COSM6970526; COSM6970527
EP300	22:g.41523587C>T	ENST00000263253.8_2.1:c.1003C>T	ENSP00000263253.7:p.Arg335Cys	12,4137931	
NTRK3	15:g.88521959A>C	ENST00000317501.7_2.1:c.*617T>G		12,39669421	
NOTCH3	19:g.15297788C>T	ENST00000263388.6_2.1:c.1852G>A	ENSP00000263388.1:p.Glu618Lys	12,39669421	COSM992095; COSM1589823
ATRX	X:g.76938995C>T	ENST00000373344.9_2.1:c.1753G>A	ENSP00000362441.4:p.Glu585Lys	12,35955056	COSM5120258
ACVR1B	12:g.52370255G>A	ENST00000257963.8_2.1:c.476G>A	ENSP00000257963.4:p.Arg159His	12,35294118	COSM273619; COSM273620
ESR1	6:g.152382165C>T	ENST00000206249.7_2.1:c.1275C>T	ENSP00000206249.3:p.Phe425=	12,34567901	COSM3019473; COSM4350665
FAT1	4:g.187628505C>A	ENST00000441802.6_2.1:c.2477G>T	ENSP00000406229.2:p.Ser826Ile	12,32876712	
FGF10	5:g.44364133G>T	ENST00000264664.4_2.1:c.325+24327C>A		12,32876712	
RANBP2	2:g.109381319A>C	ENST00000283195.10_2.1:c.4324A>C	ENSP00000283195.6:p.Lys1442Gln	12,31884058	
ROS1	6:g.117652143C>T	ENST00000368507.7_2.1:c.5231-1534G>A		12,30769231	
NSD1	5:g.176636719G>A	ENST00000347982.8_3.1:c.512G>A	ENSP00000343209.4:p.Arg171Gln	12,29508197	COSM1436256; COSM1436257
NRG1	8:g.32617769C>T	ENST00000287842.7_1.1:c.1128C>T	ENSP00000287842.4:p.Ile376=	12,17948718	COSM4708137; COSM4708138; COSM6729589; COSM6729590
MAP3K4	6:g.161470088G>A	ENST00000348824.11_2.1:c.784G>A	ENSP00000297332.10:p.Glu262Lys	12,04188482	COSM207464; COSM207465
TFE3	X:g.48886484C>T	ENST00000315869.7_2.1:c.*1185G>A		12,03007519	
MYB	6:g.135527548T>G	ENST00000316528.12_2.1:c.2064+3086T>G		12	
ETV1	7:g.13984979C>A	ENST00000242066.9_2.1:c.182-6108G>T		12	
ERG	21:g.39870326C>T	ENST00000288319.11_2.1:c.-22G>A		12	
KMT2A	11:g.118365420T>C	ENST00000389506.9_2.1:c.5292T>C	ENSP00000374157.5:p.Arg1764=	11,86440678	
ETV1	7:g.14004992C>T	ENST00000242066.9_2.1:c.181+21271G>A		11,84210526	
TMPRSS2	21:g.42872395T>G	ENST00000332149.9_3.1:c.-56-2279A>C		11,8226601	
EZH2	7:g.148504761C>T	ENST00000320356.6_2.1:c.2233G>A	ENSP00000320147.2:p.Glu745Lys	11,79775281	COSM1087033; COSM1087034
ETV6	12:g.11992197T>G	ENST00000396373.8_2.1:c.287T>G	ENSP00000379658.3:p.Leu96Arg	11,79775281	
SMARCD1	12:g.50481162G>A	ENST00000381513.8_2.1:c.548G>A	ENSP00000370924.4:p.Arg183Gln	11,73469388	COSM176245; COSM6924995
FANCE	6:g.35420518G>A	ENST00000229769.2_2.1:c.196G>A	ENSP00000229769.2:p.Ala66Thr	11,67883212	
CDC73	1:g.193111009A>C	ENST00000367435.3_2.1:c.542A>C	ENSP00000356405.3:p.Lys181Thr	11,66666667	
NKX3-1	8:g.23536116T>C			11,62790698	

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SUPPLEMENTAL TABLE 3. *(Continued)*

