

---

## **Supporting Information**

### **Identification and Therapeutic Intervention of Co-activated ALK, FGFR2 and EphA5 Kinases in Hepatocellular Carcinoma**

**This word file includes: Supporting Materials and Methods; Supporting Table S2 and S4; Supporting Figure Legends**

**Other supporting information includes: Supporting Tables S1, S3 and S5**

#### **Supporting Materials and Methods**

##### **Immunoprecipitation and Immunoblotting**

For immunoblotting, protein extracts were prepared by washing twice in cold PBS followed by lysis with SDS-lysis buffer (50 mM Tris-HCl, pH 7.4, 2% SDS). Lysates were boiled for 10 min and then subjected to SDS-PAGE. For immunoprecipitation and co-immunoprecipitation, cells were washed twice with cold PBS followed by solubilization in cold NP-40 lysis buffer (50 mM Tris-HCl, pH 7.4, 1% NP-40, 150 mM NaCl, 1 mM EDTA, 1 mM NaF, 0.25% Sodium deoxycholate, 1 mM PMSF, 1×Cocktail). Then, the lysates were centrifuged at 14,000×g for 20 min at 4°C to remove the cell debris. Equal amounts of proteins in lysis buffer were used for incubation with indicated antibodies or control IgG separately overnight at 4°C, following by immunoprecipitation with protein A/G-conjugated agarose beads (Santa Cruz, Paso Robles, CA) at 4°C for 3 h. Samples were centrifuged at 2,000×rpm for 5

min at 4°C and washed with NP-40 lysis buffer for three times. The precipitates were boiled in SDS-lysis buffer for 10 min and the supernatants were collected and subjected to immunoblotting analysis. Immunoblotting analyses were performed according to the antibody manufacturer's recommendations. Antibodies against  $\beta$ -Actin, AKT, p-AKT, ERK1/2, p-ERK1/2, ALK, p-STAT3, STAT3, p-p38, p38, p-JNK, JNK, PARP, Caspase-3, ACK1, TXK, TNK1, TrkB, EGFR, HGFR, Insulin R, ABL1, FRK, p-FRS2 $\alpha$ , FRS2 $\alpha$  and Hsp70 were obtained from Cell Signaling Technology (Danvers, MA), antibodies against EphA5 and Hsp90 were from Santa Cruz, antibodies against LTK, p-EphA5, p-ALK and FGFR2 were from Genetex (Irvine, CA), p-FGFR2 was from Abcam (Cambridge, MA), antibodies against EphA1, EphA3, EphB2 and EphB3 were obtained from ABclonal (Woburn, MA).

### **SNP array analysis**

Cells were seeded in 100-mm dishes and incubated at 37°C for 24 h, then the cells were trypsinized and collected. Genomic DNA was extracted and subjected to Affymetrix Genome-Wide Human Mapping SNP6.0 Array. Genomic DNA extraction, amplification, array hybridization and data analysis were conducted by Shanghai Biotechnology Co (Shanghai, China).

### **PU-H71 beads pull down assay**

PU-H71 beads and control beads were synthesized by HaBo Medical Technology Co., Ltd (Nanjing, China) as previously reported with some modifications.<sup>(1)</sup> Cells were

seeded in 100-mm dishes and incubated at 37°C for 24 h and then cells were washed twice with cold PBS followed by solubilization in Felts buffer (20 mM HEPES, 50 mM KCl, 5 mM MgCl<sub>2</sub>, 0.01% NP-40, freshly prepared 20 mM Na<sub>2</sub>MoO<sub>4</sub>, pH 7.2–7.3) supplemented with protease and phosphatase inhibitors as previously described. The lysates were centrifuged at 14,000×g for 20 min at 4°C to remove the cell debris. PU-H71 beads and control beads were washed three times in lysis buffer, and then 80 µL beads were incubated with cell lysates (250 µg) overnight at 4°C. Following incubation, bead conjugates were washed five times with the lysis buffer and proteins in the pull-down were analyzed by immunoblotting.

### **Cell viability assay**

Cells were seeded in 96-well plates at the density of 3,000 cells/well in triplicates. After incubation overnight, cells were exposed to indicated concentrations of compounds and incubated at 37°C for another 72 h. Then, the cells were fixed with 10% cold trichloroacetic acid, washed with distilled water, and stained with 4 mg/mL sulforhodamine B (SRB, Sigma, St. Louis, MO) in 1% acetic acid. SRB in the cells was dissolved in 10 mmol/L Tris-HCl and measured at 560 nm using spectra-MAX190 (Molecular Devices, Sunnyvale, CA).

### **Apoptosis analysis**

Cells were seeded in 6-well plates at a density of  $2 \times 10^5$  cells/well. After incubation overnight, cells were exposed to indicated concentrations of compounds and

incubated at 37°C for another 48 h. Then, the cells were trypsinized and washed once with cold PBS. Aliquots of the cells were re-suspended in 500  $\mu$ L of binding buffer and stained with 5  $\mu$ L of Annexin V-FITC and 5  $\mu$ L of PI working solution (BD Biosciences) for 15 min at room temperature in the dark. Then, analysis was performed using a Becton-Dickinson FACS Calibur flow cytometer (BD Biosciences). Data was analyzed using FlowJo software (FlowJo LLC, Ashland, OR).

### **RNA interference**

Cells were seeded in 6-well plates at a density of  $2 \times 10^5$  cells/well or 96-well plates at a density of 3,000 cells/well. After 24 h, indicated siRNA oligonucleotides were transfected using Lipofectamine<sup>®</sup> RNAiMAX Transfection Reagent (Invitrogen, Grand Island, NY) according to the manufacturer's instructions. After 72 h, cells were harvested for apoptosis analysis, proliferation detection or subjected to immunoblotting analysis. Negative control, Hsp90, ALK, EphA5, EphA1, EphA3, HGFR, and FGFR2 siRNAs were obtained from Sigma. LTK, TrkB, EphB2, EphB3, FRK, TNK1, TXK, ACK1, ABL1, EGFR and Insulin R siRNAs were obtained from Raybio (Guangzhou, China).

### **Quantitative real-time PCR**

Quantitative real-time PCR was performed using Vii7 Real-Time PCR System (Life Technologies, Carlsbad, CA). For detection of gene expression, total RNA was extracted with TRIzol reagent (Invitrogen, Grand Island, NY) and subjected to reverse

transcription with PrimeScript<sup>®</sup> RT reagent Kit (Takara, Mountain View, CA). PCR reactions were performed with SYBR<sup>®</sup> Premix Ex Taq<sup>™</sup> kit (Takara). Primers for ALK, FGFR2, EphA5 and  $\beta$ -Actin were synthesized by Sangon (Shanghai, China).

Primers used for RT-PCR were listed as follows:

$\beta$ -Actin Forward: CATGTACGTTGCTATCCAGGC;

Reverse: CTCCTTAATGTCACGCACGAT

ALK Forward: TTCATCGCAGCCGATATGG;

Reverse: GGCATCTCCTTAGAACGCTCT

FGFR2 Forward: AGCACCATACTGGACCAACAC;

Reverse: GGCAGCGAAACTTGACAGTG

EphA5 Forward: GTGACCGATGAACCTCCCAAA;

Reverse: CCAGGTCTGCACACTTGACAG

### Supporting Tables

**Supporting Table S2.** The list of 17 commonly over-activated kinases and their corresponding inhibitors

<b>Kinase over-activated In number of cell lines</b>	<b>Kinase</b>	<b>Inhibitor</b>
8	EphB3	Dasatinib
	TrkB	GNF-5837
	ALK	Ceritinib
	EphA3	Dasatinib
	EphA5	Dasatinib
	LTK	Ceritinib
	HGFR	SGX-523
	EphB2	Dasatinib
7	FRK	Dasatinib
	TNK1	XMD8-92
	TXK	Lck inhibitor 2
	ACK1	AIM-100

	FGFR2	AZD4547
6	ABL1	Imatinib
	EphA1	Dasatinib
5	EGFR	Gefitinib
	Insulin R	Linsitinib

**Supporting Table S4.** The specific siRNA sequences used in this study

Target gene	siRNA sequences
ALK	1: CGAGGAUACCAUUCUGAAAdTdT
	2: GAGACAUUGCUGCCAGAAAdTdT
FGFR2	1: UUAGUUGAGGAUACCACAUUAdTdT
	2: GGCCAACACUGUCAAGUUUdTdT
Hsp90	1: GCUUGACAGAUCCCAGUAAAdTdT
	2: GCUGGUGCAGAUAUUCUCUAdTdT
ABL1	1: CCACCAAGCCUUUGAAACAdTdT
	2: GGAGAUAAACACUCUAAGCAdTdT
EphA1	1: GAAACAUCUUGGUGAAUCAdTdT
	2: CUCUGAGACUGGUGAAGAAAdTdT
EphA3	1: CACUGAGAUUAGAGAAGUAdTdT
	2: GCAGGUGUGAGAAUAAUUAdTdT
EphA5	1: GAGAAUGGCUCUUUAGAUAdTdT
	2: GGAAAGACGUGUCAUUAUUAdTdT
EphB2	1: CGGACAAGCUGCAACACUAdTdT
	2: CCUUCAACCUCUAUUACUAdTdT
EphB3	1: GCGAGUCAAGCCAGAACAAdTdT
	2: CACUCAAGCUCUACUGCAAdTdT
ACK1	1: GCAAGUCGUGGAUGAGUAAAdTdT
	2: CGGACAGGAUUGACGAACUdTdT
TXK	1: GGAAAGCTTAGGAAGGAAAdTdT
	2: GTACGGAGGCTGCCATAAAAdTdT
TNK1	1: GCATAGATGGAGACAGAAAdTdT
	2: GAGTTGCAGAGGAAGATTAdTdT
FRK	1: GGAGTACCTAGAACCCTATdTdT
	2: GGAGUACCUAGAACCCUAUdTdT
TrkB	1: GAATTGACGATGGTGCAAAdTdT
	2: CCTAATATGTATTGGGATGdTdT
Insulin R	1: GAACAAGGCTCCCAGAGGTdTdT
	2: ACGGAGACCTGAAGAGCTAdTdT

LTK	1: GTGGCAACCTCAACACTGAdTdT
	2: GGATGGCACGAGATATCTAdTdT
EGFR	1: CGCAAAGTGTGTAACGGAATAAdTdT
	2: CTGACTCCGTCCAGTATTGATdTdT
HGFR	1: GGCCCAGAUACCAGAAUAAAdTdT
	2: GGGCCAAGAAAUAUGAAAAdTdT

### Supporting Figure Legends

**Supporting Figure S1.** ALK, FGFR2 and EphA5 collaborate to regulate the viability of HCC cells through AKT-dependent, ERK-dependent and p38-dependent pathways.

**(A-B)** ZIP177 and SMMC-7721 cells were transfected with a customized pre-designed RNAi library against 17 kinases for 72 h. Cell viability was measured by SRB assay **(A)**. Bars represent means  $\pm$  SD. The efficacy of two individual siRNAs against each kinase was detected by immunoblotting **(B)**. **(C)** IC<sub>50</sub> values of the kinase inhibitors against ZIP177 and SMMC-7721 cells were assessed by SRB assay. Bars represent means  $\pm$  SD. **(D-E)** ZIP177 and SMMC-7721 were treated with indicated kinase inhibitors at 1  $\mu$ M, alone or in combination, for 72 h. Cell viability was measured by SRB assay. Bars represent means  $\pm$  SD. **(F)** QGY-7703, SK-Hep-1, Hep3B, HepG2, BEL-7402 and Huh-7 cells were treated with ceritinib (1  $\mu$ M), AZD4547 (1  $\mu$ M) and dasatinib (1  $\mu$ M), alone or in combination, for 72 h. Cell viability was assessed by SRB assay. Bars represent means  $\pm$  SD. **(G)** LO2 and GSY-7701 cells were treated with ceritinib (1  $\mu$ M), AZD4547 (1  $\mu$ M) and dasatinib (1  $\mu$ M), alone or in combination, for 72 h. Cell viability was assessed by SRB assay. Bars represent means  $\pm$  SD. **(H-I)** SMMC-7721 cells were transfected with ALK,

FGFR2 and EphA5 siRNAs, alone or in combination, for 72 h. Cell viability was assessed by SRB assay **(H)**. Cell lysates were subjected to immunoblotting **(I)**. **(J)** ZIP177 and SMMC-7721 were transfected with LTK, FGFR2 and EphA5 siRNAs, alone or in combination, for 72 h. Cell viability was assessed by SRB assay. Bars represent means  $\pm$  SD.

**Supporting Figure S2.** ALK, FGFR2 and EphA5 are stringent client proteins of Hsp90. **(A)** SMMC-7721 cells were treated with ganetespib at 0.1  $\mu$ M for 6, 12, 24 and 48 h. The expression of ALK, FGFR2 and EphA5 were detected by immunoblotting. **(B)** SMMC-7721 cells were treated with ganetespib at 0.1  $\mu$ M for 24 h. The mRNA expression level of ALK, FGFR2 and EphA5 was analyzed by Real Time PCR. Bars represent means  $\pm$  SD.

**Supporting Figure S3.** Hsp90 inhibition impacts cell growth through abrogating ALK, FGFR2 and EphA5 activities *in vitro* and *in vivo*. **(A)** LO2 and QSG-7701 cells were treated with Hsp90 inhibitors ganetespib and NVP-AUY922 for 72 h. Cell viability was assessed by SRB assay. **(B-D)** ZIP177 and SMMC-7721 cells were treated with ganetespib (0.01, 0.1 and 1  $\mu$ M) for 48 or 72 h. Cell viability was assessed by SRB assay **(B)**, Cell apoptosis was analyzed by flow cytometry **(C)**, Cell lysates were subjected to immunoblotting analysis **(D)**. Bars represent means  $\pm$  SD. **(E)** ZIP177 and SMMC-7721 cells were treated with ganetespib (0.01, 0.1, 1  $\mu$ M) for 24h, cell lysate were subjected to immunoblotting analysis with indicated antibodies.

