Supplementary Table S1

Modulators of dasatinib response

Genes targetd by enriched shRNA			Genes targeted by depleted shRNA		
Gene	p-value	Hairpin score	Gene	p-value	Hairpin score
CSAG2	0.00010	1.06	CRLS1	0.00000	0.96
RIMS3	0.00010	1.54	RABL5	0.00000	1.80
CHRNB3	0.00020	2.72	TOMM20	0.00000	2.43
GNAT2	0.00030	3.97	GCNT3	0.00010	1.71
BRF2	0.00050	4.32	FASLG	0.00030	1.43
TSEN34	0.00050	1.20	SCIN	0.00030	0.86
TAF11	0.00100	0.23	SYP	0.00030	1.03
ASNA1	0.00110	1.81	UBQLN3	0.00040	0.21
C14orf166B	0.00130	0.21	DEFB123	0.00060	2.67
GDF2	0.00130	3.64	KRT222P	0.00060	2.30
JPH2	0.00130	0.94	RHBDD3	0.00060	1.18
SCARB2	0.00130	4.79	FAIM2	0.00080	0.82
CDK10	0.00170	0.44	HLA-DQB2	0.00090	1.15
EIF2AK1	0.00170	1.76	MAP2	0.00090	1.02
CIB4	0.00190	3.05	FLJ44674	0.00090	1.14
CCDC11	0.00230	1.83	DUOXA1	0.00110	0.91
ABCA4	0.00260	2.87	TRERF1	0.00110	1.83
PCDHB14	0.00260	1.42	GC	0.00140	2.65
ZNF615	0.00270	0.95	NTN3	0.00140	1.07
IFNA2	0.00290	1.40	SPTAN1	0.00140	1.40
ZFP30	0.00310	0.77	MAPK10	0.00150	0.66
C16orf46	0.00330	1.15	RAD51C	0.00150	2.97
NEDD4	0.00330	2.30	CD1A	0.00170	1.89
SULT2B1	0.00330	0.73	PIGK	0.00220	0.74
HCN3	0.00340	0.89	C10orf54	0.00230	0.65
PDLIM5	0.00340	0.82	C21orf33	0.00290	1.30
ATP1A1	0.00380	0.83	CDC25C	0.00290	1.86
MRC1	0.00380	2.93	NCBP2	0.00290	1.15
RMND5A	0.00380	5.42	OMD	0.00290	0.99
CAMK2D	0.00390	2.00	XPO1	0.00310	1.47
EEA1	0.00410	3.82	ZNF354A	0.00310	2.21
MED18	0.00410	0.32	PEX5L	0.00340	0.93
SIX6	0.00410	4.71	TRUB1	0.00340	3.29
C14orf41	0.00420	0.35	POT1	0.00360	3.79
SLC39A1	0.00420	0.62	DUSP2	0.00390	5.34
NEK5	0.00430	1.05	SPOP	0.00390	0.73
CCND3	0.00450	0.61	HERC4	0.00400	2.68
SLFN5	0.00450	0.77	HMGCS2	0.00420	0.29
ATP4A	0.00460	0.84	TRIM4	0.00420	1.07
SLC24A4	0.00460	0.89	PPP1R1B	0.00470	0.85
SOCS2	0.00460	1.17	TMEM199	0.00470	1.25
AATK	0.00470	0.82	GAGE7	0.00480	1.28
TCP1	0.00470	0.83	TRMT61B	0.00500	1.60
C6orf10	0.00480	0.92	RNF5	0.00510	0.22
ST7L	0.00490	0.51	LRCH2	0.00560	0.86
SATB1	0.00510	0.80	KRAS	0.00570	0.85
ZNF549	0.00520	1.02	ZNF229	0.00570	0.50
PALLD	0.00550	2.76	SPATA18	0.00580	1.00
PAWR	0.00550	0.66	LEAP2	0.00600	1.48
CYP2R1	0.00560	0.68	MAT2B	0.00620	2.09
CELA2B	0.00580	2.06	MOSC1	0.00620	0.84
HOXB3	0.00590	3.79	NLRP7	0.00630	1.06
PDE7A	0.00590	0.79	POPDC2	0.00630	0.72
SLC18A2	0.00590	0.90	UBN2	0.00630	0.84
SULT6B1	0.00600	0.82	C19orf2	0.00640	0.83

CDH3	0.00620	0.68	MTCP1	0.00640	0.83
SOX3	0.00630	0.77	BMP2	0.00650	0.23
IRS1	0.00640	0.51	MFSD6L	0.00650	0.60
CNNM3	0.00650	0.24	NPM2	0.00660	0.87
DRP2	0.00670	0.74	SEPHS2	0.00680	0.63
ANKRD35	0.00690	0.42	PDE12	0.00690	0.82
PTRH1	0.00690	2.36	PSME4	0.00690	1.81
FZD4	0.00700	0.21	GSTO1	0.00700	0.94
ZNF2	0.00700	1.40	RMND1	0.00700	0.20
EMP3	0.00740	0.54	CCDC66	0.00710	0.68
OPLAH	0.00750	5.58	CCDC90B	0.00720	0.51
CDK8	0.00790	0.67	C7orf36	0.00730	0.59
SPHAR	0.00790	0.54	ANKRD7	0.00740	0.80
NFYA	0.00830	4.92	PMS1	0.00750	1.92
CCRL2	0.00840	2.04	CCDC51	0.00760	0.81
PKHD1L1	0.00850	1.04	DNAH3	0.00760	0.81
CACNA2D3	0.00870	0.52	INHBE	0.00760	1.11
SLC1A1	0.00890	0.51	MCF2	0.00760	1.16
UGT1A5	0.00900	2.53	MYEOV	0.00760	1.08
IMP5	0.00900	2.24	HSF5	0.00790	0.80
ITGA4	0.00920	0.71	INHBB	0.00830	2.10
UNK	0.00930	0.54	GDAP2	0.00850	2.57
CCNG2	0.00950	0.21	HYI	0.00870	0.76
REM2	0.00950	0.64	CBX7	0.00890	2.06
GATA4	0.00960	0.70	MAGEB3	0.00890	1.07
GPD2	0.00960	0.70	AVL9	0.00900	1.70
MMP12	0.00960	0.97	DAG1	0.00900	0.48
GGTLC2	0.00970	0.66	DYNC1LI1	0.00900	1.79
GLTSCR1	0.00970	1.70	C10orf72	0.00910	1.19
LYZL6	0.00970	0.55	DMRT2	0.00940	0.32
NRTN	0.00970	0.45	C11orf1	0.00950	2.38
PHF13	0.00970	0.54	LUC7L	0.00950	0.31
NAB2	0.01000	0.75	PSTK	0.00970	2.50
RPS28	0.01000	0.70	SRSF12	0.00980	2.10
ARL13B	0.01100	0.82	AMY1C	0.01000	0.31
CLIC3	0.01100	0.52	C13orf15	0.01000	0.22
FBXW4P1	0.01100	1.26	CCDC60	0.01000	0.88
GMPR	0.01100	1.40	DEK	0.01000	0.74
GUCA1B	0.01100	1.18	GSTM1	0.01000	0.95
LZTS2	0.01100	0.68	MTR	0.01000	1.77
RPS6KA6	0.01100	0.84	TTC39B	0.01000	1.11
ZNF32	0.01100	0.69	TTLL9	0.01000	0.98
CYP11B2	0.01200	0.73	APOOL	0.01100	0.89
HMX1	0.01200	0.52	C4orf32	0.01100	0.72
OR10H1	0.01200	0.93	C6orf127	0.01100	0.73
SSBP4	0.01200	1.70	CREB5	0.01100	3.38
TASP1	0.01200	0.75	CYP2C18	0.01100	0.84
ACAD11	0.01300	4.39	EDAR	0.01100	0.22
CPAMD8	0.01300	0.70	IRX5	0.01100	0.74
LMX1A	0.01300	0.60	ITGA6	0.01100	0.61
H1FX	0.01400	0.66	KIAA1191	0.01100	1.10
JUN	0.01400	3.74	MRPS12	0.01100	0.77
LALBA	0.01400	0.64	MYST2	0.01100	0.72
MTERF	0.01400	0.53	PHLDA1	0.01100	0.20
RUNX2	0.01400	0.34	TXNDC5	0.01100	1.33
LOC284805	0.01400	0.77	APOBEC3C	0.01200	0.98
SF3B1	0.01400	2.01	C10orf12	0.01200	1.98
UXS1	0.01400	0.73	GPRC5D	0.01200	0.53
XRCC6	0.01400	0.50	KLRK1	0.01200	0.71
DYNC1I1	0.01500	0.84	NDUFAF1	0.01200	0.61
FGGY	0.01500	1.98	PTPN21	0.01200	0.71
NXF3	0.01500	0.24	TUBE1	0.01200	0.71
RNF214	0.01500	0.71	ALG9	0.01300	0.85