Gene	Hgvsg	Hgvsc	Hgvsp	% Variation (VAF)	COSMIC IDs (COSMIC v86)
DNMT1	19:g.10267124C>T	ENST00000340748.8_3.1:c.1294G>A	ENSP00000345739.3:p.Glu432Lys	11,62790698	COSM266403; COSM5826029
CASP8	2:g.202131317A>C	ENST00000264274.13_4.1:c.108A>C	ENSP00000264274.9:p.Glu36Asp	11,61290323	
FGF10	5:g.44314795G>T	ENST00000264664.4_2.1:c.326-4163C>A		11,57024793	
ROS1	6:g.117739650C>T	ENST00000368507.7_2.1:c.143G>A	ENSP00000357493.3:p.Gly48Asp	11,53846154	COSM3697372; COSM3697373
ATRX	X:g.76778736C>T	ENST00000373344.9_2.1:c.6843G>A	ENSP00000362441.4:p.Glu2281=	11,53846154	
ATM	11:g.108216609C>T	ENST00000278616.8_2.1:c.8558C>T	ENSP00000278616.4:p.Thr2853Met	11,51515152	COSM922753; COSM1152250
EPHA3	3:g.89456466T>C	ENST00000336596.6_2.1:c.1642T>C	ENSP00000337451.2:p.Ser548Pro	11,47540984	
NTRK2	9:g.87481353G>A	ENST00000277120.7_2.1:c.1445-805G>A		11,45038168	
TFE3	X:g.48886584dup	ENST00000315869.7_2.1:c.*1089dup		11,42857143	
APC	5:g.112177049C>T	ENST00000257430.8_2.1:c.5758C>T	ENSP00000257430.4:p.Arg1920Ter	11,38613861	COSM1059619
ESR1	6:g.152265323G>A	ENST00000206249.7_2.1:c.776G>A	ENSP00000206249.3:p.Arg259Gln	11,38211382	COSM1441227; COSM5830261
FGF2	4:g.123754699C>T	ENST00000264498.7_2.1:c.577+6192C>T		11,34020619	
PPARG	3:g.12414326G>A	ENST00000287820.10_2.1:c.83-6877G>A		11,30434783	
CTNNA1	5:g.138261034G>A	ENST00000302763.11_2.1:c.1837G>A	ENSP00000304669.7:p.Asp613Asn	11,2244898	
FGF9	13:g.22275458A>C	ENST00000382353.5_2.1:c.511A>C	ENSP00000371790.5:p.Thr171Pro	11,19402985	
NF1	17:g.29677227C>T	ENST00000356175.7_3.1:c.7285C>T	ENSP00000348498.3:p.Arg2429Ter	11,18421053	COSM24487; COSM303898; COSM4619727
ATR	3:g.142226864C>T	ENST00000350721.8_2.1:c.4940G>A	ENSP00000343741.4:p.Arg1647His	11,17647059	COSM205529
MET	7:g.116418932G>A	ENST00000318493.10_2.1:c.3497G>A	ENSP00000317272.6:p.Arg1166Gln	11,17318436	COSM252607
APC	5:g.112173824C>T	ENST00000257430.8_2.1:c.2533C>T	ENSP00000257430.4:p.Arg845Cys	11,11111111	
GNAS	20:g.57428560C>T	ENST00000306120.3_1.1:c.50C>T	ENSP00000302237.3:p.Ser17Phe	11,05263158	
CHD2	15:g.93467661A>C	ENST00000394196.8_1.1:c.173A>C	ENSP00000377747.4:p.Glu58Ala	11,04972376	
NUP93	16:g.56865770G>A	ENST00000308159.9_2.1:c.1102G>A	ENSP00000310668.5:p.Glu368Lys	11,03448276	
BRAF	7:g.140490174A>C	ENST00000288602.10_2.1:c.1141-2790T>G		11,00917431	
TAF1	X:g.70642970G>A	ENST00000276072.7_2.1:c.4516G>A	ENSP00000276072.3:p.Glu1506Lys	11,00917431	
CCND3	6:g.41923626G>A	ENST00000372988.8_2.1:c.-45-15303C>T		10,98901099	