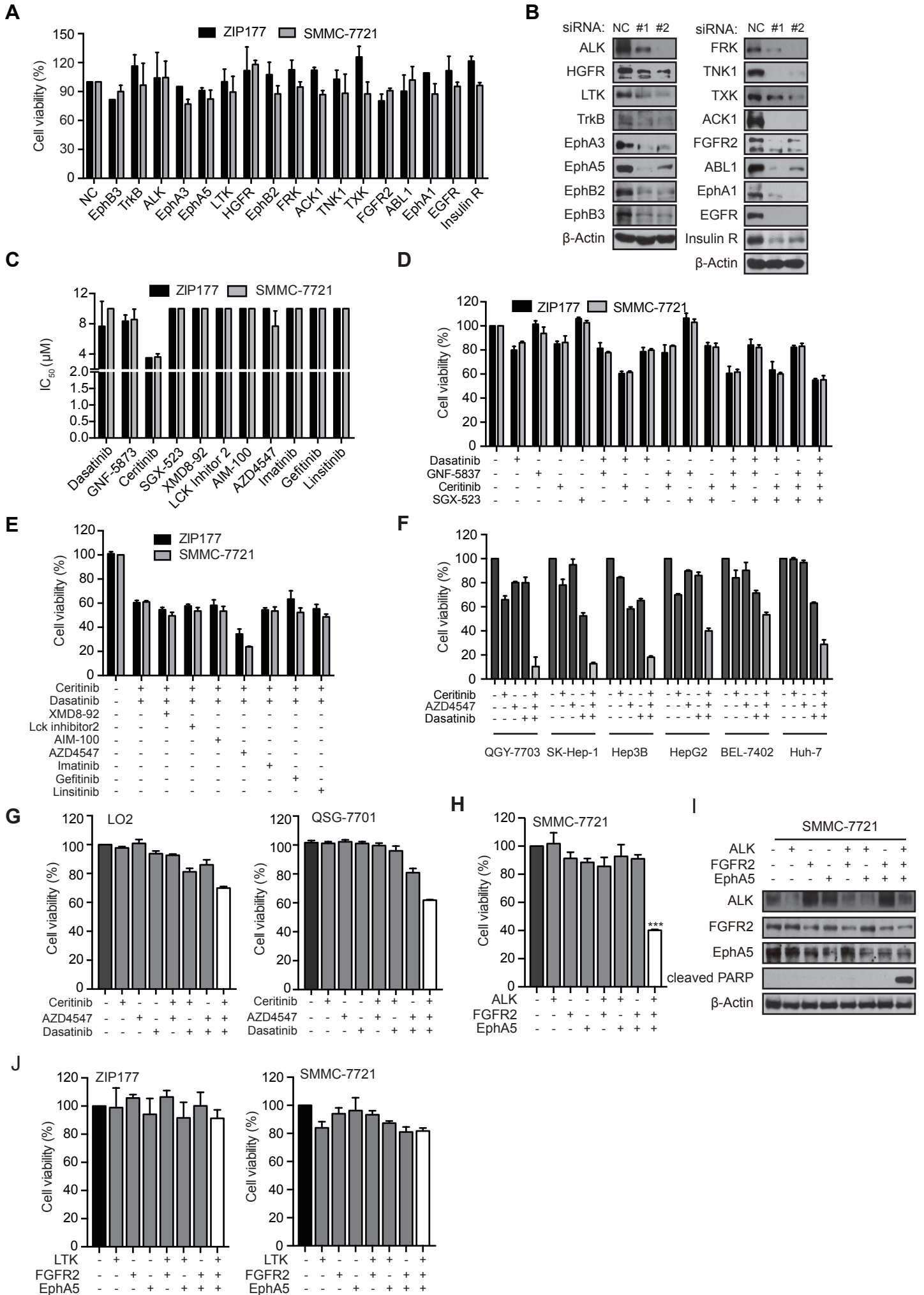


(F) Mice bearing SMMC-7721 xenografts were treated with vehicle or ganetespib (10 mg/kg or 30 mg/kg, three times per week) for consecutive four weeks, the body weights of mice in each group were measured three times a week.

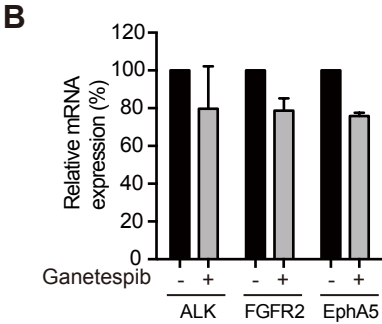
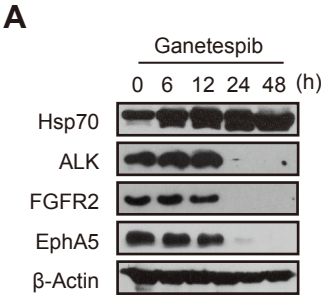
**Supporting Figure S4.** Abrogating ALK, FGFR2 and EphA5 activities leads to HCC patient-derived xenograft growth suppression. (A) Mice bearing HCC patient derived xenograft model LI0752 were treated with vehicle or ceritinib (25 mg/kg), AZD4547 (12.5 mg/kg), dasatinib (25 mg/kg), individually or in combination, once a day for consecutive 3 weeks. Body weight was measured twice a week, Bars represent means  $\pm$  SEM, n=6. (B) Mice bearing HCC patient derived xenograft model LI0752 were treated with vehicle or ganetespib (30 mg/kg or 50 mg/kg, three times per week). Body weight was measured twice a week, Bars represent means  $\pm$  SEM, n=6. (C) Tumor lysates were prepared and subjected to immunoblotting analysis with indicated antibodies.

## Reference

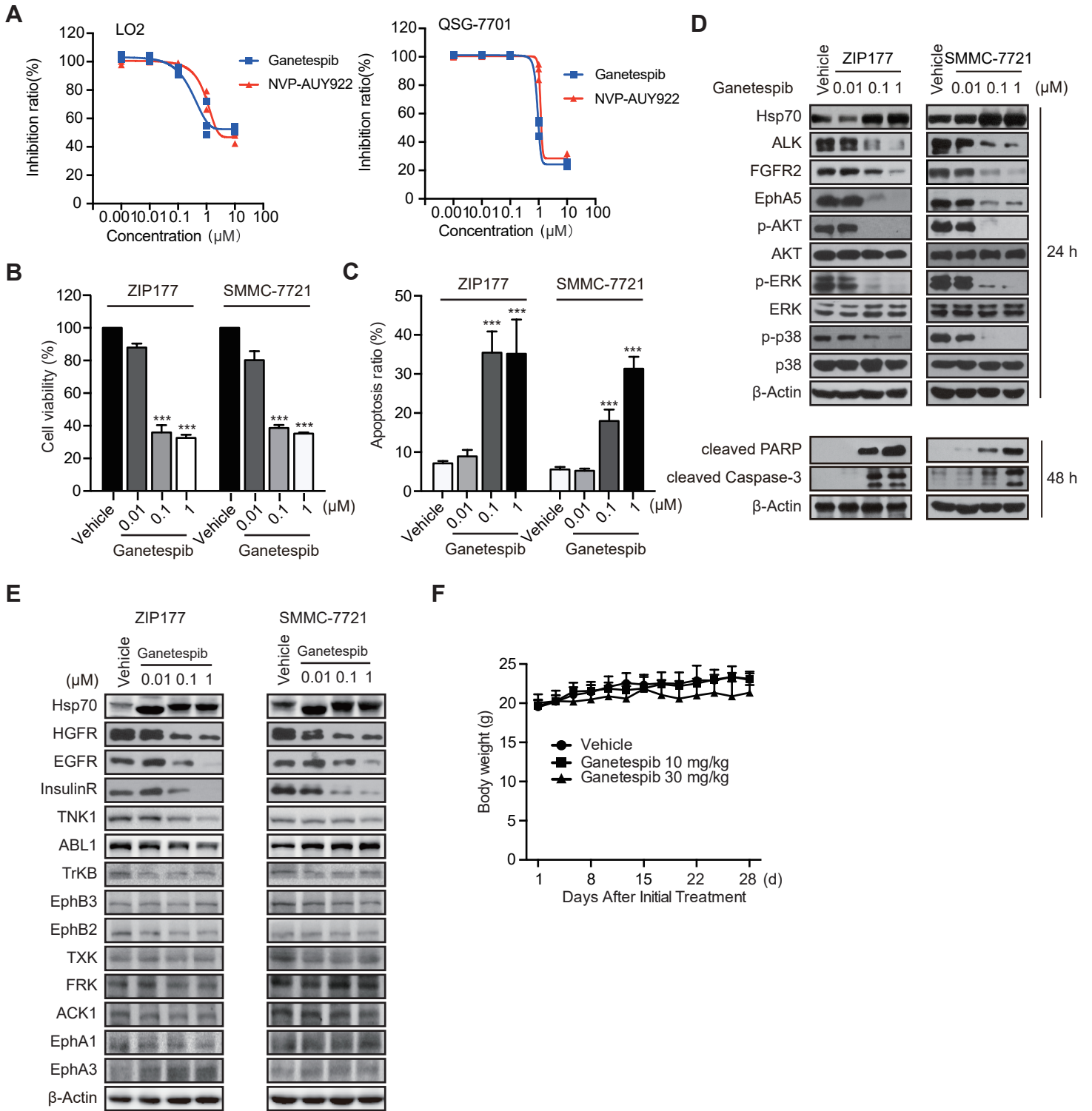
1. Taldone T, Zatorska D, Patel PD, Zong H, Rodina A, Ahn JH, et al. Design, synthesis, and evaluation of small molecule Hsp90 probes. *Bioorg Med Chem* 2011;19:2603-2614.



Supporting Figure S2



Supporting Figure S3



**Supporting Table S1:** The basal phosphorylation of 71 kinases in 8 HCC cell lines

**RayBio® Phosphorylation Antibody Array I**

**Normalization (with Background Subtraction)**

<b>Cell line Kinase</b>	<b>BEL-7402</b>	<b>SMMC-7721</b>	<b>HepG2</b>	<b>Hep3B</b>	<b>SK-Hep-1</b>	<b>Huh-7</b>	<b>QGY-7703</b>	<b>ZIP177</b>
POS	5394.6	5394.6	5394.6	5394.6	5394.6	5394.6	5394.6	5394.6
NEG	6.8	3.8	1.4	1.8	2.7	1.4	1.4	1.0
ABL1	194.5	215.3	274.1	450.9	257.3	172.5	403.6	235.0
ACK1	226.0	247.4	309.2	471.8	302.1	208.6	437.3	268.5
ALK	201.0	244.7	304.5	546.8	300.7	190.6	477.0	279.1
Axl	181.5	190.3	201.1	214.7	244.4	136.5	235.9	210.1
Blk	82.5	103.9	125.2	141.8	105.9	90.1	121.9	131.8
BMX	213.0	207.7	239.5	253.8	251.2	161.4	214.3	197.0
Btk	139.5	140.3	169.3	172.8	173.1	109.9	134.0	129.3
Csk	45.0	53.3	89.2	56.0	52.9	40.3	38.9	57.2
Dtk	97.0	122.9	255.1	477.2	169.7	100.4	293.0	139.9
EGFR	545.0	257.2	111.9	930.8	211.1	471.7	289.5	274.7
EphA1	180.5	202.3	368.0	708.8	265.4	179.4	474.5	247.4
EphA2	111.0	102.8	146.1	32.4	149.3	81.5	140.0	110.6
EphA3	200.0	251.2	295.0	545.4	307.5	193.6	443.3	274.7
EphA4	51.0	50.6	87.7	0.0	65.8	31.8	0.0	33.6
EphA5	190.0	243.6	310.6	602.8	280.4	178.1	449.4	270.4
EphA6	126.5	121.8	175.9	112.1	164.3	94.4	178.0	108.2
EphA7	155.5	190.3	218.6	417.8	230.8	137.3	344.0	212.6

EphA8	103.0	92.4	131.8	23.6	141.9	75.1	126.2	97.0
EphB1	79.0	72.3	99.6	0.0	107.3	59.2	67.4	65.3
EphB2	197.0	268.1	381.8	651.4	279.7	169.5	458.9	294.6
EphB3	327.5	408.4	523.6	777.6	439.9	303.4	606.7	466.8
EphB4	19.5	26.1	45.5	34.4	29.9	22.3	24.2	26.7
EphB6	157.0	183.8	219.6	370.6	213.8	138.2	332.7	201.4
ErbB2	138.0	157.1	331.5	571.1	198.2	148.1	407.9	177.2
ErbB3	109.5	118.0	198.7	217.4	150.7	110.3	186.7	121.8
ErbB4	126.0	165.8	438.2	608.9	212.5	119.3	391.5	179.0
FAK	129.5	154.4	269.4	218.7	158.8	120.2	209.1	165.3
FER	138.5	108.2	145.6	0.0	135.8	110.3	63.1	97.6
FGFR1	94.5	96.2	217.2	190.4	133.7	92.7	188.4	97.0
FGFR2	154.5	168.6	310.2	447.5	215.2	145.1	374.2	184.0
FGFR2 ( $\alpha$ isoform)	168.5	211.0	290.2	635.2	241.7	164.4	476.2	253.6
Fgr	34.5	38.6	139.4	20.9	40.7	28.8	42.3	49.7
FRK	230.5	247.4	522.1	571.7	294.6	217.2	492.6	291.5
Fyn	154.5	164.8	188.3	523.1	173.8	132.6	366.4	186.5
Hck	166.5	156.1	178.3	16.9	174.5	128.8	110.6	149.2
HGFR	203.5	244.1	334.8	744.5	255.9	177.7	534.9	248.0
IGF-IR	121.5	131.0	166.0	759.4	229.4	155.8	396.7	138.6
Insulin R	168.0	197.4	329.1	587.3	271.5	388.0	479.6	210.1
Itk	82.5	101.1	152.7	187.7	124.2	80.3	157.3	108.2
JAK1	172.5	144.1	195.4	125.6	190.1	144.2	161.6	155.4
JAK2	145.0	67.4	106.7	0.0	91.6	62.7	57.0	70.2
JAK3	136.0	163.7	232.4	490.7	208.4	145.1	340.5	174.7

LCK	122.0	126.7	146.5	166.7	119.5	103.0	171.1	124.3
LTK	189.5	236.5	334.3	581.2	272.9	215.0	458.9	269.1
Lyn	171.0	188.1	255.6	379.4	232.8	160.9	338.8	221.3
MATK	192.5	165.8	199.7	82.4	203.0	146.4	177.2	167.2
M-CSFR	97.0	125.1	200.6	457.7	129.7	96.1	231.6	130.5
MUSK	133.0	187.1	186.9	371.3	189.4	130.0	290.4	183.4
NGFR	308.0	233.8	211.0	452.3	272.9	161.8	377.7	235.6
PDGFR- $\alpha$	63.0	65.3	79.2	64.8	72.0	48.9	67.4	62.8
PDGFR- $\beta$	43.0	48.4	91.1	89.1	50.9	43.3	70.9	49.7
PYK2	98.0	114.2	145.6	140.4	111.3	90.6	150.4	122.5
RET	244.0	239.8	277.4	73.6	171.1	225.3	174.6	219.4
ROR1	4.0	32.6	30.8	0.0	34.6	23.2	65.7	24.9
ROR2	93.0	132.7	201.6	356.4	139.8	106.9	264.4	139.9
ROS	157.0	214.2	310.2	465.8	223.3	157.1	388.9	243.7
RYK	111.0	112.0	145.1	58.7	149.3	86.3	144.3	126.2
SCFR	112.5	112.6	212.9	309.8	158.2	110.7	234.2	135.5
SRMS	154.0	149.0	159.3	35.1	164.3	119.3	139.1	144.2
SYK	330.0	154.4	188.3	215.3	179.2	125.3	223.0	161.6
Tec	40.0	58.7	61.2	54.7	49.6	45.1	71.7	70.2
Tie-1	132.0	157.1	552.5	664.9	190.1	146.8	433.8	180.3
Tie-2	81.5	90.3	208.2	297.7	116.8	85.4	190.1	103.8
TNK1	398.0	406.2	427.3	293.0	386.9	347.6	409.6	447.5
TRKB	229.0	267.5	295.9	612.2	310.9	217.6	476.2	304.0
TXK	218.5	252.3	297.8	436.7	297.3	206.4	408.8	276.6
Tyk2	118.5	142.5	209.6	202.5	141.2	110.7	191.9	166.0