SLC7A5P1	0.01500	0.57	DBNL	0.01300	0.69
STXBP3	0.01500	0.84	NMBR	0.01300	2.23
TRIM48	0.01500	0.84	WNT2	0.01300	1.29
SPPL2B	0.01500	0.57	CITED4	0.01400	0.82
ZNF645	0.01500	0.65	EIF4EBP2	0.01400	0.95
GDF7	0.01600	2.24	FBXO42	0.01400	0.70
MAN1A2	0.01600	4.94	HSD11B2	0.01400	0.69
PLA2G2F	0.01600	0.96	MAD1L1	0.01400	0.21
LOC220686	0.01600	0.49	MEX3C	0.01400	0.76
ZNF276	0.01600	0.65	TCTN3	0.01400	1.22
ADRB3	0.01700	0.62	TNFSF9	0.01400	0.69
AOAH	0.01700	1.53	VPS4B	0.01400	1.87
GJD3	0.01700	0.44	WNT2B	0.01400	0.69
KRT76	0.01700	0.33	ACSBG1	0.01500	1.36
LTB	0.01700	0.49	CCDC36	0.01500	1.42
PHF17	0.01700	0.87	DZIP1	0.01500	0.20
PLK1	0.01700	0.49	GSDMB	0.01500	2.18
SHPRH	0.01700	1.25	IPCEF1	0.01500	0.81
TMEM106B	0.01700	0.66	SGK1	0.01500	0.86
SPATA4	0.01700	0.62	FLJ46026	0.01500	0.24
VPS26B	0.01700	0.82	TUBB	0.01500	0.68
CDC2	0.01800	0.86	WDR77	0.01500	0.71
GTF2E1	0.01800	2.77	ZNF544	0.01500	0.98
ITM2B	0.01800	0.73	C1QC	0.01600	0.58
MTBP	0.01800	0.47	EPCAM	0.01600	0.89
PMS2L2	0.01800	0.72	PFDN6	0.01600	0.22
RTP4	0.01800	0.54	PRDM11	0.01600	0.87
IL11	0.01900	1.47	ST6GALNAC1	0.01600	4.13
NCBP1	0.01900	0.79	SYNGAP1	0.01600	1.76
SRRM1	0.01900	0.45	PTPRQ	0.01600	1.04
STS	0.01900	2.01	C3orf37	0.01700	0.66
TKTL1	0.01900	0.60	C6orf72	0.01700	4.45
CCNF	0.02000	0.24	LAMA1	0.01700	0.96
FKBP10	0.02000	0.62	LMAN2	0.01700	1.54
GPR44	0.02000	0.46	MYEF2	0.01700	0.37
GRAP2	0.02000	0.55	PLXNB3	0.01700	1.03
KIAA1539	0.02000	0.90	PSMA2	0.01700	0.69
PRG2	0.02000	0.60	APOF	0.01800	0.86
SLC5A7	0.02000	0.46	DYSF	0.01800	0.49
ZNF788	0.02000	0.50	GNPDA2	0.01800	0.50
ATG7	0.02100	0.59	KIAA1826	0.01800	1.37
BLM	0.02100	0.79	LRRC1	0.01800	0.62
BLOC1S2	0.02100	0.67	MRPS10	0.01800	0.23
C14orf162	0.02100	1.45	TMCO3	0.01800	0.76
IFNA21	0.02100	0.49	TMUB2	0.01800	0.23
LPAR1	0.02100	0.87	ZNF91	0.01800	0.24
TMTC1	0.02100	0.59	ADAM11	0.01900	1.09
WFDC5	0.02100	0.20	AEN	0.01900	1.11
APEX2	0.02200	0.75	ASPH	0.01900	4.81
FAM86B1	0.02200	1.70	IL10RB	0.01900	0.49
NBL1	0.02200	0.59	P2RY8	0.01900	0.64
PCSK1N	0.02200	0.23	PAX2	0.01900	0.47
PTPLAD2	0.02200	0.27	RPS26	0.01900	1.50
TAF7	0.02200	0.45	TBXAS1	0.01900	0.79
CUGBP1	0.02300	0.93	TMF1	0.01900	3.32
ECE2	0.02300	0.90	DCDC2	0.02000	0.48
GPC1	0.02300	0.58	DGKH	0.02000	0.75
IMPACT	0.02300	1.03	GTF3C6	0.02000	0.38
S100A2	0.02300	0.58	LMAN1	0.02000	0.85
SLC9A7	0.02300	0.64	SKI	0.02000	0.38
ZNF248	0.02300	0.61	VPREB1	0.02000	0.40
ALPPL2	0.02400	0.57	CARD14	0.02100	4.01
APOD	0.02400	0.33	FAM47A	0.02100	0.79