NRG1	8:g.32269742T>C	ENST00000519301.5_1.1:c.38-183604T>C		10,94890511	
FGF6	12:g.4554585G>A	ENST00000228837.2_2.1:c.152C>T	ENSP00000228837.2:p.Ser51Leu	10,9375	
EED	11:g.85963248A>C	ENST00000263360.10_2.1:c.326A>C	ENSP00000263360.6:p.Asp109Ala	10,84337349	
BLM	15:g.91346896C>T	ENST00000355112.7_2.1:c.3504C>T	ENSP00000347232.3:p.Ile1168=	10,83333333	
ERG	21:g.39762950G>T	ENST00000288319.11_2.1:c.886C>A	ENSP00000288319.7:p.Leu296Ile	10,81081081	COSM1030634; COSM4865372
PDCD1	2:g.242794903G>A	ENST00000334409.9_2.1:c.306C>T	ENSP00000335062.5:p.Asn102=	10,75268817	COSM4093154
PTPRT	20:g.41420012G>A	ENST00000356100.6_2.1:c.309C>T	ENSP00000348408.2:p.Ile103=	10,73446328	

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SUPPLEMENTAL TABLE 3. *(Continued)*

Gene	Hgvsg	Hgvsc	Hgvsp	% Variation (VAF)	COSMIC IDs (COSMIC v86)
ERBB3	12:g.56478854G>A	ENST00000267101.7_2.1:c.310G>A	ENSP00000267101.3:p.Val104Met	10,625	COSM20710; COSM172423; COSM1152549
PTPRD	9:g.8339011C>T	ENST00000355233.9_2.1:c.4072G>A	ENSP00000347373.5:p.Ala1358Thr	10,57692308	
PAX3	2:g.223068964C>T	ENST00000336840.10_2.1:c.1174-2803G>A		10,52631579	
FGF9	13:g.22268428C>T	ENST00000382353.5_2.1:c.382-6901C>T		10,52631579	
ETV6	12:g.11992104A>G	ENST00000396373.8_2.1:c.194A>G	ENSP00000379658.3:p.Asp65Gly	10,49723757	
FGFR2	10:g.123240021G>T	ENST00000346997.6_3.1:c.2296-486C>A		10,43478261	
BLM	15:g.91306210A>C	ENST00000355112.7_2.1:c.1897A>C	ENSP00000347232.3:p.Asn633His	10,41666667	
XIAP	X:g.123019608T>G	ENST00000355640.3_2.1:c.96T>G	ENSP00000347858.3:p.Thr32=	10,41666667	
TAF1	X:g.70602865C>T	ENST00000276072.7_2.1:c.1858C>T	ENSP00000276072.3:p.Arg620Trp	10,40462428	
BCL2	18:g.60985209C>T	ENST00000589955.2_2.1:c.*73G>A		10,38961039	
ATM	11:g.108201008C>T	ENST00000278616.8_2.1:c.7375C>T	ENSP00000278616.4:p.Arg2459Cys	10,37735849	COSM1315810; COSM6946278
MYB	6:g.135536063C>T	ENST00000316528.12_2.1:c.2065-2939C>T		10,34482759	
TP63	3:g.189455532C>T	ENST00000264731.7_2.1:c.66C>T	ENSP00000264731.3:p.Phe22=	10,22727273	COSM1042482; COSM1593518
STAT4	2:g.191941027G>T	ENST00000358470.8_2.1:c.298C>A	ENSP00000351255.4:p.His100Asn	10,20408163	
PTPRT	20:g.40709556A>G	ENST00000356100.6_2.1:c.4316T>C	ENSP00000348408.2:p.Val1439Ala	10,15625	
ARID1B	6:g.157502295A>G	ENST00000346085.9_3.1:c.3328A>G	ENSP00000344546.4:p.Ile1110Val	10,14492754	
RNF43	17:g.56435927G>A	ENST00000407977.6_2.1:c.1210C>T	ENSP00000385328.2:p.Arg404Cys	10,10638298	COSM6957598
FLT3	13:g.28608093T>C	ENST00000241453.11_2.1:c.1873A>G	ENSP00000241453.7:p.Met625Val	10,09174312	