TYRO10	11.0	1.1	11.9	0.0	9.5	5.6	0.0	0.0
VEGFR2	96.5	116.9	112.9	240.3	129.0	75.5	162.5	116.2
VEGFR3	160.5	176.7	206.3	420.5	231.5	138.6	296.4	185.2
ZAP70	138.0	175.6	206.8	393.5	200.3	136.1	295.6	170.9

**Note: POS: Positive; NEG: Negative**



**Supprting Table S3:** The genetic backgrounds of 17 commonly over-activated kinases  
**Affymetrix Genome-Wide Human Mapping SNP6.0 Array**

**The single nucleotide polymorphism of the 17 commonly over-activated kinases**

SNP ID	GeneSymbol	Chr	Chr position	Position in the gene/effect	Codon exchange	AA exchange	Functional Consequence
rs7041983	ABL1	9	133605045	intronic		.	
rs10793970	ABL1	9	133635546	intronic		.	
rs2696141	ABL1	9	133754099	intronic		.	
rs2855180	ABL1	9	133657347	intronic		.	
rs2789764	ABL1	9	133620998	intronic		.	
rs2855190	ABL1	9	133708361	intronic		.	
rs1800609	ABL1	9	133731184	intronic		.	
rs2253084	ABL1	9	133621773	intronic		.	
rs12005879	ABL1	9	133737649	intronic		.	
rs4740376	ABL1	9	133747734	intronic		.	
rs4740365	ABL1	9	133630410	intronic		.	
rs2791728	ABL1	9	133611739	intronic		.	
rs10901275	ABL1	9	133599031	intronic		.	
rs6597642	ABL1	9	133725767	intronic		.	
rs7862514	ABL1	9	133611693	intronic		.	
rs6597644	ABL1	9	133744911	intronic		.	
rs2583845	ABL1	9	133613565	intronic		.	
rs2855160	ABL1	9	133617241	intronic		.	
rs10901285	ABL1	9	133670874	intronic		.	

rs2253070	ABL1	9	133621504	intronic	.
rs2855166	ABL1	9	133623449	intronic	.
rs3824400	ABL1	9	133734075	intronic	.
rs11792273	ABL1	9	133754032	intronic	.
rs10901294	ABL1	9	133732752	intronic	.
rs11244146	ABL1	9	133675143	intronic	.
rs4740366	ABL1	9	133630622	intronic	.
rs10901281	ABL1	9	133645144	intronic	.
rs946486	ABL1	9	133646005	intronic	.
rs4740377	ABL1	9	133754220	intronic	.
rs3808816	ABL1	9	133746117	intronic	.
rs2855178	ABL1	9	133657270	intronic	.
rs7851964	ABL1	9	133749766	intronic	.
rs7021981	ABL1	9	133739735	intronic	.
rs13300884	ABL1	9	133628699	intronic	.
rs3780286	ABL1	9	133732698	intronic	.
rs6597643	ABL1	9	133725830	intronic	.
rs11244143	ABL1	9	133670111	intronic	.
rs11244172	ABL1	9	133751526	intronic	.
rs2855194	ABL1	9	133735644	intronic	.
rs3808817	ABL1	9	133746060	intronic	.
rs3808821	ABL1	9	133712801	intronic	.
rs7851946	ABL1	9	133719256	intronic	.
rs11244164	ABL1	9	133736116	intronic	.
rs7870374	ABL1	9	133671066	intronic	.

rs2772032	ABL1	9	133756793	intronic	.
rs4504690	ABL1	9	133663764	intronic	.
rs2855191	ABL1	9	133708441	intronic	.
rs3808815	ABL1	9	133757695	intronic	.
rs7865403	ABL1	9	133748673	intronic	.
rs12340378	ABL1	9	133643229	intronic	.
rs2791738	ABL1	9	133633507	intronic	.
rs12351264	ABL1	9	133756710	intronic	.
rs2791734	ABL1	9	133627890	intronic	.
rs2791743	ABL1	9	133640777	intronic	.
rs2313569	ABL1	9	133610179	intronic	.
rs3808814	ABL1	9	133757785	intronic	.
rs2260323	ABL1	9	133700786	intronic	.
rs4666194	ALK	2	29520085	intronic	.
rs10177364	ALK	2	29847957	intronic	.
rs13384022	ALK	2	29520832	intronic	.
rs4319896	ALK	2	30139849	intronic	.
rs17007920	ALK	2	29570906	intronic	.
rs4413121	ALK	2	29792216	intronic	.
rs6731230	ALK	2	29486078	intronic	.
rs10208167	ALK	2	29837275	intronic	.
rs2631987	ALK	2	29912163	intronic	.
rs4666262	ALK	2	29859805	intronic	.
rs4075919	ALK	2	30075237	intronic	.
rs4510175	ALK	2	30102582	intronic	.

rs4503952	ALK	2	29756119	intronic	.
rs11127219	ALK	2	29618550	intronic	.
rs6711471	ALK	2	29840371	intronic	.
rs12714281	ALK	2	29691960	intronic	.
rs2541194	ALK	2	29947235	intronic	.
rs2276549	ALK	2	29541104	intronic	.
rs17007931	ALK	2	29578068	intronic	.
rs4666199	ALK	2	29535197	intronic	.
rs17007916	ALK	2	29562741	intronic	.
rs12465577	ALK	2	29715212	intronic	.
rs13399141	ALK	2	29502569	intronic	.
rs7572088	ALK	2	29481036	intronic	.
rs7608034	ALK	2	29868259	intronic	.
rs17716681	ALK	2	29524432	intronic	.
rs7605970	ALK	2	29776488	intronic	.
rs4366859	ALK	2	29682984	intronic	.
rs4525647	ALK	2	29615419	intronic	.
rs4264531	ALK	2	30048387	intronic	.
rs2541180	ALK	2	29986574	intronic	.
rs10187657	ALK	2	30042217	intronic	.
rs7425108	ALK	2	29453835	intronic	.
rs4666201	ALK	2	29542948	intronic	.
rs12618086	ALK	2	29739002	intronic	.
rs2631988	ALK	2	29912210	intronic	.
rs6722514	ALK	2	30119222	intronic	.

rs10190119	ALK	2	29821201	intronic	.
rs4575680	ALK	2	29770763	intronic	.
rs2541184	ALK	2	29980221	intronic	.
rs17007974	ALK	2	29592698	intronic	.
rs1528424	ALK	2	29477830	intronic	.
rs7580098	ALK	2	29771727	intronic	.
rs17007682	ALK	2	29432105	intronic	.
rs12052994	ALK	2	29851716	intronic	.
rs10205397	ALK	2	29852264	intronic	.
rs4666260	ALK	2	29853061	intronic	.
rs17008529	ALK	2	29947102	intronic	.
rs2541186	ALK	2	29977099	intronic	.
rs41344745	ALK	2	29977354	intronic	.
rs7580440	ALK	2	29977809	intronic	.
rs9973358	ALK	2	30000281	intronic	.
rs17008743	ALK	2	30011959	intronic	.
rs6547946	ALK	2	29780633	intronic	.
rs4280420	ALK	2	30106142	intronic	.
rs10209375	ALK	2	29737495	intronic	.
rs1317902	ALK	2	29449005	intronic	.
rs17007970	ALK	2	29592531	intronic	.
rs7577363	ALK	2	29876343	intronic	.
rs4666255	ALK	2	29823652	intronic	.
rs17729272	ALK	2	29842485	intronic	.
rs6754787	ALK	2	30141950	intronic	.

rs12465499	ALK	2	30102136	intronic	.
rs4128317	ALK	2	29659854	intronic	.
rs4073186	ALK	2	30043619	intronic	.
rs6547951	ALK	2	29797217	intronic	.
rs11899406	ALK	2	29593844	intronic	.
rs2631962	ALK	2	29922364	intronic	.
rs10186747	ALK	2	29871576	intronic	.
rs10175802	ALK	2	29947449	intronic	.
rs4666212	ALK	2	29613214	intronic	.
rs6547936	ALK	2	29716266	intronic	.
rs4268897	ALK	2	29517881	intronic	.
rs4322797	ALK	2	29666976	intronic	.
rs17008540	ALK	2	29949771	intronic	.
rs2541169	ALK	2	29916548	intronic	.
rs7599686	ALK	2	29533736	intronic	.
rs4233753	ALK	2	30140540	intronic	.
rs2541205	ALK	2	29926075	intronic	.
rs4473345	ALK	2	29767668	intronic	.
rs11682395	ALK	2	30075802	intronic	.
rs17007760	ALK	2	29486702	intronic	.
rs2631986	ALK	2	29911541	intronic	.
rs7563365	ALK	2	29715714	intronic	.
rs13423991	ALK	2	29459309	intronic	.
rs7588612	ALK	2	29481195	intronic	.
rs2001916	ALK	2	29849076	intronic	.

rs1406235	ALK	2	29499304	intronic	.
rs7564893	ALK	2	29514769	intronic	.
rs2339548	ALK	2	29859029	intronic	.
rs3768672	ALK	2	29417948	intronic	.
rs7599783	ALK	2	29533782	intronic	.
rs10171094	ALK	2	29745284	intronic	.
rs7559091	ALK	2	29863414	intronic	.
rs2339379	ALK	2	29481537	intronic	.
rs3885973	ALK	2	29702460	intronic	.
rs17783899	ALK	2	29523611	intronic	.
rs1969528	ALK	2	29525069	intronic	.
rs4274561	ALK	2	30102736	intronic	.
rs13020484	ALK	2	30097479	intronic	.
rs13399115	ALK	2	30009179	intronic	.
rs17007869	ALK	2	29535061	intronic	.
rs4452101	ALK	2	30009226	intronic	.
rs6547929	ALK	2	29666856	intronic	.
rs2001915	ALK	2	29848771	intronic	.
rs12997875	ALK	2	29434339	intronic	.
rs6754936	ALK	2	29685945	intronic	.
rs7561657	ALK	2	29574604	intronic	.
rs747148	ALK	2	29972678	intronic	.
rs6711746	ALK	2	29438549	intronic	.
rs7573553	ALK	2	29591769	intronic	.
rs17008447	ALK	2	29888337	intronic	.

rs7592571	ALK	2	29767894	intronic		.	
rs10445907	ALK	2	29727228	intronic		.	
rs6547920	ALK	2	29573090	intronic		.	
rs1881420	ALK	2	29416481	exonic	GTA-GCA	Val-Ala	missense
rs11691898	ALK	2	29751116	intronic		.	
rs4666266	ALK	2	29872209	intronic		.	
rs11679467	ALK	2	29486280	intronic		.	
rs2879497	ALK	2	29950291	intronic		.	
rs1406237	ALK	2	29499625	intronic		.	
rs10184494	ALK	2	29513501	intronic		.	
rs1104869	ALK	2	29454701	intronic		.	
rs13001260	ALK	2	29578251	intronic		.	
rs6719019	ALK	2	29796453	intronic		.	
rs4665447	ALK	2	29446721	intronic		.	
rs11127215	ALK	2	29525654	intronic		.	
rs6753491	ALK	2	30006764	intronic		.	
rs3923028	ALK	2	29685596	intronic		.	
rs17783776	ALK	2	29521005	intronic		.	
rs1406236	ALK	2	29499442	intronic		.	
rs4578812	ALK	2	30119773	intronic		.	
rs6734066	ALK	2	29978379	intronic		.	
rs4296388	ALK	2	29609076	intronic		.	
rs9309673	ALK	2	29839915	intronic		.	
rs12621412	ALK	2	29796202	intronic		.	
rs11885445	ALK	2	29438655	intronic		.	



rs10193883	ALK	2	29852825	intronic	.
rs13383676	ALK	2	29708704	intronic	.
rs1670289	ALK	2	29434034	intronic	.
rs10206377	ALK	2	29782226	intronic	.
rs11694445	ALK	2	30034279	intronic	.
rs2541183	ALK	2	29980408	intronic	.
rs2257135	ALK	2	29948698	intronic	.
rs1104870	ALK	2	29454418	intronic	.
rs6547924	ALK	2	29627861	intronic	.
rs3885975	ALK	2	29702436	intronic	.
rs6708231	ALK	2	29873120	intronic	.
rs872674	ALK	2	29949616	intronic	.
rs6547937	ALK	2	29716326	intronic	.
rs17008524	ALK	2	29945322	intronic	.
rs2631939	ALK	2	29977925	intronic	.
rs7421353	ALK	2	29641874	intronic	.
rs6740714	ALK	2	29731788	intronic	.
rs17041287	ALK	2	29847112	intronic	.
rs11684750	ALK	2	29640505	intronic	.
rs3927337	ALK	2	29577405	intronic	.
rs11890191	ALK	2	30043558	intronic	.
rs1406233	ALK	2	29514509	intronic	.
rs4666283	ALK	2	30073650	intronic	.
rs11886642	ALK	2	29592365	intronic	.
rs10195355	ALK	2	29542123	intronic	.

rs10167952	ALK	2	29809505	intronic	.
rs4233740	ALK	2	29758503	intronic	.
rs12998454	ALK	2	29954652	intronic	.
rs4666189	ALK	2	29502690	intronic	.
rs13005169	ALK	2	29500455	intronic	.
rs17007646	ALK	2	29416794	intronic	.
rs10495773	ALK	2	29852088	intronic	.
rs4666273	ALK	2	30011868	intronic	.
rs4350701	ALK	2	29640557	intronic	.
rs6547945	ALK	2	29780501	intronic	.
rs6547981	ALK	2	30106509	intronic	.
rs4402711	ALK	2	29934963	intronic	.
rs7568222	ALK	2	29771927	intronic	.
rs12466048	ALK	2	30002690	intronic	.
rs12466952	ALK	2	30002793	intronic	.
rs2631956	ALK	2	29954664	intronic	.
rs7559372	ALK	2	29487527	intronic	.
rs2631955	ALK	2	29954416	intronic	.
rs10194138	ALK	2	29444656	intronic	.
rs2631948	ALK	2	29986601	intronic	.
rs2247443	ALK	2	29934975	intronic	.
rs13406263	ALK	2	29519475	intronic	.
rs12714277	ALK	2	29586686	intronic	.
rs4408683	ALK	2	29667326	intronic	.
rs7567732	ALK	2	29771510	intronic	.