KDM3B	0.02400	1.84	KIAA0367	0.02100	1.59
LILRA5	0.02400	0.57	LRRC55	0.02100	0.49
NEDD9	0.02400	0.44	MAP2K1	0.02100	0.90
SIX5	0.02400	0.82	PRR19	0.02100	0.81
PARG	0.02400	0.30	SIK1	0.02100	1.19
ASAH1	0.02500	0.53	SLC6A5	0.02100	0.97
SSRP1	0.02500	0.51	TRAF1	0.02100	0.39
TAS2R14	0.02500	0.89	TSPAN10	0.02100	0.44
TRIM16L	0.02500	1.81	BAG5	0.02200	0.61
ZNF771	0.02500	0.47	C1QA	0.02200	0.78
BHLHE22	0.02600	0.45	EIF3H	0.02200	0.71
IRF4	0.02600	0.43	FANCE	0.02200	0.43
ITGA1	0.02600	0.43	LNX1	0.02200	0.43
ZAN	0.02600	0.56	LYG1	0.02200	0.90
ACOT2	0.02700	1.63	MTSS1	0.02200	0.61
LPO	0.02700	0.60	OTUD5	0.02200	1.40
POLR2B	0.02700	0.62	PHF11	0.02200	0.61
SPRED1	0.02700	0.60	PAM16	0.02200	0.47
TAF4B	0.02700	0.56	C2orf61	0.02300	0.63
TFPI2	0.02700	0.45	CCDC25	0.02300	0.47
ZNF362	0.02700	2.03	CD6	0.02300	0.49
COX7C	0.02800	0.55	RCN2	0.02300	0.47
EFHD1	0.02800	0.27	SGCE	0.02300	0.45
FADS1	0.02800	0.71	SLC37A3	0.02300	0.39
FHDC1	0.02800	1.30	TAS2R5	0.02300	0.64
PKD2L1	0.02800	0.57	ACADM	0.02400	0.46
SMARCA4	0.02800	0.71	C5orf44	0.02400	0.84
SSBP3	0.02800	0.49	CCDC75	0.02400	0.64
TTC8	0.02800	0.64	DOCK11	0.02400	0.46
ZNF564	0.02800	0.30	HBG2	0.02400	0.90
ACBD5	0.02900	0.80	IDE	0.02400	1.36
HNRNPL	0.02900	0.55	MIB2	0.02400	0.81
NDUFC1	0.02900	1.74	MRPL4	0.02400	1.30
PHLPP1	0.02900	0.20	PARK2	0.02400	0.71
PSMA5	0.02900	0.69	PROZ	0.02400	0.54
RAB20	0.02900	0.65	RAF1	0.02400	0.39
ARHGEF15	0.03000	1.71	SAP18	0.02400	0.54
CYP11B1	0.03000	0.80	TAF5	0.02400	0.33
DHX8	0.03000	0.42	WIPI1	0.02400	0.60
GPR156	0.03000	0.87	ZNF828	0.02400	0.61
INE1	0.03000	0.54	NUP133	0.02500	1.44
KIF2A	0.03000	0.65	PSD3	0.02500	0.59
MIOX	0.03000	1.99	TMEM81	0.02500	1.10
SLC5A5	0.03000	1.22	ZNF468	0.02500	0.65
TBCD	0.03000	0.69	CALU	0.02600	0.53
TBX3	0.03000	0.74	FADD	0.02600	1.08
USP31	0.03000	0.35	NLGN4X	0.02600	0.60
EPB41L1	0.03100	0.25	OCLM	0.02600	0.40
FNTB	0.03100	0.48	PSMB6	0.02600	0.40
INSRR	0.03100	0.36	TMPRSS4	0.02600	0.55
CBLN1	0.03200	0.66	WFDC9	0.02600	0.45
KDM4D	0.03200	0.21	AGTR1	0.02700	0.79
MMP16	0.03200	0.29	GUCY2C	0.02700	0.45
ZFP14	0.03200	0.52	GZMB	0.02700	0.57
ZCCHC7	0.03300	0.62	HLTF	0.02700	0.48
ACTA1	0.03400	0.44	SLC25A45	0.02700	0.78
APOBEC3G	0.03400	1.09	LOC143188	0.02700	1.31
BDH1	0.03400	0.42	ANKRD13C	0.02800	0.28
CDKL2	0.03400	0.97	ATG4C	0.02800	0.68
COL6A1	0.03400	0.75	C19orf48	0.02800	0.95
FBLN2	0.03400	0.70	CLN3	0.02800	0.56
FTL	0.03400	1.60	FAM161A	0.02800	1.26
GALNT4	0.03400	0.34	FAM175A	0.02800	0.83

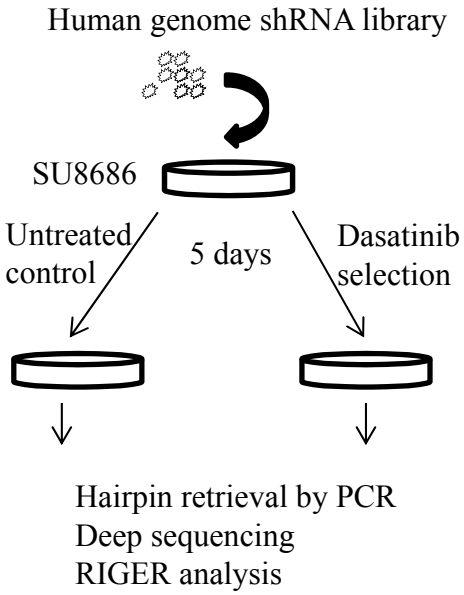
MDFIC	0.03400	0.52	PDYN	0.02800	0.40
SORCS2	0.03400	1.40	RGS16	0.02800	0.34
TNFRSF13B	0.03400	0.75	TAF12	0.02800	0.29
ZIM3	0.03400	1.23	DIRAS3	0.02900	0.50
AATF	0.03500	0.40	SH2D2A	0.02900	0.78
CCL8	0.03500	0.40	UHRF1BP1	0.02900	0.37
CD55	0.03500	0.29	LRRC40	0.03000	0.50
FIG4	0.03500	0.53	MMP23A	0.03000	0.77
OR4D10	0.03500	0.58	TRIM72	0.03000	0.57
PLCB1	0.03500	0.87	PGM5	0.03000	0.58
PMP22	0.03500	0.42	WFDC10B	0.03000	0.63
PPP2R5D	0.03500	2.93	ADPRHL2	0.03100	0.44
RSPO4	0.03500	0.55	ATM	0.03100	0.33
SOX6	0.03500	0.60	CCDC138	0.03100	0.21
TNFSF10	0.03500	0.73	FAM129C	0.03100	1.24
CCDC136	0.03600	0.52	SNX19	0.03100	0.57
GSPT2	0.03600	0.41	CCNJL	0.03200	0.68
MMP10	0.03600	0.52	CLEC2B	0.03200	0.61
SLC25A23	0.03600	0.35	HBXIP	0.03200	1.21
SOD1	0.03600	0.50	HES2	0.03200	1.36
TACR3	0.03600	0.43	HIST3H3	0.03200	0.23
MGAM2	0.03600	0.51	IARS2	0.03200	0.63
BSPRY	0.03700	0.62	MOGAT2	0.03200	1.57
KCMF1	0.03700	1.86	MSTO1	0.03200	0.56
POLD4	0.03700	1.56	NUP210L	0.03200	0.99
PSG3	0.03700	0.40	PRL	0.03200	0.56
DHX38	0.03800	0.29	SERPINB3	0.03200	1.58
DOCK8	0.03800	0.49	SUSD1	0.03200	0.62
FLT4	0.03800	0.76	PCAT4	0.03200	0.84
GM2A	0.03800	0.51	FLJ40194	0.03200	0.52
IQCF1	0.03800	0.67	WWTR1	0.03200	8.79
MSH5	0.03800	0.57	ZNF454	0.03200	0.67
PLEK2	0.03800	0.70	ARRDC1	0.03300	0.25
SSTR1	0.03800	0.51	CHCHD8	0.03300	0.88
ZNF207	0.03800	0.51	GLUD1	0.03300	3.88
DFFB	0.03900	0.72	ABCB6	0.03400	1.48
ERN1	0.03900	1.96	C11orf74	0.03400	0.64
KLK7	0.03900	0.50	ENG	0.03400	0.87
P2RX2	0.03900	1.50	ETV4	0.03400	0.91
PLS3	0.03900	0.63	FLAD1	0.03400	5.00
TAF11	0.03900	0.38	IGFBPL1	0.03400	0.42
PKCI-1	0.03900	0.50	TBC1D9B	0.03400	0.68
BPIL3	0.04000	0.38	CHRNA3	0.03500	0.22
CD99	0.04000	0.22	CSK	0.03500	0.72
SMTN	0.04000	0.50	TMEM136	0.03500	0.41
TMC6	0.04000	0.52	ACSS2	0.03600	0.99
ARAP1	0.04100	0.38	ADAMTSL1	0.03600	0.44
LILRA1	0.04100	0.44	CSNK2B	0.03600	1.09
NUDT13	0.04100	1.03	DDX4	0.03600	0.88
PLEKHA5	0.04100	0.63	DPYSL4	0.03600	1.11
PRSS2	0.04100	0.50	LY96	0.03600	0.63
SH2D1B	0.04100	0.32	PDPK1	0.03600	0.59
SLC9A5	0.04100	0.46	PIM1	0.03600	1.17
TAOK3	0.04100	0.91	RD3	0.03600	0.42
WISP3	0.04100	0.31	SLC25A16	0.03600	0.25
ZNF26	0.04100	0.43	ADRA2B	0.03700	0.54
ACVR2A	0.04200	0.61	CEP170	0.03700	0.54
BCKDHA	0.04200	0.43	CXorf40A	0.03700	0.93
DGCR14	0.04200	1.35	F2RL1	0.03700	3.06
DISP2	0.04200	1.43	FAM123B	0.03700	0.54
HADH	0.04200	0.49	KIF11	0.03700	0.33
ICOSLG	0.04200	0.25	POLE3	0.03700	0.49
OTOP3	0.04200	0.50	SFMBT1	0.03700	0.32