KRAS	12:g.25380275T>G	ENST00000256078.8_2.1:c.183A>C	ENSP00000256078.4:p.Gln61His	10	COSM554; COSM1135364
NOTCH3	19:g.15276678C>T	ENST00000263388.6_2.1:c.5587G>A	ENSP00000263388.1:p.Ala1863Thr	9,941520468	
CTNNB1	3:g.41266930A>G	ENST00000349496.9_2.1:c.601A>G	ENSP00000344456.5:p.Thr201Ala	9,90990991	
NUTM1	15:g.34639501G>A	ENST00000333756.4_2.1:c.17-669G>A		9,87654321	
RAF1	3:g.12660102C>T	ENST00000251849.8_2.1:c.119G>A	ENSP00000251849.4:p.Arg40His	9,868421053	
RAD54L	1:g.46726574C>T	ENST00000371975.8_2.1:c.653C>T	ENSP00000361043.4:p.Ser218Leu	9,826589595	
DNMT1	19:g.10291154C>T	ENST00000340748.8_3.1:c.317G>A	ENSP00000345739.3:p.Arg106His	9,79020979	
CARD11	7:g.2955004G>A	ENST00000396946.8_2.1:c.2706C>T	ENSP00000380150.4:p.Phe902=	9,77443609	COSM1088967
CBL	11:g.119144662A>T	ENST00000264033.5_2.1:c.675A>T	ENSP00000264033.3:p.Lys225Asn	9,77443609	
TP63	3:g.189612028C>T	ENST00000264731.7_2.1:c.1780C>T	ENSP00000264731.3:p.Arg594Ter	9,770114943	COSM285877; COSM3591234
MAP3K4	6:g.161470139G>A	ENST00000348824.11_2.1:c.835G>A	ENSP00000297332.10:p.Asp279Asn	9,770114943	
ESR1	6:g.152310378C>A	ENST00000206249.7_2.1:c.1097-22413C>A		9,708737864	
ERG	21:g.39755032C>G	ENST00000288319.11_2.1:c.*293G>C		9,701492537	
NTRK3	15:g.88420175A>C	ENST00000355254.6_2.1:c.2445T>G	ENSP00000347397.3:p.Ile815Met	9,696969697	
BLM	15:g.91337445T>G	ENST00000355112.7_2.1:c.3068T>G	ENSP00000347232.3:p.Leu1023Trp	9,677419355	

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SUPPLEMENTAL TABLE 3. *(Continued)*

Gene	Hgvsg	Hgvsc	Hgvsp	% Variation (VAF)	COSMIC IDs (COSMIC v86)
MED12	X:g.70344018G>A	ENST00000333646.10_2.1:c.1295G>A	ENSP00000333125.7:p.Arg432Gln	9,615384615	COSM1124650; COSM1124651; COSM6962492
TBX3	12:g.115120751C>T	ENST00000257566.7_4.1:c.255G>A	ENSP00000257566.3:p.Ala85=	9,604519774	
FGF5	4:g.81198346G>A	ENST00000312465.11_2.1:c.459+2180G>A		9,523809524	
TBX3	12:g.115118806C>T	ENST00000257566.7_4.1:c.535G>A	ENSP00000257566.3:p.Glu179Lys	9,523809524	
PAX7	1:g.19073517T>G	ENST00000420770.6_2.1:c.*2094T>G		9,497206704	
SDHB	1:g.17355174C>T	ENST00000375499.7_2.1:c.344G>A	ENSP00000364649.3:p.Arg115Gln	9,433962264	
EMSY	11:g.76257265C>T	ENST00000334736.7_2.1:c.3698C>T	ENSP00000334130.3:p.Ala1233Val	9,42408377	
EPHA7	6:g.93967915T>C	ENST00000369303.8_2.1:c.2012A>G	ENSP00000358309.4:p.Tyr671Cys	9,420289855	
CBL	11:g.119142446C>T	ENST00000264033.5_2.1:c.445C>T	ENSP00000264033.3:p.Arg149Ter	9,375	COSM6956649
ZFHX3	16:g.72822285G>A	ENST00000268489.9_2.1:c.9890C>T	ENSP00000268489.5:p.Ser3297Leu	9,340659341	COSM6975521