rs876748	ALK	2	29512675	intronic		.	
rs4665479	ALK	2	30006714	intronic		.	
rs13412931	ALK	2	29788934	intronic		.	
rs11689118	ALK	2	29716164	intronic		.	
rs10432709	ALK	2	30021682	intronic		.	
rs13011250	ALK	2	30091906	intronic		.	
rs11894279	ALK	2	29467468	intronic		.	
rs12619049	ALK	2	29446701	intronic		.	
rs4438441	ALK	2	29731165	intronic		.	
rs6727501	ALK	2	30087069	intronic		.	
rs1670283	ALK	2	29416572	exonic	ATC-ACC	Thr-Ile	missense
rs13025924	ALK	2	29795040	intronic		.	
rs6707371	ALK	2	30075404	intronic		.	
rs10180703	ALK	2	29600620	intronic		.	
rs13024453	ALK	2	30067557	intronic		.	
rs10178161	ALK	2	30069828	intronic		.	
rs7575137	ALK	2	30074066	intronic		.	
rs6709279	ALK	2	29417782	intronic		.	
rs10198871	ALK	2	29779145	intronic		.	
rs4499385	ALK	2	29606824	intronic		.	
rs7594683	ALK	2	29704514	intronic		.	
rs4488615	ALK	2	29704884	intronic		.	
rs4261679	ALK	2	29724183	intronic		.	
rs4233745	ALK	2	29793129	intronic		.	
rs6547975	ALK	2	30011499	intronic		.	

rs4074252	ALK	2	30071411	intronic	.
rs4595923	ALK	2	30048342	intronic	.
rs1881417	ALK	2	29511480	intronic	.
rs5003770	ALK	2	29796951	intronic	.
rs11686458	ALK	2	29671885	intronic	.
rs4128814	ALK	2	29800482	intronic	.
rs11127238	ALK	2	30066492	intronic	.
rs11898966	ALK	2	29646424	intronic	.
rs6716559	ALK	2	29755934	intronic	.
rs6709762	ALK	2	29766715	intronic	.
rs13009937	ALK	2	29558608	intronic	.
rs11897469	ALK	2	29643071	intronic	.
rs4267473	ALK	2	29712765	intronic	.
rs4341892	ALK	2	30061083	intronic	.
rs12617691	ALK	2	29725908	intronic	.
rs11127241	ALK	2	30080628	intronic	.
rs11681922	ALK	2	29442426	intronic	.
rs4349303	ALK	2	30136530	intronic	.
rs4350702	ALK	2	30136730	intronic	.
rs11127217	ALK	2	29568945	intronic	.
rs12620310	ALK	2	29728909	intronic	.
rs13422847	ALK	2	29520389	intronic	.
rs10173116	ALK	2	29728811	intronic	.
rs4356623	ALK	2	29605508	intronic	.
rs6713380	ALK	2	29802178	intronic	.

rs12464131	ALK	2	30065138	intronic	.
rs10439521	ALK	2	29477885	intronic	.
rs10185035	ALK	2	29719818	intronic	.
rs12987571	ALK	2	29437842	intronic	.
rs13000043	ALK	2	29569562	intronic	.
rs12620548	ALK	2	30090341	intronic	.
rs6729436	ALK	2	29578564	intronic	.
rs10184885	ALK	2	29669822	intronic	.
rs6750887	ALK	2	29739210	intronic	.
rs10171502	ALK	2	29557564	intronic	.
rs2541199	ALK	2	29942699	intronic	.
rs13397113	ALK	2	29462405	intronic	.
rs4665485	ALK	2	30095846	intronic	.
rs4666275	ALK	2	30016786	intronic	.
rs11897665	ALK	2	30041690	intronic	.
rs13407210	ALK	2	29720219	intronic	.
rs6759800	ALK	2	29932567	intronic	.
rs11695573	ALK	2	29682857	intronic	.
rs12996631	ALK	2	29572299	intronic	.
rs11693439	ALK	2	29766613	intronic	.
rs10180728	ALK	2	29788851	intronic	.
rs12623676	ALK	2	30053342	intronic	.
rs7592354	ALK	2	29698759	intronic	.
rs17008468	ALK	2	29904696	intronic	.
rs10176775	ALK	2	29912318	intronic	.

rs4610005	ALK	2	29892289	intronic	.
rs4503951	ALK	2	29698383	intronic	.
rs4630722	ALK	2	30090629	intronic	.
rs12469277	ALK	2	29609205	intronic	.
rs2245914	ALK	2	29910540	intronic	.
rs6547948	ALK	2	29790622	intronic	.
rs11891005	ALK	2	29600843	intronic	.
rs12623507	ALK	2	29792763	intronic	.
rs13411869	ALK	2	29487103	intronic	.
rs6708752	ALK	2	29536039	intronic	.
rs13419205	ALK	2	29917524	intronic	.
rs2631959	ALK	2	29968995	intronic	.
rs17007998	ALK	2	29595021	intronic	.
rs9973865	ALK	2	29826784	intronic	.
rs13392455	ALK	2	29871128	intronic	.
rs13404353	ALK	2	29616013	intronic	.
rs7591913	ALK	2	29619971	intronic	.
rs10195189	ALK	2	29612926	intronic	.
rs11887306	ALK	2	29600898	intronic	.
rs2631946	ALK	2	29986208	intronic	.
rs13417904	ALK	2	30060021	intronic	.
rs11675197	ALK	2	30101016	intronic	.
rs6547957	ALK	2	29816800	intronic	.
rs4666271	ALK	2	29992732	intronic	.
rs6724436	ALK	2	29727719	intronic	.

rs11678427	ALK	2	29802542	intronic	.
rs4666254	ALK	2	29823352	intronic	.
rs13387847	ALK	2	29426938	intronic	.
rs10188389	ALK	2	30021598	intronic	.
rs13027395	ALK	2	29573193	intronic	.
rs10206197	ALK	2	29781843	intronic	.
rs2631994	ALK	2	29909409	intronic	.
rs13015783	ALK	2	29434500	intronic	.
rs7574859	ALK	2	30094209	intronic	.
rs13019456	ALK	2	29555506	intronic	.
rs2270353	ALK	2	29940820	intronic	.
rs3923554	ALK	2	29683227	intronic	.
rs6748797	ALK	2	29432982	intronic	.
rs13394743	ALK	2	30042872	intronic	.
rs10178628	ALK	2	29471420	intronic	.
rs7572957	ALK	2	29487405	intronic	.
rs12616992	ALK	2	30080818	intronic	.
rs1406231	ALK	2	29570266	intronic	.
rs4666176	ALK	2	29424004	intronic	.
rs3820712	ALK	2	29430519	intronic	.
rs1406228	ALK	2	29538642	intronic	.
rs1113643	ALK	2	29539536	intronic	.
rs1113627	ALK	2	29579623	intronic	.
rs17008465	ALK	2	29904447	intronic	.
rs763836	ALK	2	29905304	intronic	.

rs10200505	ALK	2	29905337	intronic		.	
rs4666269	ALK	2	29943596	intronic		.	
rs10495771	ALK	2	29999161	intronic		.	
rs17008728	ALK	2	30005010	intronic		.	
rs10495769	ALK	2	30005566	intronic		.	
rs4076174	ALK	2	30075011	intronic		.	
rs4075920	ALK	2	30075051	intronic		.	
rs17007918	ALK	2	29569604	intronic		.	
rs10167756	ALK	2	29597044	intronic		.	
rs10186332	ALK	2	29607480	intronic		.	
rs12479392	ALK	2	30065435	intronic		.	
rs13404997	ALK	2	29431202	intronic		.	
rs4041386	ALK	2	29917150	intronic		.	
rs12185720	ALK	2	29505019	intronic		.	
rs3936219	ALK	2	30091595	intronic		.	
rs2339467	ALK	2	29514593	intronic		.	
rs13424578	ALK	2	29477419	intronic		.	
rs11689426	ALK	2	29643332	intronic		.	
rs10779969	ALK	2	29671801	intronic		.	
rs2879482	ALK	2	30013096	intronic		.	
rs13391272	ALK	2	29670227	intronic		.	
rs11127225	ALK	2	29673607	intronic		.	
rs4074194	ALK	2	30071781	intronic		.	
rs1670286	ALK	2	29438333	intronic		.	
rs4493216	ALK	2	30142221	intronic		.	



rs11694370	ALK	2	29792102	intronic		.	
rs10177844	ALK	2	29872565	intronic		.	
rs4280416	ALK	2	30088023	intronic		.	
rs6547926	ALK	2	29660479	intronic		.	
rs7588341	ALK	2	29706271	intronic		.	
rs11897586	ALK	2	29542097	intronic		.	
rs1528426	ALK	2	29575049	intronic		.	
rs13411731	ALK	2	29721997	intronic		.	
rs2631979	ALK	2	29966213	intronic		.	
rs10210040	ALK	2	29732214	intronic		.	
rs2256776	ALK	2	29914852	intronic		.	
rs2631963	ALK	2	29923898	intronic		.	
rs4666232	ALK	2	29721821	intronic		.	
rs6733903	ALK	2	29805415	intronic		.	
rs4429434	ALK	2	30041479	intronic		.	
rs4665464	ALK	2	29733698	intronic		.	
rs4666177	ALK	2	29424089	intronic		.	
rs13398690	ALK	2	29869393	intronic		.	
rs2631971	ALK	2	29931699	intronic		.	
rs12105136	ALK	2	29785729	intronic		.	
rs2879504	ALK	2	29861246	intronic		.	
rs6742561	ALK	2	29793174	intronic		.	
rs7421625	ALK	2	29989451	intronic		.	
rs11127206	ALK	2	29431807	intronic		.	
rs1615183	ALK	2	29435447	intronic		.	

rs4665457	ALK	2	29632572	intronic		.	
rs9309671	ALK	2	29838529	intronic		.	
rs11888731	ALK	2	29702883	intronic		.	
rs7603280	ALK	2	29565428	intronic		.	
rs13012046	ALK	2	30068116	intronic		.	
rs5007105	ALK	2	30033720	intronic		.	
rs2879503	ALK	2	29875226	intronic		.	
rs4567889	ALK	2	29739177	intronic		.	
rs13033797	ALK	2	29579812	intronic		.	
rs6708344	ALK	2	29535725	intronic		.	
rs2924371	ALK	2	29437509	intronic		.	
rs12986732	ALK	2	29586747	intronic		.	
rs2631985	ALK	2	29911170	intronic		.	
rs6724978	ALK	2	29588003	intronic		.	
rs6726799	ALK	2	29572680	intronic		.	
rs4519472	ALK	2	30041788	intronic		.	
rs7583871	ALK	2	29881235	intronic		.	
rs7592311	ALK	2	29501720	intronic		.	
rs12997218	ALK	2	30041065	intronic		.	
rs17007778	ALK	2	29500442	intronic		.	
rs6716687	ALK	2	29756031	intronic		.	
rs6734413	ALK	2	29726078	intronic		.	
rs6547973	ALK	2	29969390	intronic		.	
rs1569156	ALK	2	29444095	exonic			stopgain
rs13399652	ALK	2	29873085	intronic		.	

rs12105526	ALK	2	30029875	intronic		.	
rs17008653	ALK	2	29991076	intronic		.	
rs6750566	ALK	2	29621756	intronic		.	
rs11690456	ALK	2	29625029	intronic		.	
rs6547947	ALK	2	29781000	intronic		.	
rs12998728	ALK	2	29474502	intronic		.	
rs11892780	ALK	2	29418844	intronic		.	
rs4473347	ALK	2	30074893	intronic		.	
rs6745718	ALK	2	29758466	intronic		.	
rs17783362	ALK	2	29487744	intronic		.	
rs2293348	EGFR	7	55266757	intronic		.	
rs1107616	EGFR	7	55280152	intronic		.	
rs12535328	EGFR	7	55291726	intronic		.	
rs7803660	EGFR	7	55174071	intronic		.	
rs2293347	EGFR	7	55268916	exonic	GAA-GAG	Glu-Glu	synonymous
rs12718947	EGFR	7	55292321	intronic		.	
rs6960438	EGFR	7	55141908	intronic		.	
rs940806	EGFR	7	55279745	intronic		.	
rs17518446	EGFR	7	55262967	intronic		.	
rs41324647	EGFR	7	55291353	intronic		.	
rs4140770	EGFR	7	55141476	intronic		.	
rs17172461	EGFR	7	55304166	intronic		.	
rs6947594	EGFR	7	55203297	intronic		.	
rs763317	EGFR	7	55095197	intronic		.	
rs2877260	EGFR	7	55171629	intronic		.	

rs2110290	EGFR	7	55172768	intronic		.	
rs10488142	EGFR	7	55195947	intronic		.	
rs2075109	EGFR	7	55218903	intronic		.	
rs2075110	EGFR	7	55219159	intronic		.	
rs11506105	EGFR	7	55220177	intronic		.	
rs7785313	EGFR	7	55113095	intronic		.	
rs12666347	EGFR	7	55205930	intronic		.	
rs17746482	EGFR	7	55309247	intronic		.	
rs10244108	EGFR	7	55152337	intronic		.	
rs12538489	EGFR	7	55099836	intronic		.	
rs12671550	EGFR	7	55173675	intronic		.	
rs4947984	EGFR	7	55211316	intronic		.	
rs11536635	EGFR	7	55229015	intronic		.	
rs729969	EGFR	7	55128207	intronic		.	
rs7789965	EGFR	7	55113748	intronic		.	
rs883117	EGFR	7	55307545	intronic		.	
rs1534130	EGFR	7	55309732	intronic		.	
rs17586344	EGFR	7	55140398	intronic		.	
rs7796139	EGFR	7	55175876	intronic		.	
rs35891645	EGFR	7	55324148	UTR3		.	
rs7783970	EGFR	7	55290368	intronic		.	
rs17172432	EGFR	7	55141317	intronic		.	
rs13244925	EGFR	7	55192256	intronic		.	
rs35699152	EGFR	7	55323837	intronic		.	
rs17172446	EGFR	7	55202598	intronic		.	

rs759167	EGFR	7	55127784	intronic	.
rs980653	EGFR	7	55185890	intronic	.
rs12718939	EGFR	7	55105320	intronic	.
rs759169	EGFR	7	55154636	intronic	.
rs17746476	EGFR	7	55307926	intronic	.
rs10269512	EGFR	7	55267160	intronic	.
rs6970262	EGFR	7	55259763	intronic	.
rs7785013	EGFR	7	55152667	intronic	.
rs17586365	EGFR	7	55140786	intronic	.
rs10488140	EGFR	7	55138388	intronic	.
rs11768038	EGFR	7	55291136	intronic	.
rs3735061	EGFR	7	55163867	intronic	.
rs1997083	EGFR	7	55292626	intronic	.
rs2241055	EGFR	7	55240461	intronic	.
rs12534147	EGFR	7	55291079	intronic	.
rs17172438	EGFR	7	55151537	intronic	.
rs7781264	EGFR	7	55230840	intronic	.
rs11238349	EGFR	7	55156071	intronic	.
rs17172457	EGFR	7	55300905	intronic	.
rs2740764	EGFR	7	55267458	intronic	.
rs11767730	EGFR	7	55313378	intronic	.
rs845552	EGFR	7	55245507	intronic	.
rs759166	EGFR	7	55126998	intronic	.
rs6978771	EGFR	7	55140296	intronic	.
rs7801956	EGFR	7	55214443	intronic	.