POLR1C	0.04200	1.06
HDAC3	0.04300	0.79
HPS1	0.04300	0.65
KRT81	0.04300	1.01
PICALM	0.04300	1.36
HES1	0.04400	0.75
HEYL	0.04400	0.49
MCC	0.04400	1.54
RHEB	0.04400	0.58
CNGA1	0.04500	0.69
CRYM	0.04500	1.85
HIRA	0.04500	0.46
HMX3	0.04500	0.52
JAK1	0.04500	0.69
NARFL	0.04500	1.02
SDC2	0.04500	0.44
SLC22A24	0.04500	1.17
SLC35B4	0.04500	2.27
KRT18	0.04500	0.54
C15orf23	0.04600	0.44
LZTS1	0.04600	0.43
SIAH1	0.04600	0.42
SRM	0.04600	0.48
NIM1	0.04600	1.23
ABCA12	0.04700	0.66
DAB1	0.04700	0.72
SDHA	0.04700	0.58
ACBD3	0.04800	0.47
HDAC5	0.04800	2.07
LPL	0.04800	0.58
CALCRL	0.04900	1.29
HPS4	0.04900	0.63
MUDENG	0.04900	0.48
NCAPG	0.04900	1.44
RET	0.04900	0.23
TP53	0.04900	0.37
CD80	0.05000	0.66
GATA5	0.05000	0.89
MS4A5	0.05000	0.47
NHLH2	0.05000	1.95
OR12D3	0.05000	0.47
PAK3	0.05000	0.47
TEKT5	0.05000	1.41

GMEB1	0.03800	0.41
GNS	0.03800	0.40
HLA-DRA	0.03800	0.42
ITIH3	0.03800	0.39
KATNAL2	0.03800	0.27
SCAMP3	0.03800	1.56
SIPA1	0.03800	0.40
TGM5	0.03800	1.57
CA2	0.03800	0.64
WDR81	0.03800	0.95
YWHAZ	0.03800	0.55
ATF4	0.03900	1.54
DHX40	0.03900	0.32
DYNC2H1	0.03900	0.53
IL7R	0.03900	2.12
NKAIN3	0.03900	0.71
RSAD2	0.03900	0.40
SACM1L	0.03900	0.53
TRAM1L1	0.03900	0.20
CLK1	0.03900	0.58
C8orf79	0.04000	0.57
CCL3	0.04000	0.40
DGKZ	0.04000	0.45
KIFC2	0.04000	1.76
MFAP5	0.04000	1.00
SLC12A6	0.04000	0.61
SPATA8	0.04000	0.86
XG	0.04000	0.39
C21orf58	0.04100	0.29
CLK2	0.04100	3.64
KLK10	0.04100	0.45
NUDT4	0.04100	0.28
OR10H2	0.04100	0.55
STYX	0.04100	0.25
LOC389791	0.04100	0.66
ZNF519	0.04100	0.97
C1orf92	0.04200	0.51
C9orf135	0.04200	0.74
ELAVL3	0.04200	0.52
GPR125	0.04200	0.68
NFKBIE	0.04200	0.24
POLRMT	0.04200	1.02
RNF212	0.04200	0.54
ZNF134	0.04200	0.78
ATPIF1	0.04300	0.79
AUH	0.04300	1.02
CHD8	0.04300	1.21
KREMEN2	0.04300	0.36
NEGR1	0.04300	0.42
SHOC2	0.04300	0.51
TCTE1	0.04300	1.00
ATP5E	0.04400	0.51
CBR3	0.04400	0.69
CLDN9	0.04400	0.51
DRD3	0.04400	0.22
KCNMB4	0.04400	0.51
UBE2F	0.04400	0.51
C8orf85	0.04500	0.22
CNPY1	0.04500	0.74
DDX53	0.04500	0.50
GDE1	0.04500	0.53
PABPN1	0.04500	0.50
SLC16A11	0.04500	0.83

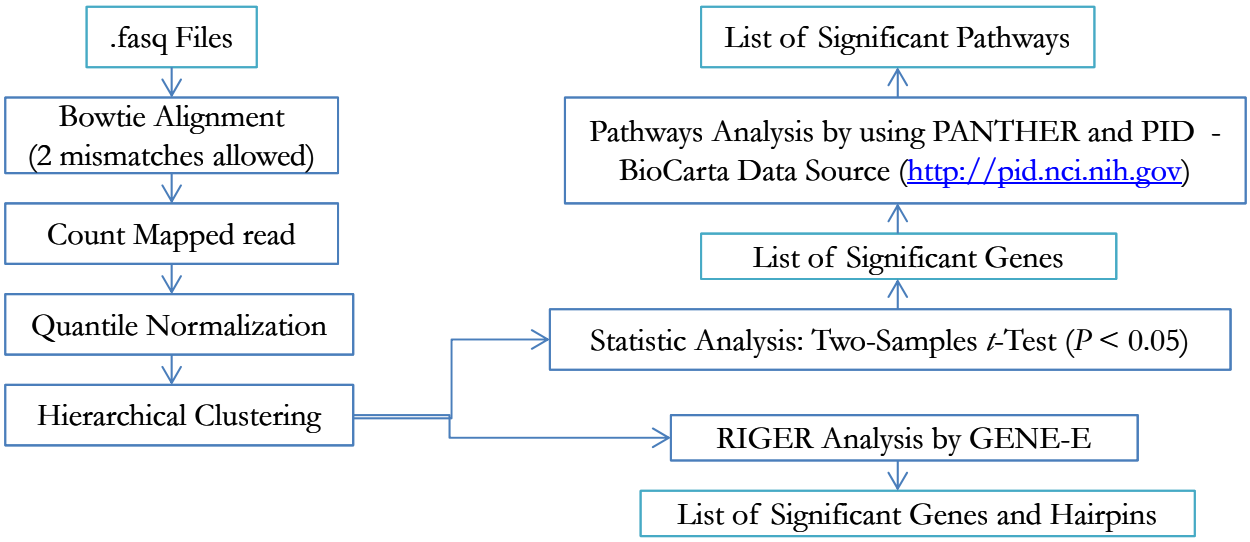
CCL14	0.04600	0.97
CST9L	0.04600	0.93
KRTAP4-4	0.04600	0.50
LRRC46	0.04600	0.50
OR2K2	0.04600	0.50
PAPD5	0.04600	0.50
RAB3B	0.04600	0.52
SDS	0.04600	0.50
SFRP2	0.04600	0.50
SLC4A4	0.04600	0.57
TIMP4	0.04600	0.50
SLC4A7	0.04700	0.43
TAAR6	0.04700	0.62
TOP3A	0.04700	0.73
TRPV1	0.04700	0.35
TXNL4A	0.04700	0.48
AMTN	0.04800	1.01
CENPH	0.04800	0.48
FOXN2	0.04800	1.16
KLF1	0.04800	0.53
LHX5	0.04800	1.15
MBD3L2	0.04800	0.57
NUP160	0.04800	0.50
SCRIB	0.04800	1.03
SLC12A8	0.04800	0.42
TMCC1	0.04800	0.62
ZNF90	0.04800	0.58
GTF2H3	0.04900	0.78
KRT28	0.04900	0.68
MPP4	0.04900	0.38
PDDC1	0.04900	0.38
PHF8	0.04900	0.24
STXBP4	0.04900	0.44
TFDP3	0.04900	0.56
CXXC4	0.05000	0.78
KHSRP	0.05000	0.49
KIF5B	0.05000	0.51
MAX	0.05000	0.45
SLC25A15	0.05000	0.66
TMEM30A	0.05000	1.14

Modulators of dasatinib response identified in genome wide sceen in human pancreatic cancer cell line SU8686. Genes targeted by enrichment and depletion of shRNAs had a high hairpin score (> 0.2) at a significant level ($p < 0.05$).