ROS1	6:g.117661166C>A	ENST00000368507.7_2.1:c.5061+1132G>T		9,322033898	
TSHR	14:g.81554305C>T	ENST00000298171.6_2.1:c.325C>T	ENSP00000298171.2:p.Arg109Trp	9,322033898	COSM3356715; COSM3356716
LATS1	6:g.150023019G>A	ENST00000253339.9_2.1:c.244C>T	ENSP00000253339.5:p.Arg82Ter	9,289617486	COSM1074464; COSM1074465; COSM3430104
ETV1	7:g.14018531C>A	ENST00000242066.9_2.1:c.181+7732G>T		9,278350515	
CREBBP	16:g.3778018G>A	ENST00000262367.9_2.1:c.7030C>T	ENSP00000262367.5:p.Arg2344Trp	9,223300971	COSM172758
AKT3	1:g.243667365C>A	ENST00000263826.9_2.1:c.*1186G>T		9,210526316	
ANKRD11	16:g.89349648dup	ENST00000301030.8_2.1:c.3309dup	ENSP00000301030.4:p.Asp1104Argfs Ter2	8,965517241	COSM5573792
PLCG2	16:g.81990462T>C	ENST00000564138.5_2.1:c.3733T>C	ENSP00000482457.1:p.Tyr1245His	8,943089431	
SNCAIP	5:g.121787020G>A	ENST00000261367.11_2.1:c.2619G>A	ENSP00000261367.7:p.Glu873=	8,791208791	
PIK3CG	7:g.106515168C>T	ENST00000359195.3_2.1:c.2311C>T	ENSP00000352121.3:p.Leu771Phe	8,771929825	
ROS1	6:g.117700237A>G	ENST00000368507.7_2.1:c.2567T>C	ENSP00000357493.3:p.Val856Ala	8,724832215	
EIF1AX	X:g.20159750C>A	ENST00000379593.1_2.1:c.9G>T	ENSP00000368912.1:p.Lys3Asn	8,724832215	
CREBBP	16:g.3781408C>T	ENST00000262367.9_2.1:c.4957G>A	ENSP00000262367.5:p.Asp1653Asn	8,695652174	COSM5850890
	6:g.117093570G>A			8,641975309	
PAX3	2:g.223075105C>T	ENST00000336840.10_2.1:c.1174-8944G>A		8,571428571	
TET1	10:g.70406677T>C	ENST00000373644.4_2.1:c.4191T>C	ENSP00000362748.4:p.Asp1397=	8,403361345	
GLI1	12:g.57864115G>A	ENST00000228682.6_2.1:c.1592G>A	ENSP00000228682.2:p.Arg531His	7,894736842	
POLE	12:g.133250289C>A	ENST00000320574.9_3.1:c.1231G>T	ENSP00000322570.5:p.Val411Leu	7,462686567	COSM204094; COSM276835
ATRX	X:g.76912075C>T	ENST00000373344.9_2.1:c.4189G>A	ENSP00000362441.4:p.Glu1397Lys	7,438016529	COSM6984665; COSM6984666
PTPRD	9:g.8484212A>G	ENST00000355233.9_2.1:c.2087T>C	ENSP00000347373.5:p.Val696Ala	7,373271889	
PAK5	20:g.9561257C>A	ENST00000353224.9_2.1:c.525G>T	ENSP00000322957.5:p.Met175Ile	7,100591716	
RAD50	5:g.131944981G>T	ENST00000378823.7_2.1:c.2929G>T	ENSP00000368100.4:p.Glu977Ter	7,01754386	COSM1223000; COSM1223001

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SUPPLEMENTAL TABLE 3. *(Continued)*

Gene	Hgvsg	Hgvsc	Hgvsp	% Variation (VAF)	COSMIC IDs (COSMIC v86)
FGF5	4:g.81211473A>G	ENST00000456523.3_2.1:c.*3978A>G		6,976744186	
MDM2	12:g.69235947G>A	ENST00000258149.9_2.1:c.*2318G>A		6,593406593	