rs11487218	EGFR	7	55141540	intronic		.	
rs1558544	EGFR	7	55228053	intronic		.	
rs9642391	EGFR	7	55245364	intronic		.	
rs11975042	EGFR	7	55309690	intronic		.	
rs10280515	EGFR	7	55173700	intronic		.	
rs10251695	EGFR	7	55218749	intronic		.	
rs7786831	EGFR	7	55190489	intronic		.	
rs10247160	EGFR	7	55164994	intronic		.	
rs868254	EGFR	7	55302832	intronic		.	
rs17172466	EGFR	7	55306332	intronic		.	
rs759170	EGFR	7	55155372	intronic		.	
rs7804688	EGFR	7	55190098	intronic		.	
rs11976696	EGFR	7	55232333	intronic		.	
rs2041647	EGFR	7	55183115	intronic		.	
rs2072454	EGFR	7	55214348	exonic	AAC-AAT	Asn-Asn	synonymous
rs7810035	EGFR	7	55316229	intronic		.	
rs10277413	EGFR	7	55238464	UTR3		.	
rs883118	EGFR	7	55307104	intronic		.	
rs7809028	EGFR	7	55280677	intronic		.	
rs6972381	EGFR	7	55257413	intronic		.	
rs1107617	EGFR	7	55280268	intronic		.	
rs7781062	EGFR	7	55182494	intronic		.	
rs3735063	EGFR	7	55153164	intronic		.	
rs4947986	EGFR	7	55221655	intronic		.	
rs11974707	EGFR	7	55108717	intronic		.	

rs12668421	EGFR	7	55109177	intronic		.	
rs7809332	EGFR	7	55293361	intronic		.	
rs1525643	EGFR	7	55302440	intronic		.	
rs7784002	EGFR	7	55107469	intronic		.	
rs11977660	EGFR	7	55162336	intronic		.	
rs7803520	EGFR	7	55204108	intronic		.	
rs759162	EGFR	7	55228173	intronic		.	
rs3823585	EGFR	7	55163737	intronic		.	
rs12535226	EGFR	7	55156419	intronic		.	
rs10229932	EGFR	7	55190672	intronic		.	
rs6948867	EGFR	7	55323098	intronic		.	
rs17172433	EGFR	7	55142435	intronic		.	
rs6954351	EGFR	7	55171190	intronic		.	
rs2037699	EGFR	7	55306612	intronic		.	
rs4947963	EGFR	7	55088415	intronic		.	
rs11976065	EGFR	7	55107196	intronic		.	
rs4947488	EGFR	7	55116555	intronic		.	
rs10234806	EGFR	7	55132080	intronic		.	
rs917880	EGFR	7	55162011	intronic		.	
rs917881	EGFR	7	55162305	intronic		.	
rs10488143	EGFR	7	55215909	intronic		.	
rs6593211	EGFR	7	55277964	UTR3		.	
rs2037698	EGFR	7	55306625	intronic		.	
rs11770506	EGFR	7	55090379	intronic		.	
rs13234622	EGFR	7	55211879	intronic		.	

rs11760524	EGFR	7	55221167	intronic		.	
rs7800937	EphA1	7	143093307	intronic		.	
rs3885667	EphA1	7	143103155	intronic		.	
rs10227035	EphA1	7	143089295	intronic		.	
rs6967117	EphA1	7	143088867	exonic	TCC-CCC	Ser-Pro	nc transcript variant
rs4283960	EphA1	7	143103380	intronic		.	
rs11768549	EphA1	7	143095153	exonic		Pro-Leu	nc transcript variant
rs4421280	EphA1	7	143103217	intronic		.	
rs4425279	EphA3	3	89334847	intronic		.	
rs9859735	EphA3	3	89186377	intronic		.	
rs7612746	EphA3	3	89249262	intronic		.	
rs870900	EphA3	3	89417287	intronic		.	
rs7644070	EphA3	3	89370107	intronic		.	
rs17026944	EphA3	3	89521131	intronic		.	
rs6551412	EphA3	3	89496502	intronic		.	
rs7646842	EphA3	3	89249284	intronic		.	
rs9817553	EphA3	3	89384566	intronic		.	
rs11920519	EphA3	3	89306245	intronic		.	
rs7629132	EphA3	3	89307462	intronic		.	
rs1912965	EphA3	3	89518332	intronic		.	
rs7642606	EphA3	3	89168883	intronic		.	
rs17026915	EphA3	3	89458612	intronic		.	
rs17800551	EphA3	3	89317315	intronic		.	
rs994129	EphA3	3	89318462	intronic		.	
rs9866618	EphA3	3	89319577	intronic		.	



rs1512909	EphA3	3	89336417	intronic		.	
rs17801309	EphA3	3	89521664	exonic	CGC-CAC	Arg-His	missence
rs6551405	EphA3	3	89248023	intronic			
rs9861649	EphA3	3	89236041	intronic		.	
rs9310117	EphA3	3	89275906	intronic		.	
rs13101118	EphA3	3	89243942	intronic		.	
rs1015126	EphA3	3	89364451	intronic		.	
rs13097212	EphA3	3	89230610	intronic		.	
rs17026938	EphA3	3	89505858	intronic		.	
rs9828822	EphA3	3	89213912	intronic		.	
rs9868686	EphA3	3	89211284	intronic		.	
rs907713	EphA3	3	89326479	intronic		.	
rs870899	EphA3	3	89417171	intronic		.	
rs2137486	EphA3	3	89362129	intronic		.	
rs6551409	EphA3	3	89302171	intronic		.	
rs4449340	EphA3	3	89323876	intronic		.	
rs6797260	EphA3	3	89302486	intronic		.	
rs9817310	EphA3	3	89280754	intronic		.	
rs11720651	EphA3	3	89261061	intronic		.	
rs1912966	EphA3	3	89518464	intronic		.	
rs12486528	EphA3	3	89338394	intronic		.	
rs9811026	EphA3	3	89174152	intronic		.	
rs7373232	EphA3	3	89268266	intronic		.	
rs1040017	EphA3	3	89329632	intronic		.	
rs7647240	EphA3	3	89243497	intronic		.	

rs17738248	EphA3	3	89296363	intronic		.	
rs7428598	EphA3	3	89187123	intronic		.	
rs6551407	EphA3	3	89270605	intronic		.	
rs13097740	EphA3	3	89313541	intronic		.	
rs11128072	EphA3	3	89317917	intronic		.	
rs1028013	EphA3	3	89484268	intronic		.	
rs1567732	EphA3	3	89315893	intronic		.	
rs6771054	EphA3	3	89489529	intronic		.	
rs6796339	EphA3	3	89286159	intronic		.	
rs9310119	EphA3	3	89378042	intronic		.	
rs6551408	EphA3	3	89270738	intronic		.	
rs9868782	EphA3	3	89384121	intronic		.	
rs9836340	EphA3	3	89405754	intronic		.	
rs11927218	EphA3	3	89329525	intronic		.	
rs7611735	EphA3	3	89186994	intronic		.	
rs6767230	EphA3	3	89267181	intronic		.	
rs6779710	EphA3	3	89267150	intronic		.	
rs9842599	EphA3	3	89407256	intronic		.	
rs7619025	EphA3	3	89368629	intronic		.	
rs35124509	EphA3	3	89521693	exonic	TGG-CGG	Trp-Arg	missense
rs7615949	EphA3	3	89432683	intronic		.	
rs11920405	EphA3	3	89260274	intronic		.	
rs6801565	EphA3	3	89270519	intronic		.	
rs11128068	EphA3	3	89207222	intronic		.	
rs7633500	EphA3	3	89497082	intronic		.	

rs17082122	EphA5	4	66280946	intronic		.	
rs11728612	EphA5	4	66442069	intronic		.	
rs9991256	EphA5	4	66327854	intronic		.	
rs6852766	EphA5	4	66333690	intronic		.	
rs2084682	EphA5	4	66262049	intronic		.	
rs7667410	EphA5	4	66486986	intronic		.	
rs17086144	EphA5	4	66242049	intronic		.	
rs4438803	EphA5	4	66507443	intronic		.	
rs6829925	EphA5	4	66343044	intronic		.	
rs7660334	EphA5	4	66341463	intronic		.	
rs1376417	EphA5	4	66234569	intronic		.	
rs6847413	EphA5	4	66268658	intronic		.	
rs11737314	EphA5	4	66364374	intronic		.	
rs4370201	EphA5	4	66500571	intronic		.	
rs10006892	EphA5	4	66308481	intronic		.	
rs4320185	EphA5	4	66384235	intronic		.	
rs6844942	EphA5	4	66412192	intronic		.	
rs1376416	EphA5	4	66258273	intronic		.	
rs17086185	EphA5	4	66267428	intronic		.	
rs4860666	EphA5	4	66333933	intronic		.	
rs6815080	EphA5	4	66362487	intronic		.	
rs6834811	EphA5	4	66452949	intronic		.	
rs4487412	EphA5	4	66484354	intronic		.	
rs4365778	EphA5	4	66364587	intronic		.	
rs4371663	EphA5	4	66290312	intronic		.	

rs11131612	EphA5	4	66525024	intronic		.	
rs4860182	EphA5	4	66292080	intronic		.	
rs10025570	EphA5	4	66249102	intronic		.	
rs4320186	EphA5	4	66483593	intronic		.	
rs4860662	EphA5	4	66283816	intronic		.	
rs4289492	EphA5	4	66289745	intronic		.	
rs5001097	EphA5	4	66334714	intronic		.	
rs7673091	EphA5	4	66382111	intronic		.	
rs4860651	EphA5	4	66188295	UTR3		.	
rs7658065	EphA5	4	66265670	intronic		.	
rs4599467	EphA5	4	66442750	intronic		.	
rs4860663	EphA5	4	66297574	intronic		.	
rs4611975	EphA5	4	66500248	intronic		.	
rs6823779	EphA5	4	66281005	intronic		.	
rs10006666	EphA5	4	66308209	intronic		.	
rs12644315	EphA5	4	66420825	intronic		.	
rs11938753	EphA5	4	66197269	UTR3		.	
rs1349453	EphA5	4	66263653	intronic		.	
rs4267782	EphA5	4	66335098	intronic		.	
rs9784550	EphA5	4	66528411	intronic		.	
rs7697278	EphA5	4	66243126	intronic		.	
rs17086224	EphA5	4	66282361	intronic		.	
rs2198103	EphA5	4	66272179	intronic		.	
rs4608860	EphA5	4	66514008	intronic		.	
rs7684022	EphA5	4	66389701	intronic		.	

rs4508946	EphA5	4	66192715	intronic		.	
rs17086125	EphA5	4	66236191	intronic		.	
rs4604104	EphA5	4	66384360	intronic		.	
rs1451170	EphA5	4	66283184	intronic		.	
rs12509018	EphA5	4	66278087	intronic		.	
rs9312144	EphA5	4	66265727	intronic		.	
rs10517937	EphA5	4	66267320	intronic		.	
rs896215	EphA5	4	66270913	intronic		.	
rs9986026	EphA5	4	66292262	intronic		.	
rs4374661	EphA5	4	66291257	intronic		.	
rs4860679	EphA5	4	66401110	intronic		.	
rs1376412	EphA5	4	66267015	intronic		.	
rs17086181	EphA5	4	66267300	intronic		.	
rs10008930	EphA5	4	66342070	intronic		.	
rs3752774	EphA5	4	66201634	intronic		.	
rs6840093	EphA5	4	66366103	intronic		.	
rs6551926	EphA5	4	66292123	intronic		.	
rs7659227	EphA5	4	66496170	intronic		.	
rs4860671	EphA5	4	66367589	intronic		.	
rs6551932	EphA5	4	66399839	intronic		.	
rs4422467	EphA5	4	66494645	intronic		.	
rs11947629	EphA5	4	66197329	UTR3		.	
rs4541571	EphA5	4	66378192	intronic		.	
rs5027823	EphA5	4	66487084	intronic		.	
rs4132314	EphA5	4	66381628	intronic		.	

rs6849874	EphA5	4	66280731	intronic		.	
rs13139257	EphA5	4	66337853	intronic		.	
rs11931601	EphA5	4	66431909	intronic		.	
rs4860652	EphA5	4	66196635	UTR3		.	
rs12642347	EphA5	4	66431605	intronic		.	
rs6850093	EphA5	4	66443198	intronic		.	
rs13123581	EphA5	4	66215872	intronic		.	
rs4349648	EphA5	4	66289006	intronic		.	
rs4613617	EphA5	4	66440622	intronic		.	
rs10002887	EphA5	4	66256159	intronic		.	
rs9997603	EphA5	4	66438114	intronic		.	
rs12498502	EphA5	4	66328051	intronic		.	
rs17086139	EphA5	4	66239035	intronic		.	
rs7688941	EphA5	4	66196622	UTR3		.	
rs6855605	EphA5	4	66456092	intronic		.	
rs11943721	EphA5	4	66282405	intronic		.	
rs2084681	EphA5	4	66261976	intronic		.	
rs4566705	EphA5	4	66521229	intronic		.	
rs13124187	EphA5	4	66208911	intronic		.	
rs10022719	EphA5	4	66356885	intronic		.	
rs4132313	EphA5	4	66381581	intronic		.	
rs4518304	EphA5	4	66421666	intronic		.	
rs17086208	EphA5	4	66277342	intronic		.	
rs13122571	EphA5	4	66346556	intronic		.	
rs10030643	EphA5	4	66268421	intronic		.	

rs12502991	EphA5	4	66295548	intronic		.	
rs9992203	EphA5	4	66227800	intronic		.	
rs11947238	EphA5	4	66284091	intronic		.	
rs12504386	EphA5	4	66380863	intronic		.	
rs13137977	EphA5	4	66380539	intronic		.	
rs6844228	EphA5	4	66377633	intronic		.	
rs7688795	EphA5	4	66189260	UTR3		.	
rs1868847	EphA5	4	66190432	intronic		.	
rs1451178	EphA5	4	66219859	intronic		.	
rs7668692	EphA5	4	66251050	intronic		.	
rs2084680	EphA5	4	66264699	intronic		.	
rs10010284	EphA5	4	66376366	intronic		.	
rs11934861	EphA5	4	66340446	intronic		.	
rs4475196	EphA5	4	66483863	intronic		.	
rs6851852	EphA5	4	66208079	intronic		.	
rs4565127	EphA5	4	66526101	intronic		.	
rs7656497	EphA5	4	66210664	intronic		.	
rs2218847	EphA5	4	66275695	intronic		.	
rs13120093	EphA5	4	66272411	intronic		.	
rs7690645	EphA5	4	66242661	intronic		.	
rs2290254	EphA5	4	66214043	intronic		.	
rs12506403	EphA5	4	66453438	intronic		.	
rs12054588	EphA5	4	66447771	intronic		.	
rs7664993	EphA5	4	66333341	intronic		.	
rs4241663	EphA5	4	66291445	intronic		.	