Supplementary Figure S1. Synthetic lethal screen in dasatinib-resistant human pancreatic cancer cell line (SU8686). Schematic diagram showing the work flow of shRNA library screen.

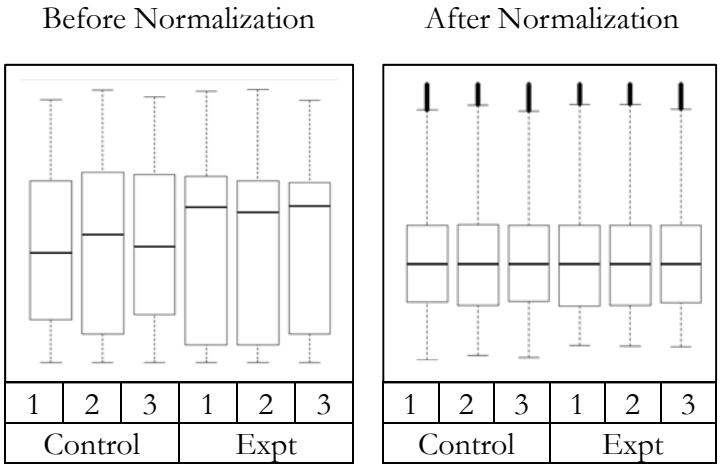
A. Method of analysis



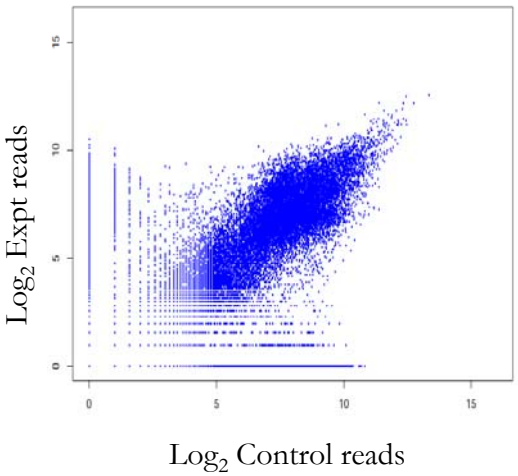
B. Bowtie Alignment *

	Control 1	Control 2	Control 3	Expt 1	Expt 2	Expt 3
Total read	36,266,530	41,196,360	32,262,320	36,438,288	38,043,949	38,594,768
Mapped read	10,073,034	11,735,172	10,028,874	11,161,443	11,045,053	10,757,755
% Mapped read	27.8	28.5	31.1	30.6	29.0	27.9