RAD21	8:g.117875450G>A	ENST00000297338.6_2.1:c.193C>T	ENSP00000297338.2:p.Arg65Ter	6,542056075	COSM5879130
FLT1	13:g.28962292T>G	ENST00000615840.4_2.1:c.*1546A>C		6,451612903	
KIT	4:g.55573646G>A	ENST00000288135.5_2.1:c.1115+193G>A		6,349206349	
ETV5	3:g.185765794G>A	ENST00000306376.9_2.1:c.*634C>T		6,153846154	
ETV6	12:g.12015205C>T	ENST00000396373.8_2.1:c.464-7153C>T		6,153846154	
ATM	11:g.108122659G>T	ENST00000278616.8_2.1:c.1703G>T	ENSP00000278616.4:p.Arg568Ile	6,097560976	
IRS2	13:g.110434933C>T	ENST00000375856.4_2.1:c.3468G>A	ENSP00000365016.3:p.Thr1156=	6,010928962	
FAM46C	1:g.118166378C>T	ENST00000369448.3_2.1:c.888C>T	ENSP00000358458.3:p.Phe296=	5,913978495	
KMT2A	11:g.118339536G>A	ENST00000389506.9_2.1:c.479G>A	ENSP00000374157.5:p.Arg160Gln	5,769230769	
FOXA1	14:g.38068641C>A			5,755395683	
BRD4	19:g.15364969C>T	ENST00000263377.6_2.1:c.2152G>A	ENSP00000263377.1:p.Glu718Lys	5,714285714	
APC	5:g.112178000C>T	ENST00000257430.8_2.1:c.6709C>T	ENSP00000257430.4:p.Arg2237Ter	5,699481865	COSM1059635
RICTOR	5:g.39021185C>T	ENST00000296782.9_2.1:c.151G>A	ENSP00000296782.5:p.Val51Ile	5,555555556	
GRIN2A	16:g.9927974C>A	ENST00000330684.3_1.1:c.1765G>T	ENSP00000332549.3:p.Ala589Ser	5,555555556	
MSH3	5:g.79974872G>A	ENST00000265081.6_2.1:c.1300G>A	ENSP00000265081.6:p.Glu434Lys	5,555555556	
MDM4	1:g.204517245A>C	ENST00000367182.7_2.1:c.904-996A>C		5,494505495	
ACVR1	2:g.158617468G>A	ENST00000263640.7_2.1:c.1188C>T	ENSP00000263640.3:p.Phe396=	5,319148936	COSM1400286
FAT1	4:g.187557799C>T	ENST00000441802.6_2.1:c.3912G>A	ENSP00000406229.2:p.Pro1304=	5,263157895	COSM6660729; COSM6660730
FGF23	12:g.4488040T>G	ENST00000237837.1_2.1:c.211+498A>C		5,263157895	
ZFHX3	16:g.72828699C>T	ENST00000268489.9_2.1:c.7882G>A	ENSP00000268489.5:p.Glu2628Lys	5,172413793	COSM973507
ARID5B	10:g.63759958A>G	ENST00000279873.11_3.1:c.611A>G	ENSP00000279873.7:p.Asp204Gly	5,142857143	
MDM2	12:g.69222705G>A	ENST00000258148.11_2.1:c.513G>A	ENSP00000258148.7:p.Ser171=	5,109489051	COSM942905; COSM1586721
ETV4	17:g.41605418G>T	ENST00000319349.9_2.1:c.*469C>A		5,084745763	
ZFHX3	16:g.72993278A>G	ENST00000268489.9_2.1:c.767T>C	ENSP00000268489.5:p.Val256Ala	5,076142132	
BRCA2	13:g.32968909A>G	ENST00000380152.7_2.1:c.9340A>G	ENSP00000369497.3:p.Ile3114Val	5	
ZNF217	20:g.52193253C>T	ENST00000302342.3_2.1:c.2050G>A	ENSP00000304308.3:p.Glu684Lys	5	COSM6828600; COSM6828601
RYBP	3:g.72427569G>A	ENST00000477973.3_4.1:c.622C>T	ENSP00000419494.2:p.Gly208=	4,954954955	
BCORL1	X:g.129155110G>A	ENST00000218147.11_2.1:c.3592G>A	ENSP00000218147.7:p.Asp1198Asn	4,891304348	