rs10866158	EphA5	4	66288667	intronic		.	
rs6826193	EphA5	4	66427044	intronic		.	
rs7659865	EphA5	4	66292306	intronic		.	
rs2582036	EphB2	1	23128940	intronic		.	
rs6695566	EphB2	1	23042127	intronic		.	
rs893961	EphB2	1	23118173	intronic		.	
rs10917280	EphB2	1	23044181	intronic		.	
rs4655102	EphB2	1	23082136	intronic		.	
rs16827476	EphB2	1	23053536	intronic		.	
rs16827699	EphB2	1	23200129	intronic		.	
rs16827555	EphB2	1	23122540	intronic		.	
rs309543	EphB2	1	23225322	intronic		.	
rs4655099	EphB2	1	23081927	intronic		.	
rs7554093	EphB2	1	23199402	intronic		.	
rs2869513	EphB2	1	23045943	intronic		.	
rs1561624	EphB2	1	23101688	UTR5		.	
rs2582021	EphB2	1	23089261	intronic		.	
rs2765854	EphB2	1	23217804	intronic		.	
rs10753541	EphB2	1	23061992	intronic		.	
rs16827678	EphB2	1	23185449	intronic		.	
rs4361967	EphB2	1	23148336	intronic		.	
rs7519206	EphB2	1	23174591	intronic		.	
rs4655136	EphB2	1	23199949	intronic		.	
rs12076863	EphB2	1	23113910	intronic		.	
rs6686970	EphB2	1	23073622	intronic		.	



rs4263970	EphB2	1	23063930	intronic		.	
rs751023	EphB2	1	23143778	intronic		.	
rs10917288	EphB2	1	23071845	intronic		.	
rs7516175	EphB2	1	23096818	intronic		.	
rs16827672	EphB2	1	23182684	intronic		.	
rs6698922	EphB2	1	23073167	intronic		.	
rs7536195	EphB2	1	23142496	intronic		.	
rs6687094	EphB2	1	23156289	intronic		.	
rs12061624	EphB2	1	23174163	intronic		.	
rs4654825	EphB2	1	23199726	intronic		.	
rs309473	EphB2	1	23218714	intronic		.	
rs1866792	EphB2	1	23123331	intronic		.	
rs170129	EphB2	1	23209562	intronic		.	
rs10917279	EphB2	1	23038732	intronic		.	
rs16827697	EphB2	1	23199311	intronic		.	
rs16827484	EphB2	1	23065120	intronic		.	
rs309499	EphB2	1	23234946	intronic		.	
rs12090415	EphB2	1	23155231	intronic		.	
rs4506436	EphB2	1	23127876	intronic		.	
rs309471	EphB2	1	23220026	intronic		.	
rs6703896	EphB2	1	23189059	intronic		.	
rs12239985	EphB2	1	23204183	intronic		.	
rs2295022	EphB2	1	23241601	UTR3		.	
rs10442639	EphB2	1	23061365	intronic		.	
rs10917307	EphB2	1	23147541	intronic		.	

rs2817901	EphB2	1	23109291	intronic		.	
rs10157808	EphB2	1	23076916	intronic		.	
rs2675495	EphB2	1	23226074	intronic		.	
rs10917325	EphB2	1	23209278	intronic		.	
rs4589082	EphB2	1	23147403	intronic		.	
rs10799762	EphB2	1	23112369	intronic		.	
rs12724658	EphB2	1	23115749	intronic		.	
rs2138542	EphB2	1	23197525	intronic		.	
rs2817890	EphB2	1	23237825	intronic		.	
rs12566963	EphB2	1	23060250	intronic		.	
rs12723359	EphB2	1	23137761	intronic		.	
rs882025	EphB2	1	23050352	intronic		.	
rs2765849	EphB2	1	23215595	intronic		.	
rs4654819	EphB2	1	23148919	intronic		.	
rs6687487	EphB2	1	23061551	intronic		.	
rs4655134	EphB2	1	23198619	intronic		.	
rs6667289	EphB2	1	23175151	intronic		.	
rs10753546	EphB2	1	23184264	intronic		.	
rs12404289	EphB2	1	23168961	intronic		.	
rs6667416	EphB2	1	23145239	intronic		.	
rs893960	EphB2	1	23044223	intronic		.	
rs309495	EphB2	1	23238023	intronic		.	
rs4655129	EphB2	1	23169528	intronic		.	
rs11801544	EphB2	1	23115939	intronic		.	
rs10799764	EphB2	1	23117460	intronic		.	

rs10917282	EphB2	1	23048063	intronic	.
rs6701399	EphB2	1	23152988	intronic	.
rs2817893	EphB2	1	23197913	intronic	.
rs7340102	EphB2	1	23229177	intronic	.
rs10917284	EphB2	1	23062908	intronic	.
rs16827646	EphB2	1	23164756	intronic	.
rs4147362	EphB2	1	23200159	intronic	.
rs4655130	EphB2	1	23175994	intronic	.
rs10158095	EphB2	1	23207352	intronic	.
rs4427376	EphB2	1	23176740	intronic	.
rs4654814	EphB2	1	23094421	intronic	.
rs12143574	EphB2	1	23142716	intronic	.
rs10753545	EphB2	1	23158122	intronic	.
rs4655117	EphB2	1	23137631	intronic	.
rs893964	EphB2	1	23086096	intronic	.
rs4655128	EphB2	1	23169503	intronic	.
rs3122405	EphB2	1	23092066	intronic	.
rs309476	EphB2	1	23212740	intronic	.
rs7413155	EphB2	1	23184206	intronic	.
rs10799771	EphB2	1	23206684	intronic	.
rs10799772	EphB2	1	23229640	intronic	.
rs2165332	EphB2	1	23142351	intronic	.
rs6658894	EphB2	1	23175356	intronic	.
rs7530478	EphB2	1	23128716	intronic	.
rs2817907	EphB2	1	23106474	intronic	.

rs17488885	EphB2	1	23176759	intronic		.	
rs10799766	EphB2	1	23151876	intronic		.	
rs1138510	EphB3	3	184299167	exonic	TCC-TCT	Ser-Ser	synonymous
rs7652597	EphB3	3	184293769	exonic	TCC-TCT	Ser-Ser	synonymous
rs1078806	FGFR2	10	123338975	intronic		.	
rs11200000	FGFR2	10	123311510	intronic		.	
rs2981456	FGFR2	10	123272009	intronic		.	
rs3135715	FGFR2	10	123354726	intronic		.	
rs2912753	FGFR2	10	123257402	intronic		.	
rs3135819	FGFR2	10	123241122	intronic		.	
rs2278202	FGFR2	10	123243197	intronic		.	
rs2981433	FGFR2	10	123287727	intronic		.	
rs2912754	FGFR2	10	123261694	intronic		.	
rs3135810	FGFR2	10	123242780	intronic		.	
rs1649202	FGFR2	10	123240625	intronic		.	
rs1613776	FGFR2	10	123244834	intronic		.	
rs2981434	FGFR2	10	123287703	intronic		.	
rs2912774	FGFR2	10	123348662	intronic		.	
rs2912759	FGFR2	10	123269711	intronic		.	
rs2912787	FGFR2	10	123325538	intronic		.	
rs2981449	FGFR2	10	123325755	intronic		.	
rs3135730	FGFR2	10	123325794	intronic		.	
rs11814493	FGFR2	10	123317185	intronic		.	
rs2162540	FGFR2	10	123352136	intronic		.	
rs3116478	FGFR2	10	123335800	intronic		.	

rs3135748	FGFR2	10	123310025	intronic		.	
rs2981581	FGFR2	10	123352382	intronic		.	
rs2981582	FGFR2	10	123352317	intronic		.	
rs2420942	FGFR2	10	123277742	intronic		.	
rs3135734	FGFR2	10	123324889	intronic		.	
rs2981432	FGFR2	10	123326646	intronic		.	
rs10736303	FGFR2	10	123334457	intronic		.	
rs2433759	FGFR2	10	123252532	intronic		.	
rs17541509	FGFR2	10	123285620	intronic		.	
rs2981439	FGFR2	10	123282561	intronic		.	
rs3135807	FGFR2	10	123244677	intronic		.	
rs1219643	FGFR2	10	123348355	intronic		.	
rs1649200	FGFR2	10	123243730	intronic		.	
rs3135785	FGFR2	10	123260007	intronic		.	
rs7090018	FGFR2	10	123268889	intronic		.	
rs2162539	FGFR2	10	123261519	intronic		.	
rs1219648	FGFR2	10	123346190	intronic		.	
rs2981575	FGFR2	10	123346116	intronic		.	
rs2303568	FGFR2	10	123323962	intronic		.	
rs1649163	FGFR2	10	123240287	intronic		.	
rs3798234	FRK	6	116316235	intronic		.	
rs1193609	FRK	6	116298479	intronic		.	
rs3777427	FRK	6	116278377	intronic		.	
rs3798235	FRK	6	116315408	intronic		.	
rs9488818	FRK	6	116300452	intronic		.	

rs3777425	FRK	6	116278817	intronic		.	
rs10456902	FRK	6	116333742	intronic		.	
rs11153594	FRK	6	116354591	intronic		.	
rs9374588	FRK	6	116311701	intronic		.	
rs9400883	FRK	6	116306113	intronic		.	
rs9387379	FRK	6	116290349	intronic		.	
rs3822856	FRK	6	116316103	intronic		.	
rs9387380	FRK	6	116327579	intronic		.	
rs3798231	FRK	6	116317638	intronic		.	
rs496311	FRK	6	116274730	intronic		.	
rs1193608	FRK	6	116298792	intronic		.	
rs12202641	FRK	6	116314634	intronic		.	
rs6927766	FRK	6	116290682	intronic		.	
rs3798232	FRK	6	116317444	intronic		.	
rs12524293	FRK	6	116369110	intronic		.	
rs9488829	FRK	6	116355105	intronic		.	
rs9320553	FRK	6	116330942	intronic		.	
rs7758899	FRK	6	116267345	intronic		.	
rs546418	FRK	6	116301913	intronic		.	
rs544757	FRK	6	116302050	intronic		.	
rs6568921	FRK	6	116373616	intronic		.	
rs1035940	INSR	19	7199978	intronic		.	
rs4804304	INSR	19	7140525	intronic		.	
rs8104314	INSR	19	7212256	intronic		.	
rs3815902	INSR	19	7166138	intronic		.	

rs2963	INSR	19	7163154	exonic	AAG-AAA	Lys-Lys	synonymous
rs7245757	INSR	19	7187628	intronic		.	
rs7508679	INSR	19	7222832	intronic		.	
rs4804424	INSR	19	7229677	intronic		.	
rs2860173	INSR	19	7129086	intronic		.	
rs1035942	INSR	19	7199803	intronic		.	
rs16994298	INSR	19	7170882	intronic		.	
rs10415589	INSR	19	7170935	intronic		.	
rs10500204	INSR	19	7182963	intronic		.	
rs2042901	INSR	19	7204394	intronic		.	
rs16994185	INSR	19	7140801	intronic		.	
rs7248104	INSR	19	7224431	intronic		.	
rs890862	INSR	19	7233604	intronic		.	
rs7245562	INSR	19	7218135	intronic		.	
rs2059807	INSR	19	7166109	intronic		.	
rs8101064	INSR	19	7293119	intronic		.	
rs16994200	INSR	19	7141871	intronic		.	
rs919275	INSR	19	7261441	intronic		.	
rs4804416	INSR	19	7223848	intronic		.	
rs2229434	INSR	19	7142921	exonic	CAC-CAT	His-His	synonymous
rs3745546	INSR	19	7211816	intronic		.	
rs10404166	INSR	19	7281735	intronic		.	
rs3745545	INSR	19	7211841	intronic		.	
rs2229430	INSR	19	7142843	exonic	GCC-GCG	Ala-Ala	synonymous
rs8109559	INSR	19	7171629	intronic		.	

rs8108622	INSR	19	7182753	intronic		.	
rs2229431	INSR	19	7141775	exonic	TTG-TTA	Leu-Leu	synonymous
rs10416429	INSR	19	7230438	intronic		.	
rs6510975	INSR	19	7266878	intronic		.	
rs16990074	INSR	19	7137351	intronic		.	
rs3786681	INSR	19	7168933	intronic		.	
rs4804219	INSR	19	7265908	intronic		.	
rs2962	INSR	19	7163065	exonic	TTG-TTA	Leu-Leu	synonymous
rs8107575	INSR	19	7165539	intronic		.	
rs11667110	INSR	19	7136609	intronic		.	
rs7254358	INSR	19	7199341	intronic		.	
rs4804368	INSR	19	7190290	intronic		.	
rs10426094	INSR	19	7205240	intronic		.	
rs4804403	INSR	19	7216771	intronic		.	
rs3786680	INSR	19	7183551	intronic		.	
rs891088	INSR	19	7184762	intronic		.	
rs17253937	INSR	19	7184801	intronic		.	
rs10404318	INSR	19	7247627	intronic		.	
rs12459488	INSR	19	7206073	intronic		.	
rs10424224	INSR	19	7240481	intronic		.	
rs6510956	INSR	19	7169276	intronic		.	
rs8103883	INSR	19	7203422	intronic		.	
rs1035939	INSR	19	7188979	intronic		.	
rs4804415	INSR	19	7223819	intronic		.	
rs1864193	INSR	19	7114213	UTR3		.	



rs16994314	INSR	19	7176974	intronic		.	
rs316623	LTK	15	41801081	intronic		.	
rs316617	LTK	15	41795900	UTR3		.	
rs41735	MET	7	116435416	intronic		.	
rs10487353	MET	7	116323936	intronic		.	
rs2283053	MET	7	116427019	intronic		.	
rs6566	MET	7	116438418	UTR3		.	
rs38841	MET	7	116319926	intronic		.	
rs10215153	MET	7	116399131	intronic		.	
rs38852	MET	7	116354525	intronic		.	
rs2299433	MET	7	116330878	intronic		.	
rs2237717	MET	7	116405387	intronic		.	
rs41736	MET	7	116435768	exonic	GAC-GAT	Asp-Asp	benign
rs38857	MET	7	116365413	intronic		.	
rs2896191	MET	7	116334044	intronic		.	
rs6978135	MET	7	116430362	intronic		.	
rs38847	MET	7	116325326	intronic		.	
rs4566974	MET	7	116334058	intronic		.	
rs39747	MET	7	116321039	intronic		.	
rs17138943	MET	7	116342280	intronic		.	
rs12535996	MET	7	116325149	intronic		.	
rs10243024	MET	7	116346603	intronic		.	
rs10232307	MET	7	116369187	intronic		.	
rs2237712	MET	7	116338658	intronic		.	
rs40239	MET	7	116317877	intronic		.	