C. Data Normalization

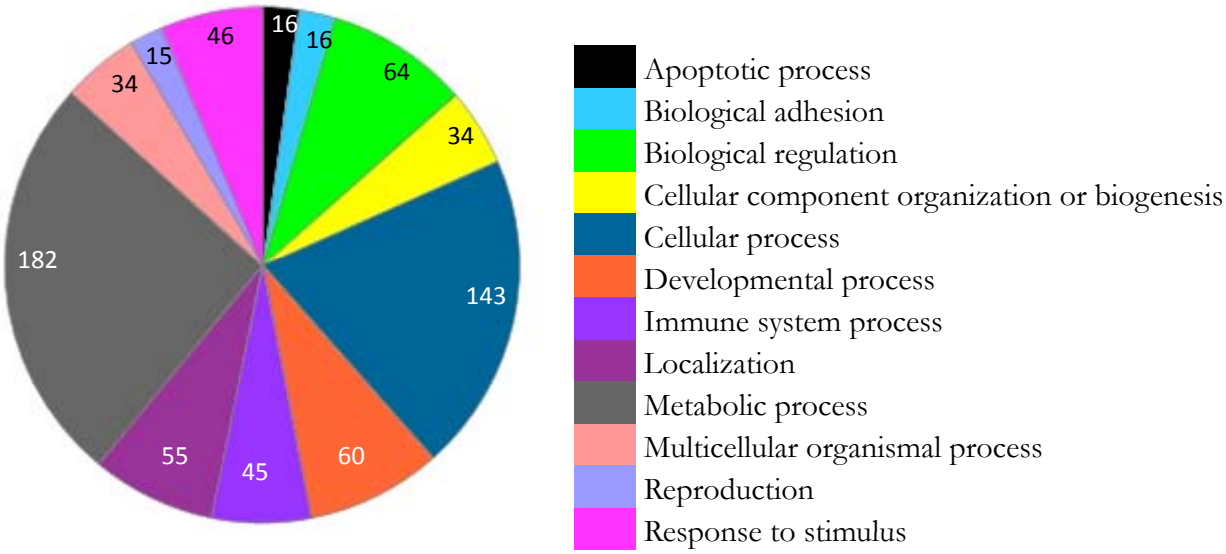


D. Distribution of normalized reads

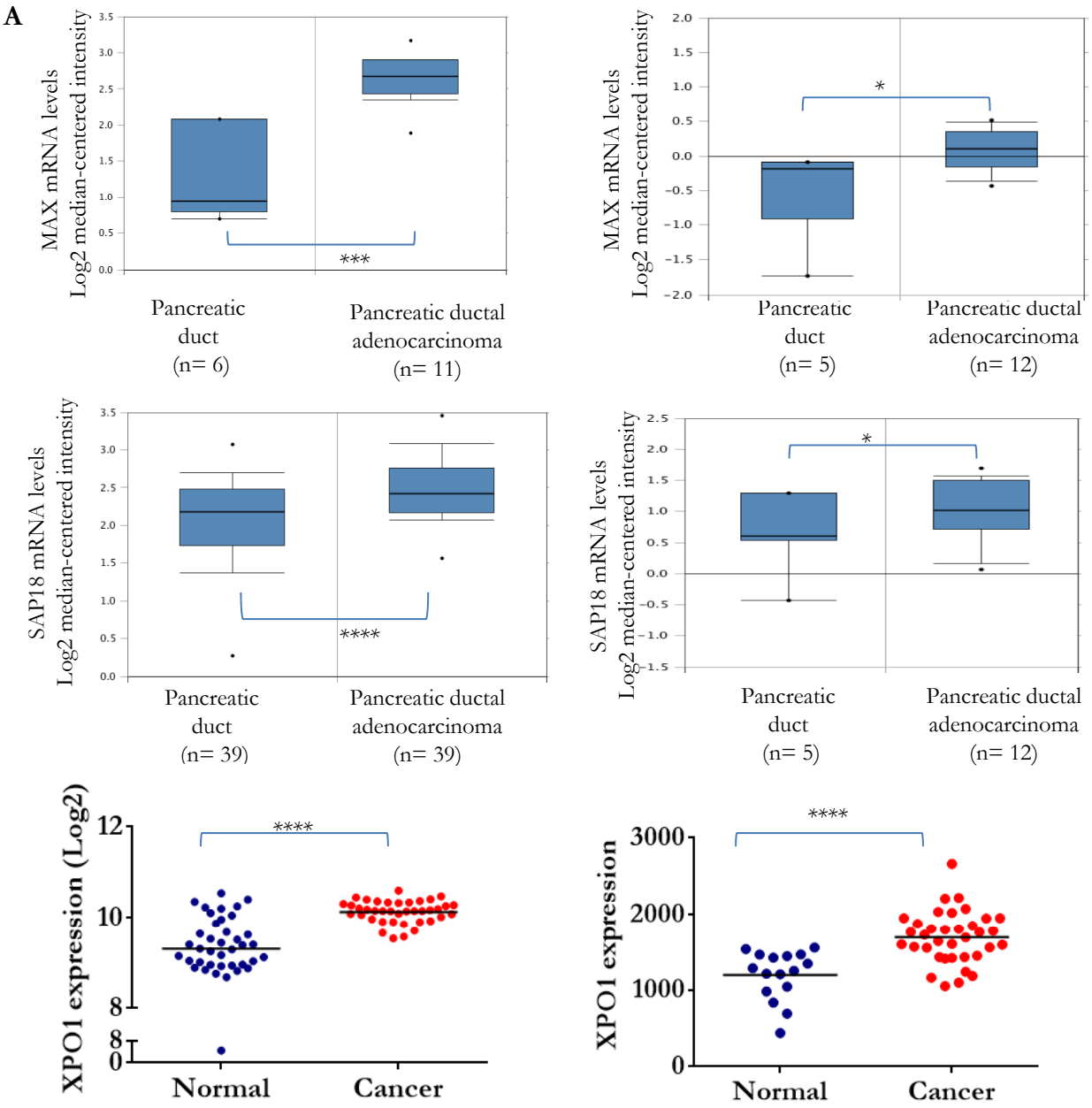


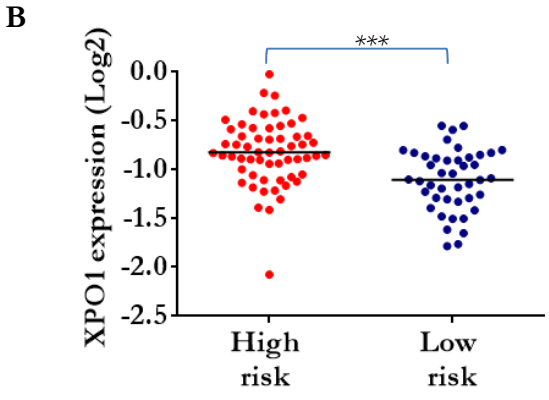
Supplementary Figure S2. Work flow for analysis of SOLEXA sequencing results. Reads (.fasq) from deep sequencing were analyzed through bioinformatic pipeline as shown. A. After Bowtie alignment, mapped reads were normalized, and samples were clustered. Significant genes and hairpins were deduced from RIGER analysis and significant pathways were identified from PANTHER and PID analysis. B. Results of bowtie alignment: Triplicate samples of control and dasatinib-treated (Expt) were used for SOLEXA sequencing. *: Alignments that were reported were at most 2 mismatches. C. Data were normalized to account for technical variations. D. Distribution of normalized reads of shRNAs in control and experimental samples. Normalized reads in samples are shown in scattered plot. Expt: dasatinib treated samples. Triplicates for each control and dasatinib treatment.

Gene Ontology: Biological processes

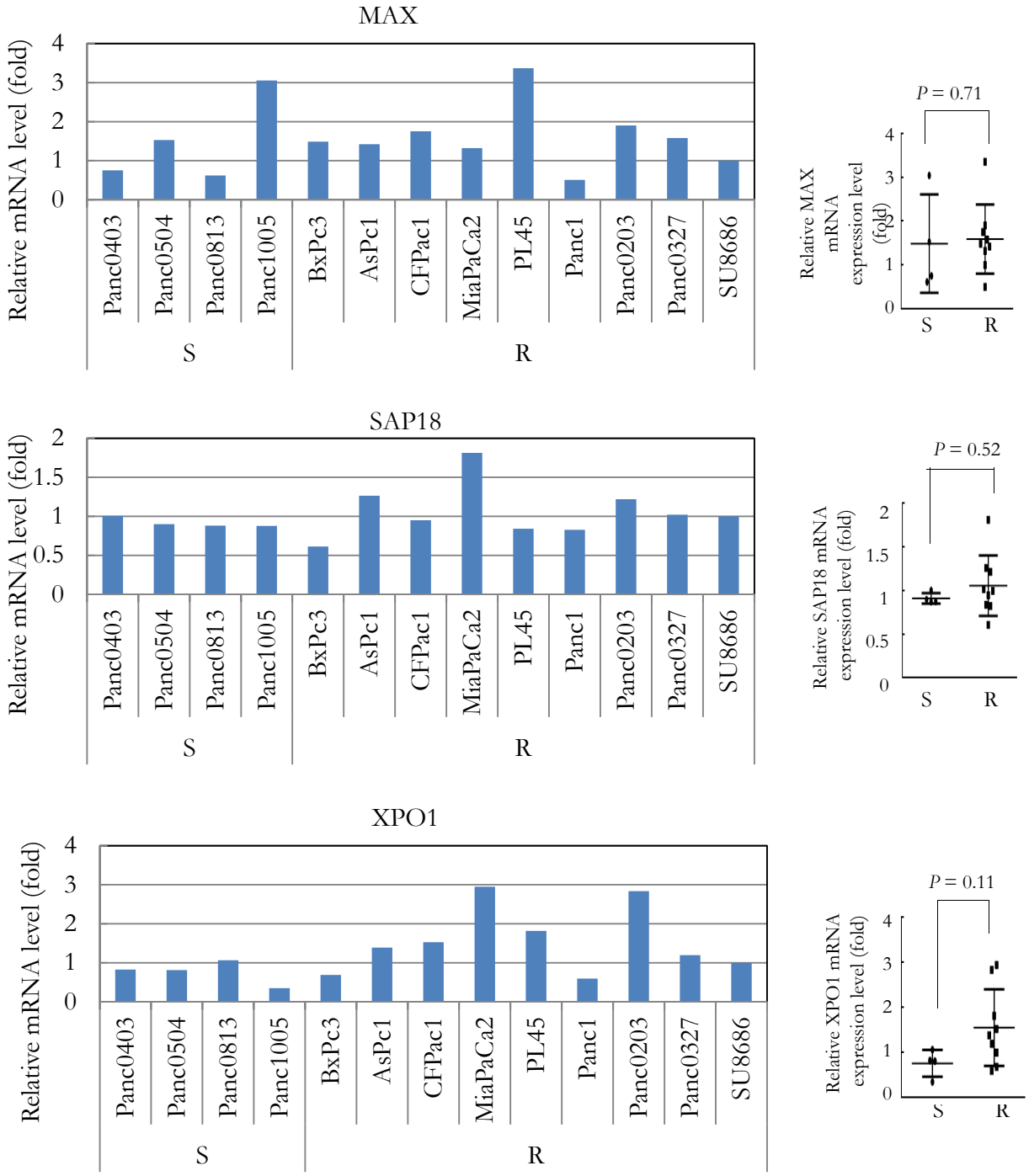


Supplementary Figure S3. Gene target classification. A. Gene Ontology (GO) biological process: Target genes from library screen were analyzed with PANTHER classification system, and GO term biological processes were presented in bar chart. Numbers in bar chart indicate the number of genes involved in a specific biological process.