FAT1	4:g.187525085T>G	ENST00000441802.6_2.1:c.10595A>C	ENSP00000406229.2:p.Asp3532Ala	4,666666667	
CDK8	13:g.26959449C>A	ENST00000381527.7_2.1:c.616C>A	ENSP00000370938.3:p.Leu206Ile	4,651162791	
AXL	19:g.41762440G>A	ENST00000301178.8_2.1:c.2120G>A	ENSP00000301178.3:p.Arg707His	4,516129032	
PTPRD	9:g.8471072T>C	ENST00000355233.9_2.1:c.2194A>G	ENSP00000347373.5:p.Ile732Val	4,494382022	
LATS2	13:g.21557415G>A	ENST00000382592.4_2.1:c.2430C>T	ENSP00000372035.4:p.Phe810=	4,347826087	
ETS1	11:g.128331458A>C	ENST00000392668.8_2.1:c.*798T>G		4,285714286	
NUP93	16:g.56868048G>A	ENST00000308159.9_2.1:c.1546G>A	ENSP00000310668.5:p.Glu516Lys	4,278074866	

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SUPPLEMENTAL TABLE 3. *(Continued)*

Gene	Hgvsg	Hgvsc	Hgvsp	% Variation (VAF)	COSMIC IDs (COSMIC v86)
CSF1R	5:g.149449464G>A	ENST00000286301.7_2.1:c.1482C>T	ENSP00000286301.3:p.Gly494=	4,278074866	
SMC1A	X:g.53409534C>T	ENST00000322213.8_2.1:c.3178G>A	ENSP00000323421.3:p.Glu1060Lys	4,245283019	COSM1468548
AR	X:g.66765082G>A	ENST00000374690.8_3.1:c.94G>A	ENSP00000363822.3:p.Glu32Lys	4,242424242	COSM1468963
PAX7	1:g.19072474T>C	ENST00000420770.6_2.1:c.*1051T>C		4,081632653	
FYN	6:g.112024169G>A	ENST00000229471.8_2.1:c.616C>T	ENSP00000229471.4:p.Arg206Cys	4,026845638	COSM281268; COSM3156578
TAF1	X:g.70683706C>T	ENST00000276072.7_2.1:c.5492C>T	ENSP00000276072.3:p.Ser1831Leu	4,022988506	
ETV1	7:g.13949261G>A	ENST00000242066.9_2.1:c.882C>T	ENSP00000242066.5:p.Phe294=	3,93258427	COSM1086161; COSM1596796
NKX3-1	8:g.23536040C>T			3,846153846	
TET2	4:g.106159840A>G	ENST00000305737.6_3.1:c.*1243A>G		3,759398496	
PAX3	2:g.223078047C>A	ENST00000336840.10_2.1:c.1173+6812G>T		3,571428571	
NCOR1	17:g.16068429G>A	ENST00000268712.7_2.1:c.482C>T	ENSP00000268712.2:p.Ser161Leu	3,50877193	
MSH6	2:g.48025925A>C	ENST00000234420.9_2.1:c.803A>C	ENSP00000234420.4:p.Asp268Ala	3,488372093	
SMC3	10:g.112362386T>C	ENST00000361804.4_2.1:c.3260T>C	ENSP00000354720.4:p.Val1087Ala	3,240740741	
NTRK2	9:g.87427572C>T	ENST00000359847.3_2.1:c.*2078C>T		3,141361257	
CHD2	15:g.93467647G>A	ENST00000394196.8_1.1:c.159G>A	ENSP00000377747.4:p.Ser53=	3,017241379	
PAX8	2:g.113980449A>C	ENST00000263334.9_2.1:c.1190-2694T>G		3,017241379	
PPM1D	17:g.58740503G>T	ENST00000305921.7_2.1:c.1408G>T	ENSP00000306682.2:p.Asp470Tyr	2,941176471	
PTPRD	9:g.8484287G>T	ENST00000355233.9_2.1:c.2012C>A	ENSP00000347373.5:p.Ser671Ter	2,745098039	

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