rs17138980	MET	7	116401669	intronic		.	
rs714180	MET	7	116319002	intronic		.	
rs17138978	MET	7	116398763	intronic		.	
rs13223756	MET	7	116397572	exonic	CAA-CAG	Gln-Gln	benign
rs11791891	NTRK2	9	87512412	intronic		.	
rs12340748	NTRK2	9	87408381	intronic		.	
rs10868246	NTRK2	9	87608846	intronic		.	
rs17087869	NTRK2	9	87535285	intronic		.	
rs1002261	NTRK2	9	87566307	intronic		.	
rs4361832	NTRK2	9	87595734	intronic		.	
rs7030960	NTRK2	9	87620420	intronic		.	
rs12552902	NTRK2	9	87401314	intronic		.	
rs11140790	NTRK2	9	87478250	intronic		.	
rs2277193	NTRK2	9	87574009	intronic		.	
rs4877900	NTRK2	9	87632318	intronic		.	
rs10116287	NTRK2	9	87477274	intronic		.	
rs10125469	NTRK2	9	87620094	intronic		.	
rs11140800	NTRK2	9	87508137	intronic		.	
rs1822421	NTRK2	9	87423106	intronic		.	
rs10123600	NTRK2	9	87624633	intronic		.	
rs12002424	NTRK2	9	87480828	intronic		.	
rs17087700	NTRK2	9	87404873	intronic		.	
rs4578034	NTRK2	9	87587782	intronic		.	
rs7855888	NTRK2	9	87452058	intronic		.	
rs12238351	NTRK2	9	87618840	intronic		.	

rs2489162	NTRK2	9	87333742	intronic	.
rs2165893	NTRK2	9	87531424	intronic	.
rs17390220	NTRK2	9	87533875	intronic	.
rs1443446	NTRK2	9	87533909	intronic	.
rs763623	NTRK2	9	87539664	intronic	.
rs4877890	NTRK2	9	87552671	intronic	.
rs17087898	NTRK2	9	87553211	intronic	.
rs7019555	NTRK2	9	87614445	intronic	.
rs4631550	NTRK2	9	87614813	intronic	.
rs1565446	NTRK2	9	87616968	intronic	.
rs1565445	NTRK2	9	87617071	intronic	.
rs1490405	NTRK2	9	87622385	intronic	.
rs1490404	NTRK2	9	87622530	intronic	.
rs984430	NTRK2	9	87582827	intronic	.
rs7048015	NTRK2	9	87478135	intronic	.
rs10121750	NTRK2	9	87288033	intronic	.
rs1187329	NTRK2	9	87289280	intronic	.
rs11140785	NTRK2	9	87466777	intronic	.
rs10115908	NTRK2	9	87623385	intronic	.
rs1187328	NTRK2	9	87289257	intronic	.
rs4075562	NTRK2	9	87595866	intronic	.
rs11140755	NTRK2	9	87391861	intronic	.
rs17088022	NTRK2	9	87613933	intronic	.
rs1899641	NTRK2	9	87409367	intronic	.
rs3739804	NTRK2	9	87421631	intronic	.

rs17087884	NTRK2	9	87548647	intronic		.	
rs13289538	NTRK2	9	87400217	intronic		.	
rs1596360	NTRK2	9	87579148	intronic		.	
rs4142910	NTRK2	9	87625097	intronic		.	
rs12555204	NTRK2	9	87453154	intronic		.	
rs4877894	NTRK2	9	87590382	intronic		.	
rs12552641	NTRK2	9	87453052	intronic		.	
rs1778913	NTRK2	9	87435737	intronic		.	
rs7867174	NTRK2	9	87381476	intronic		.	
rs11140778	NTRK2	9	87447158	intronic		.	
rs1539676	NTRK2	9	87390167	intronic		.	
rs17087705	NTRK2	9	87408352	intronic		.	
rs7045296	NTRK2	9	87620240	intronic		.	
rs4877895	NTRK2	9	87613323	intronic		.	
rs4406490	NTRK2	9	87600797	intronic		.	
rs1006446	NTRK2	9	87566393	intronic		.	
rs2799482	NTRK2	9	87408950	intronic		.	
rs17326762	NTRK2	9	87357451	intronic		.	
rs4075561	NTRK2	9	87595771	intronic		.	
rs4877289	NTRK2	9	87484613	intronic		.	
rs10780688	NTRK2	9	87446444	intronic		.	
rs10780690	NTRK2	9	87478172	intronic		.	
rs41511747	NTRK2	9	87434256	intronic		.	
rs1122530	NTRK2	9	87464352	intronic		.	
rs17087840	NTRK2	9	87520389	intronic		.	

rs2799483	NTRK2	9	87408978	intronic		.	
rs1439050	NTRK2	9	87288193	intronic		.	
rs10512154	NTRK2	9	87441475	intronic		.	
rs1443445	NTRK2	9	87534158	intronic		.	
rs4877892	NTRK2	9	87560461	intronic		.	
rs3654	NTRK2	9	87430491	UTR3		.	
rs7038866	NTRK2	9	87387907	intronic		.	
rs3780642	NTRK2	9	87553145	intronic		.	
rs1490406	NTRK2	9	87622339	intronic		.	
rs3780645	NTRK2	9	87559794	intronic		.	
rs7857957	NTRK2	9	87621612	intronic		.	
rs1187351	NTRK2	9	87295077	intronic		.	
rs1187349	NTRK2	9	87295571	intronic		.	
rs9314735	NTRK2	9	87445656	intronic		.	
rs10512155	NTRK2	9	87445916	intronic		.	
rs1822420	NTRK2	9	87467276	intronic		.	
rs10512156	NTRK2	9	87523188	intronic		.	
rs10512159	NTRK2	9	87608999	intronic		.	
rs17088001	NTRK2	9	87610439	intronic		.	
rs1565447	NTRK2	9	87616907	intronic		.	
rs2378672	NTRK2	9	87631034	intronic		.	
rs12341232	NTRK2	9	87612473	intronic		.	
rs6559840	NTRK2	9	87575500	intronic		.	
rs4314726	NTRK2	9	87589244	intronic		.	
rs1221	NTRK2	9	87492610	UTR3		.	

rs1187341	NTRK2	9	87311715	intronic		.	
rs1627784	NTRK2	9	87428866	UTR3		.	
rs6559836	NTRK2	9	87533389	intronic		.	
rs3780640	NTRK2	9	87537284	intronic		.	
rs7857558	NTRK2	9	87382415	intronic		.	
rs7044057	NTRK2	9	87348718	intronic		.	
rs11140748	NTRK2	9	87361520	intronic		.	
rs7868500	NTRK2	9	87464384	intronic		.	
rs1387926	NTRK2	9	87632663	intronic		.	
rs3780634	NTRK2	9	87488718	UTR3		.	
rs17087704	NTRK2	9	87405751	intronic		.	
rs10735569	NTRK2	9	87460236	intronic		.	
rs7043641	NTRK2	9	87595051	intronic		.	
rs11140753	NTRK2	9	87378471	intronic		.	
rs12683368	NTRK2	9	87340841	intronic		.	
rs6559839	NTRK2	9	87575426	intronic		.	
rs12685845	NTRK2	9	87464336	intronic		.	
rs11140784	NTRK2	9	87459423	intronic		.	
rs7853120	NTRK2	9	87367303	intronic		.	
rs720141	NTRK2	9	87419506	intronic		.	
rs3780625	NTRK2	9	87287408	intronic		.	
rs10116453	NTRK2	9	87363201	intronic		.	
rs11790718	NTRK2	9	87554231	intronic		.	
rs17087710	NTRK2	9	87409862	intronic		.	
rs7859023	NTRK2	9	87474420	intronic		.	

rs1443440	NTRK2	9	87406168	intronic	.
rs11140758	NTRK2	9	87410825	intronic	.
rs2277192	NTRK2	9	87573977	intronic	.
rs17087580	NTRK2	9	87347756	intronic	.
rs1659401	NTRK2	9	87324683	intronic	.
rs3780632	NTRK2	9	87352788	intronic	.
rs1209068	NTRK2	9	87340518	intronic	.
rs7045882	NTRK2	9	87542683	intronic	.
rs7873811	NTRK2	9	87483094	intronic	.
rs13295599	NTRK2	9	87584025	intronic	.
rs1778933	NTRK2	9	87324411	intronic	.
rs12336534	NTRK2	9	87633948	intronic	.
rs6559838	NTRK2	9	87553563	intronic	.
rs17087835	NTRK2	9	87512699	intronic	.
rs17087726	NTRK2	9	87434460	intronic	.
rs9802671	NTRK2	9	87597827	intronic	.
rs10746752	NTRK2	9	87595716	intronic	.
rs7855989	NTRK2	9	87556420	intronic	.
rs12342902	NTRK2	9	87554440	intronic	.
rs17087837	NTRK2	9	87519680	intronic	.
rs7041260	NTRK2	9	87318528	intronic	.
rs1187352	NTRK2	9	87293457	intronic	.
rs17332552	NTRK2	9	87583632	intronic	.
rs11788063	NTRK2	9	87508674	intronic	.
rs10868228	NTRK2	9	87447546	intronic	.

rs1936435	NTRK2	9	87383777	intronic		.	
rs17087959	NTRK2	9	87575920	intronic		.	
rs17088013	NTRK2	9	87612996	intronic		.	
rs10780687	NTRK2	9	87442302	intronic		.	
rs2075759	TNK1	17	7292685	UTR3		.	
rs2269762	TNK1	17	7285831	intronic		.	
rs2075760	TNK1	17	7292726	UTR3		.	
rs12948090	TNK1	17	7285104	intronic		.	
rs881753	TNK2	3	195606770	intronic		.	
rs11720557	TNK2	3	195628636	intronic		.	
rs3747669	TNK2	3	195615376	exonic	TCA-TCG	Ser-Ser	synonymous
rs11185498	TNK2	3	195628815	intronic		.	
rs6421308	TNK2	3	195628272	intronic		.	
rs6837324	TXK	4	48127262	intronic		.	
rs2704401	TXK	4	48118202	intronic		.	
rs6850108	TXK	4	48078593	intronic		.	
rs17574051	TXK	4	48094534	intronic		.	
rs17674224	TXK	4	48077329	intronic		.	
rs10938521	TXK	4	48113219	intronic		.	
rs1466998	TXK	4	48097400	intronic		.	
rs1567217	TXK	4	48068783	UTR3		.	
rs2661528	TXK	4	48115734	intronic		.	
rs13118073	TXK	4	48094275	intronic		.	
rs2262771	TXK	4	48122948	intronic		.	
rs1396054	TXK	4	48076724	intronic		.	



rs7679010	TXK	4	48083885	intronic		.	
rs1003873	TXK	4	48096781	intronic		.	
rs16861011	TXK	4	48135608	intronic		.	
rs3852106	TXK	4	48080536	intronic		.	
rs4589663	TXK	4	48080573	intronic		.	
rs6832282	TXK	4	48070953	intronic		.	
rs10007288	TXK	4	48090135	intronic		.	
rs3805187	TXK	4	48076562	intronic		.	
rs12646088	TXK	4	48080649	intronic		.	
rs17470585	TXK	4	48091768	exonic	CCG-CCA	Pro-Pro	synonymous
rs16860943	TXK	4	48095127	intronic		.	
rs1396049	TXK	4	48107758	intronic		.	
rs16860968	TXK	4	48120871	intronic		.	
rs13133062	TXK	4	48124057	intronic		.	
rs7658300	TXK	4	48115264	exonic	CTG-CCG	Leu-Pro	missense

**Supprting Table S3:** The genetic backgrounds of 17 commonly over-activated kinases  
**Affymetrix Genome-Wide Human Mapping SNP6.0**  
**Array**

**The copy numbers of 17 commonly over-activated kinases**

<b>Genes</b>	<b>BEL-7402</b>	<b>HePG2</b>	<b>Hep3B</b>	<b>Huh-7</b>	<b>QGY-7703</b>	<b>SK-Hep-1</b>	<b>SMMC-7721</b>	<b>ZIP177</b>
ABL1	4	2	3	4	6	2	3	3
ALK	3	3	2	4	3	3	3	2
EGFR	3	2	4	5	4	4	3	2
EphA1	3	2	3	5	3	3	3	3
EphA3	2	2	2	8	3	3	2	2
EphA5	2	2	4	3	3	2	2	2
EphB2	3	2	2	4	3	3	3	3
EphB3	3	2	3	4	4	2	3	3
FGFR2	2	3	2	4	3	3	2	2
FRK	2	2	3	5	3	2	2	2
INSR	2	2	3	4	3	2	2	2
LTK	3	2	3	3	4	2	3	3
MET	2	2	3	6	3	4	2	2
NTRK2	3	2	3	5	5	2	3	3
TNK1	3	2	3	4	4	3	3	3
TNK2	3	2	3	3	4	3	3	3
TXK	2	2	4	2	3	2	2	2

**Supporting Table S5:** The activation of ALK, FGFR2 and EphA5 kinases in liver cancer PDX array

p-ALK Location	Tissue Type	Cytoplasm		Cell membrane		Nucleus		Notes
		Staining intensity	Positive ratio	Staining intensity	Positive ratio	Staining intensity	Positive ratio	
A1	Liver PDX	1	70%			1	5%	
A2	Liver PDX	1-2	85%					
A3	Liver PDX	0.5	35%					
A4	Liver PDX	0	0%	2-3	70%			
A5	Liver PDX	0.5	90%					
A6	Liver PDX	0.5-1	75%	2-3	40%			
A7	Liver PDX	0.5-1	80%					
A8	Liver PDX	0.5	20%	1-3	55%			
A9	Liver PDX	0.5	45%					
A10	Liver PDX	0.5	30%					
A11	Liver PDX	0	0%					
A12	Liver PDX	0	0%			0.5	70%	
B1	Liver PDX	0.5-1	80%					
B2	Liver PDX	1	85%	1	25%			
B3	Liver PDX	1	20%					
B4	Liver PDX	0.5-1	60%					
B5	Liver PDX	0	0%					
B6	Liver PDX	0	0%	2	60%			
B7	Liver PDX	0	0%					