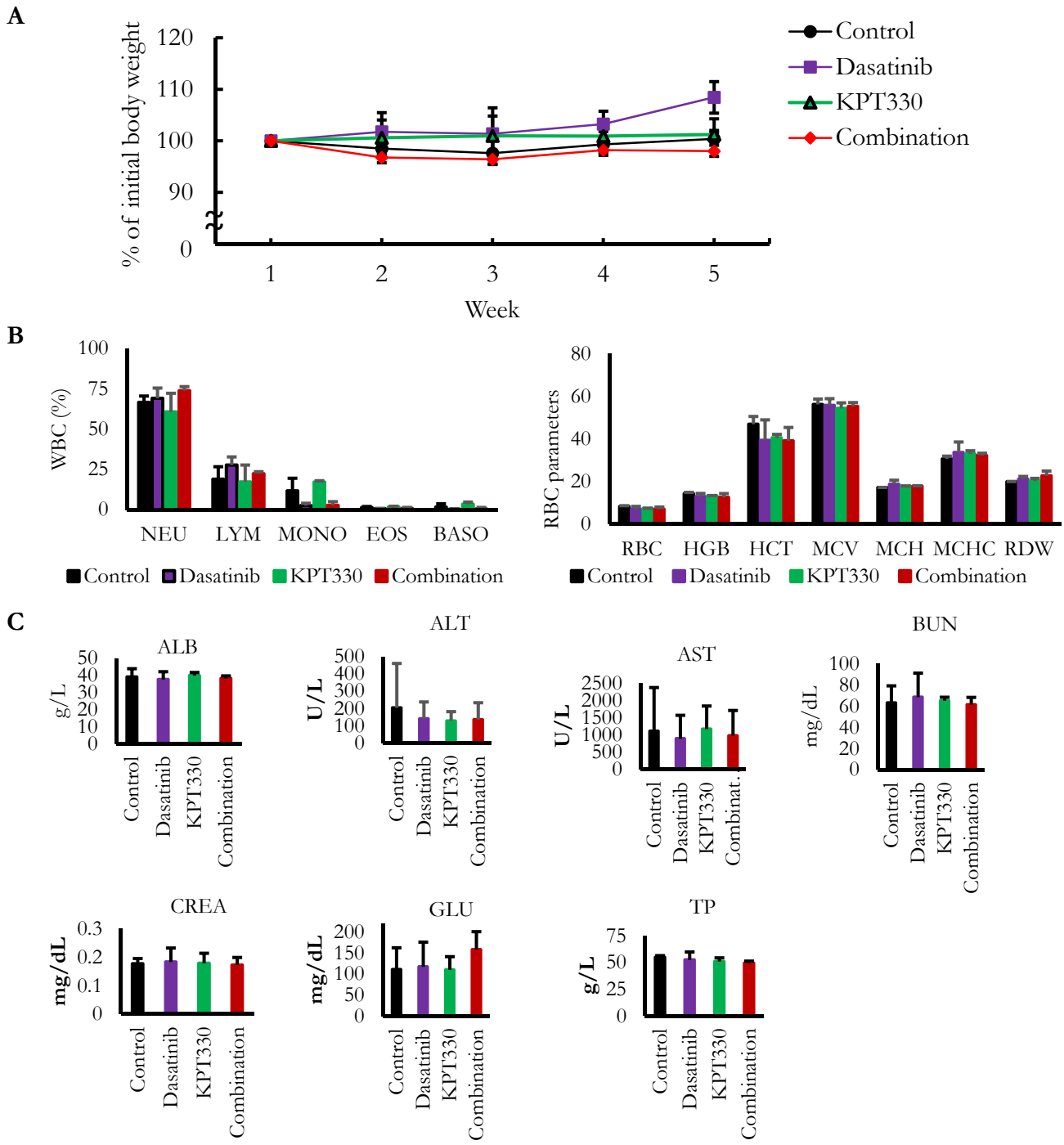




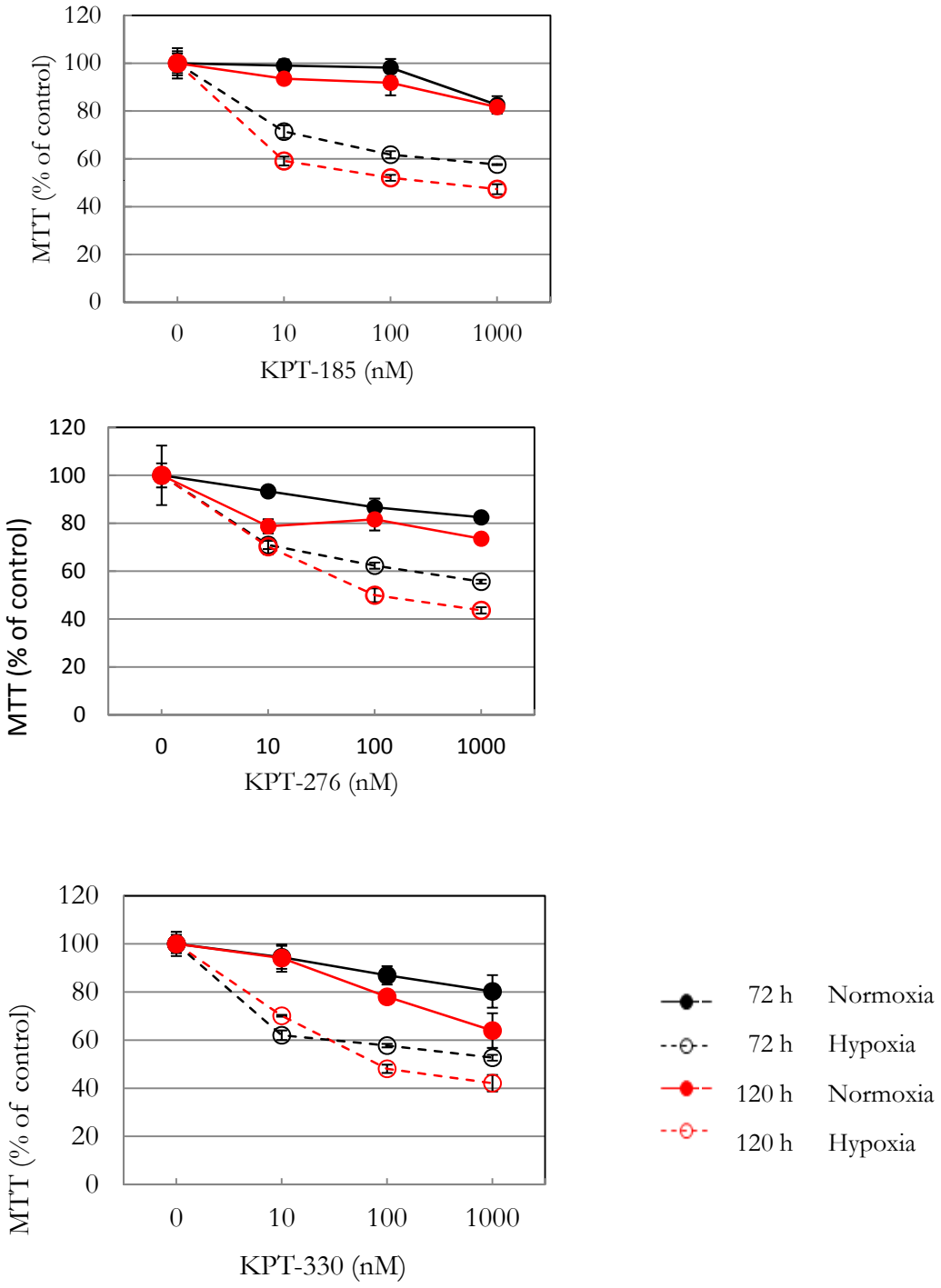
Supplementary Figure S4. mRNA expression levels of MAX, SAP18 and XPO1 in human pancreatic cancers from Oncomine database. A. Oncomine analysis of the mRNA levels of MAX, SAP18 and XPO1 in human pancreatic ductal adenocarcinoma compared to normal pancreatic duct [1-4]. B. Association between expression levels of XPO1 and risk of pancreatic cancer [5]. *: $p < 0.05$; ***: $p < 0.01$; ****: $p < 0.001$.



Supplementary Figure S5. Expression of MAX, SAP18, and XPO1 in pancreatic cancer cell lines. Thirteen human pancreatic cancer cell lines were examined for expression of MAX, SAP18, and XPO1 mRNA by real-time PCR. Levels were normalized to β-actin; levels of each gene in SU8686 cells were designated as 1. Scattered plots of the average (right panels). S: dasatinib-sensitive (IC50 < 250 nM); R: dasatinib-resistant (IC50 > 1 μM).

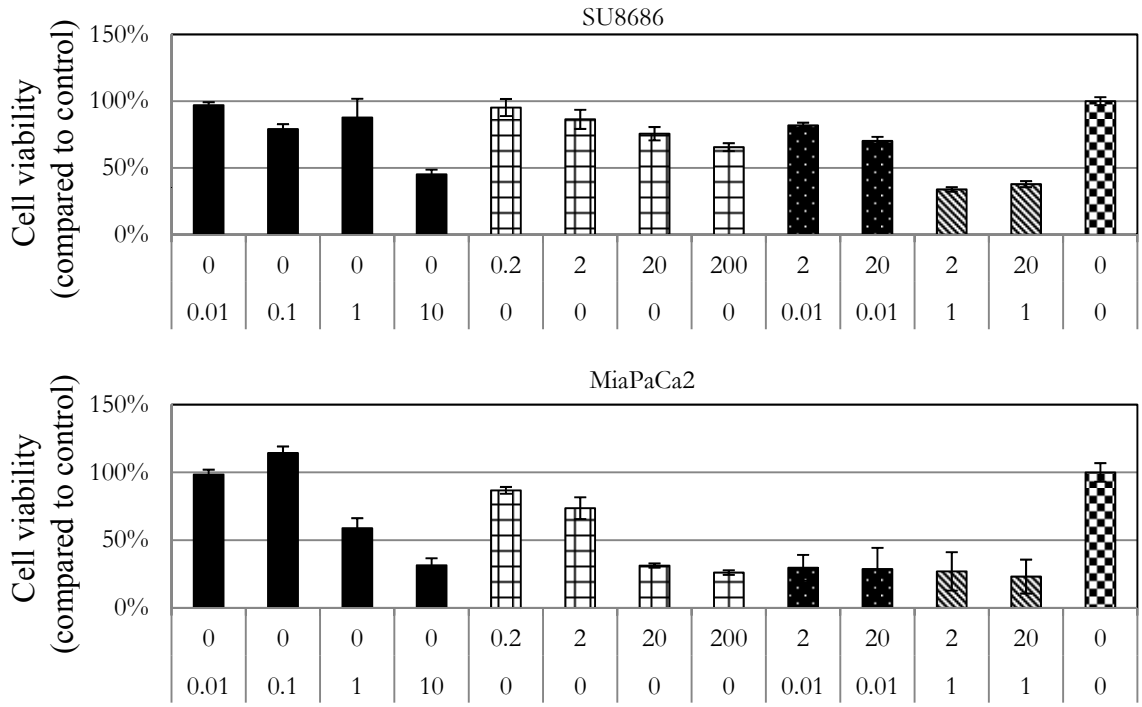


Supplementary Figure S6. Body weights, hematology and serum chemistry in pancreatic xenograt after drug treatment. Toxic side-effects of either dasatinib, KPT-330 or combination of both were evaluated. A. During treatment, body weights were measured weekly and compared to the beginning of the experiments. B. Complete blood counts included NEU (neutrophils), LYM (lymphocytes), MONO (monocytes), EOS (eosinophils), BASO (basophils) and RBC (red blood count), HGB (haemoglobin), HCT (haematocrit), MCV (mean corpuscular volume), MCH (mean corpuscular haemoglobin), MCHC (mean corpuscular haemoglobin concentration), and RDW (red cell distribution width). C. Serum chemistry parameters consisted of ALB (albumin), ALT (alanine aminotransferease), AST (aspartic acid aminotransferase), BUN (blood urea nitrogen), CREA (creatinine), GLU (glucose), and TP (total protein).



Supplementary Figure S7. Comparison of activity of XPO1 inhibitors (normoxic versus hypoxic conditions). Human pancreatic cancer cell line SU8686 was treated with one of three XPO1 inhibitors (KPT-185, -276, -330) for either 72 or 120 hrs. Cell viability was quantified by MTT assays. Cell growth without drug treatment was normalized to 100%. Normoxia: 20% O_2; Hypoxia: 2% O_2.

A



B

KPT-330 (μM)	Gemcitabine (ng/ml)	CI	
		SU8686	MiaPaCa2
0.01	2	0.24	0.005
0.01	20	0.28	0.003
1.0	2	0.02	0.006
1.0	20	0.03	0.008

Supplementary Figure S8. Anti-proliferative activity of the combination of a XPO1 inhibitor (KPT-330) and gemcitabine against human pancreatic cancer cells. A. MTT assays of pancreatic cancer cell lines (SU8686, MiaPaCa2) treated with drugs at indicated concentrations for 72 hr. B. Combination index (CI) was calculated using Calcusyn as described in Materials and Methods. CI > 1: antagonist; CI = 1: additive effect; CI < 1: synergism.

References

[1] H.V. Badea L, Dima SO, Dumitrascu T, Popescu I., Combined gene expression analysis of whole-tissue and microdissected pancreatic ductal adenocarcinoma identifies genes specifically overexpressed in tumor epithelia., Hepatogastroenterology, 55 (2008) 12.

[2] C.A. Iacobuzio-Donahue, A. Maitra, M. Olsen, A.W. Lowe, N.T. Van Heek, C. Rosty, K. Walter, N. Sato, A. Parker, R. Ashfaq, E. Jaffee, B. Ryu, J. Jones, J.R. Eshleman, C.J. Yeo, J.L. Cameron, S.E. Kern, R.H. Hruban, P.O. Brown, M. Goggins, Exploration of Global Gene Expression Patterns in Pancreatic Adenocarcinoma Using cDNA Microarrays, The American Journal of Pathology, 162 (2003) 1151-1162.

[3] L.L. Pei H, Fridley BL, Jenkins GD, Kalari KR, Lingle W, Petersen G, Lou Z, Wang L., FKBP51 affects cancer cell response to chemotherapy by negatively regulating Akt., Cancer Cell., 16 (2009) 8.

[4] D. Segara, A.V. Biankin, J.G. Kench, C.C. Langusch, A.C. Dawson, D.A. Skalicky, D.C. Gotley, M.J. Coleman, R.L. Sutherland, S.M. Henshall, Expression of HOXB2, a Retinoic Acid Signaling Target in Pancreatic Cancer and Pancreatic Intraepithelial Neoplasia, Clinical Cancer Research, 11 (2005) 3587-3596.

[5] J.K. Stratford, D.J. Bentrem, J.M. Anderson, C. Fan, K.A. Volmar, J.S. Marron, E.D. Routh, L.S. Caskey, J.C. Samuel, C.J. Der, L.B. Thorne, B.F. Calvo, H.J. Kim, M.S. Talamonti, C.A. Iacobuzio-Donahue, M.A. Hollingsworth, C.M. Perou, J.J. Yeh, A Six-Gene Signature Predicts Survival of Patients with Localized Pancreatic Ductal Adenocarcinoma, PLoS Med, 7 (2010) e1000307.