B8	Liver PDX	0	0%	2	25%			
B9	Liver PDX	1	20%	1	15%			
B10	Liver PDX	0	0%					
B11	Liver PDX	0.5-1	40%					
B12	Liver PDX	0	0%					
C1	Liver PDX	1	70%	1-2	55%			
C2	Liver PDX	0.5	30%	0.5	20%	0.5	80%	
C3	Liver PDX	0	0%					
C4	Liver PDX	0.5-1	90%					
C5	Liver PDX	0	0%			0.5-1	95%	
C6	Liver PDX	0	0%	0.5-1	85%			
C7	Liver PDX	0	0%	1-2	65%	0.5	35%	
C8	Liver PDX	0.5	20%	3	85%			
C9	Liver PDX	0.5-1	85%			1	95%	
C10	Liver PDX	0.5	20%			0.5	35%	
C11	Liver PDX	0	0%	0.5	85%			
C12	Liver PDX	0	0%	2	90%			
D1	Liver PDX	0	0%	2	55%	0.5	10%	
D2	Liver PDX	0	0%	2-3	95%			
D3	Liver PDX	0.5	85%	2-3	85%			
D4	Liver PDX	1	15%	3	95%			
D5	Liver PDX	0	0%	1	25%			
D6	Liver PDX	0.5	15%	2	75%			
D7	Liver PDX	0	0%					
D8	Liver PDX	0	0%			0.5	90%	

D9	Liver PDX	1	80%					
D10	Liver PDX	1	80%					
D11	Liver PDX	0.5-1	75%			0.5	10%	
D12	Liver PDX	0.5	60%					
E1	Liver PDX	0	0%	0.5-1	75%			
E2	Liver PDX	0	0%	2-3	85%			
E3	Liver PDX	0	0%					
E4	Liver PDX	0	0%	3	80%			
E5	Liver PDX	0	0%					
E6	Liver PDX	0.5	70%					
E7	Liver PDX	0.5-1	85%	0.5-1	90%			
E8	Liver PDX	0	0%	2	60%			
E9	Liver PDX	1	75%	1	60%			
E10	Liver PDX	0.5	65%	0.5	20%	0.5	80%	
E11	Liver PDX	0.5	90%					
E12	Liver PDX	0.5	90%			0.5	80%	
F1	Liver PDX	0	0%			0.5	95%	
F2	Liver PDX	0.5	80%	1	85%			
F3	Liver PDX	2	20%					
F4	Liver PDX	1	30%	2-3	70%			
F5	Liver PDX	1	5%	2	90%			
F6	Liver PDX	1-2	90%					
F7	Liver PDX	0.5	15%	1	80%			
F8	Liver PDX	0	0%	1-2	95%			
F9	Liver PDX	0	0%	2	65%			

F10	Liver PDX	0.5-1	85%	2	95%			
F11	Liver PDX	1-2	90%					
F12	Liver PDX	0.5	20%	2	90%			
G1	Liver PDX	0	0%	1	85%			
G2	Liver PDX	0.5	45%	1	65%			
G3	Liver PDX	0	0%	1	90%			
G4	Liver PDX	0.5	55%			0.5	85%	
G5	Liver PDX	0.5-1	75%					
G6	Liver PDX	0.5	70%					
G7	Liver PDX	0.5-1	45%					
G8	Liver PDX	0.5	60%					
G9	Liver PDX	0	0%					
G10	Liver PDX	0	0%	1	75%			
G11	Liver PDX	0	0%					
G12	Liver PDX	0	0%	2	65%			
H1	Liver PDX	0	0%	2	70%			
H2	Liver PDX	0.5	10%	2	75%			
H3	Liver PDX	0.5-1	85%	1	65%			
H4	Liver PDX	0	0%	2	85%			
H5	Liver PDX	1	85%	0.5	60%			
H6	Liver PDX	0.5	5%	0.5	15%	0.5	80%	
H7	Liver PDX	0.5	85%					
H8	Liver PDX	0.5	85%					
H9	Liver PDX	0	0%	1	20%			
H10	Liver PDX	0	0%	2	90%			

H11	Liver PDX	0	0%					
H12	Liver PDX	0.5	30%	1-2	90%			

p-FGFR2 Location	Tissue Type	Cytoplasm		Cell membrane		Nucleus		Notes
		Staining intensity	Positive ratio	Staining intensity	Positive ratio	Staining intensity	Positive ratio	
A1	Liver PDX	1-2	40%	0	0%	1	5%	
A2	Liver PDX	0	0%	0	0%	0.5	90%	
A3	Liver PDX	0	0%	1	10%			
A4	Liver PDX	0	0%	2	15%			
A5	Liver PDX	0	0%	0	0%			
A6	Liver PDX	2	15%	1-2	30%			
A7	Liver PDX	0	0%	1	25%			
A8	Liver PDX	0	0%	1-2	30%			
A9	Liver PDX	0	0%	0	0%			
A10	Liver PDX	0.5	10%	0	0%	0.5	5%	
A11	Liver PDX	0	0%	0	0%			
A12	Liver PDX	0	0%	0	0%	0.5	95%	
B1	Liver PDX	0	0%	1	85%			
B2	Liver PDX	0	0%	0	0%	0.5	40%	
B3	Liver PDX	1	5%	0	0%			
B4	Liver PDX	0	0%	0	0%			
B5	Liver PDX	0	0%	0	0%			
B6	Liver PDX	0	0%	0.5	35%			

B7	Liver PDX	0	0%	0	0%	0.5	90%	
B8	Liver PDX	0	0%	2-3	75%			
B9	Liver PDX	0	0%	2-3	75%	1	10%	
B10	Liver PDX	0	0%	0	0%			
B11	Liver PDX	0	0%	0	0%			
B12	Liver PDX	0	0%	1	10%			
C1	Liver PDX	0	0%	1	60%	0.5	20%	
C2	Liver PDX	0	0%	0.5-1	45%	0.5	80%	
C3	Liver PDX	0	0%	2	70%			
C4	Liver PDX	0	0%	0	0%			
C5	Liver PDX	0	0%	0.5	5%	0.5	95%	
C6	Liver PDX	0	0%	0.5	10%			
C7	Liver PDX	0	0%	1	55%	0.5	70%	
C8	Liver PDX	0	0%	2	80%			
C9	Liver PDX	0	0%	0	0%	0.5-1	90%	
C10	Liver PDX	0	0%	0	0%	0.5	80%	
C11	Liver PDX	0	0%	0	0%			
C12	Liver PDX	0	0%	1	85%			
D1	Liver PDX	0	0%	1-2	30%			
D2	Liver PDX	0	0%	2-3	95%			
D3	Liver PDX	0	0%	1-3	95%			
D4	Liver PDX	2	5%	2-3	95%			
D5	Liver PDX	0	0%	2	10%			
D6	Liver PDX	0	0%	1	25%	0.5	60%	
D7	Liver PDX	0	0%	0	0%			



D8	Liver PDX	0	0%	0	0%	0.5-1	95%	
D9	Liver PDX	0	0%	1	80%			
D10	Liver PDX	0	0%	0	0%	0.5	95%	
D11	Liver PDX	1	5%	0	0%	0.5	5%	
D12	Liver PDX	0	0%	0	0%	0.5	5%	
E1	Liver PDX	0	0%	0.5	20%			
E2	Liver PDX	0.5	5%	1-2	75%			
E3	Liver PDX	0	0%	0	0%	0	0%	
E4	Liver PDX	0	0%	2-3	80%	0.5	5%	
E5	Liver PDX	0	0%	3	30%	0.5	5%	
E6	Liver PDX	0	0%	1-2	40%			
E7	Liver PDX	0	0%	1	80%			
E8	Liver PDX	0.5	15%	1-2	15%			
E9	Liver PDX	0.5-1	10%	1-2	75%			
E10	Liver PDX	0	0%	0	0%	0.5-1	80%	
E11	Liver PDX	0	0%	1	55%	0.5	60%	
E12	Liver PDX	0	0%	0	0%	0.5	75%	
F1	Liver PDX	0	0%	0	0%	0.5	95%	
F2	Liver PDX	0	0%	1-2	85%			
F3	Liver PDX	0	0%	0.5-1	40%			
F4	Liver PDX	0	0%	2-3	70%			
F5	Liver PDX	2	5%	3	75%			
F6	Liver PDX	0	0%	0	0%	0.5	95%	
F7	Liver PDX	0	0%	1-2	60%			
F8	Liver PDX	0	0%	2-3	70%			

F9	Liver PDX	0	0%	2	40%			
F10	Liver PDX	1	15%	2-3	90%			
F11	Liver PDX	0	0%	0.5-1	60%			
F12	Liver PDX	0	0%	2-3	80%			
G1	Liver PDX	0	0%	0.5-1	60%			
G2	Liver PDX	0.5	70%	0.5-1	85%			
G3	Liver PDX	0	0%	0.5-1	90%			
G4	Liver PDX	0	0%	0	0%	0.5	90%	
G5	Liver PDX	0	0%	1-2	80%			
G6	Liver PDX	0	0%	0	0%	0.5	90%	
G7	Liver PDX	0.5	20%	0.5	15%			
G8	Liver PDX	0	0%	0	0%			
G9	Liver PDX	0	0%	0	0%			
G10	Liver PDX	0	0%	2-3	10%			
G11	Liver PDX	0	0%	0	0%	0.5	70%	
G12	Liver PDX	0	0%	3	75%			
H1	Liver PDX	0	0%	2-3	60%			
H2	Liver PDX	0	0%	1	65%			
H3	Liver PDX	0.5	10%	0.5-1	85%			
H4	Liver PDX	0	0%	2	55%			
H5	Liver PDX	0	0%	0.5-1	45%			
H6	Liver PDX	0	0%	0	0%	0.5-1	90%	
H7	Liver PDX	0	0%	3	20%			
H8	Liver PDX	0	0%	0	0%			
H9	Liver PDX	0	0%	1-2	60%	0.5	90%	

H10	Liver PDX	0	0%	1-2	90%			
H11	Liver PDX	0	0%	0	0%	0.5	55%	
H12	Liver PDX	0	0%	1-3	85%			

p-EphA5 Location	Tissue Type	Cytoplasm		Cell membrane		Nucleus		Notes
		Staining intensity	Positive ratio	Staining intensity	Positive ratio	Staining intensity	Positive ratio	
A1	Liver PDX	0.5-1	90%	0	0%			
A2	Liver PDX	0.5	90%	0	0%	0.5	90%	
A3	Liver PDX	0	0%	1-2	35%			
A4	Liver PDX	0.5	95%	2-3	45%			
A5	Liver PDX	0.5	90%	0	0%			
A6	Liver PDX	2	35%	1-3	85%			
A7	Liver PDX	0.5	20%	1-2	80%			
A8	Liver PDX	0	0%	2	75%			
A9	Liver PDX	0	0%	0	0%			
A10	Liver PDX	0.5	10%	1	15%			
A11	Liver PDX	0	0%	0	0%			
A12	Liver PDX	0	0%	1	85%			
B1	Liver PDX	0	0%	1-2	95%			
B2	Liver PDX	0.5	70%	1-2	30%			
B3	Liver PDX	0.5	10%					
B4	Liver PDX	0	0%					
B5	Liver PDX	0	0%					
B6	Liver PDX	0	0%	0.5-2	75%			
B7	Liver PDX	0.5	15%					

B8	Liver PDX	0.5	75%	1-2	25%			
B9	Liver PDX	0	0%	2-3	65%			
B10	Liver PDX	0.5	90%					
B11	Liver PDX	0.5-1	80%					
B12	Liver PDX	0	0%					
C1	Liver PDX	0.5	85%	0.5	30%			
C2	Liver PDX	0.5	75%	2-3	70%			
C3	Liver PDX	0	0%	3	55%			
C4	Liver PDX	0.5	95%					
C5	Liver PDX	0.5	80%			0.5	90%	
C6	Liver PDX	0	0%	1	95%			
C7	Liver PDX	0.5	80%			0.5	80%	
C8	Liver PDX	0.5	85%	0.5-1	75%			
C9	Liver PDX	0.5-1	90%					
C10	Liver PDX	0.5	15%			0.5	80%	
C11	Liver PDX	0	0%	1-2	85%			
C12	Liver PDX	0.5	35%	1-3	85%			
D1	Liver PDX	0.5	20%	0.5-1	70%			
D2	Liver PDX	0.5	20%	3	95%			
D3	Liver PDX	0	0%	2-3	90%			
D4	Liver PDX	0.5	10%	3	85%			
D5	Liver PDX	0	0%	1-2	20%			
D6	Liver PDX	0.5-1	95%	2	55%			
D7	Liver PDX	0	0%					
D8	Liver PDX	0.5	80%	0.5-1	65%			

D9	Liver PDX	0.5	55%	1	80%			
D10	Liver PDX	0.5	70%			0.5	80%	
D11	Liver PDX	0.5	90%			0.5	90%	
D12	Liver PDX	0	0%			0.5	95%	
E1	Liver PDX	0.5	20%	0.5	40%			
E2	Liver PDX	0.5	10%	2-3	80%			
E3	Liver PDX	0	0%					
E4	Liver PDX	0	0%	2	90%			
E5	Liver PDX	0	0%	2	65%			
E6	Liver PDX	0.5	95%					
E7	Liver PDX	0.5-1	90%					
E8	Liver PDX	0.5	5%	1-2	35%			
E9	Liver PDX	0.5	10%					
E10	Liver PDX	0	0%	2-3	95%			
E11	Liver PDX	0	0%	2	60%	0.5	95%	
E12	Liver PDX	0.5	95%			0.5	95%	
F1	Liver PDX	0	0%			0.5	90%	
F2	Liver PDX	0	0%	1-2	80%			
F3	Liver PDX	0	0%	0.5	60%	0.5	80%	
F4	Liver PDX	0.5	5%	1	70%			
F5	Liver PDX	0	0%	1-2	95%			
F6	Liver PDX	0	0%					
F7	Liver PDX	0	0%	1	90%			
F8	Liver PDX	0.5	35%	1-2	55%			
F9	Liver PDX	0.5	85%	1	70%			

F10	Liver PDX	0	0%	2	90%			
F11	Liver PDX	0.5	15%	2	65%			
F12	Liver PDX	0.5	75%	1	70%			
G1	Liver PDX	0	0%	0.5-1	20%			
G2	Liver PDX	0.5	15%	1-2	40%			
G3	Liver PDX	0	0%					
G4	Liver PDX	0.5	45%	1	75%	0.5	20%	
G5	Liver PDX	0.5	25%	0.5-1	85%			
G6	Liver PDX	0.5	65%			0.5	85%	
G7	Liver PDX	0.5	85%			0.5	90%	
G8	Liver PDX	0	0%					
G9	Liver PDX	0	0%					
G10	Liver PDX	0	0%	1-2	80%			
G11	Liver PDX	0	0%			0.5	80%	
G12	Liver PDX	0.5	30%	2	85%	0.5	60%	
H1	Liver PDX	0	0%	2	70%			
H2	Liver PDX	0	0%					
H3	Liver PDX	0	0%	2	5%			
H4	Liver PDX	0	0%	1	45%			
H5	Liver PDX	0	0%	0	0%			
H6	Liver PDX	0.5	20%	1-2	95%			
H7	Liver PDX	0	0%	2	35%			
H8	Liver PDX	0.5	10%					
H9	Liver PDX	0	0%			0.5	85%	
H10	Liver PDX	0	0%	0.5	10%			

H11	Liver PDX	0	0%			0.5	95%	
H12	LiverPDX	0.5	90%	0.5	15%			