

Additional file 1: Functional profiling of the genes reported to be differentially expressed in HL and ALCL cell lines

Gene ID	Gene Name
Zinc ion binding (10)	
ZCCHC2	zinc finger, CCHC domain containing 2
ZNF516	zinc finger protein 516
DNAJA1	DnaJ (Hsp40) homolog, subfamily A, member 1
UHRF2	ubiquitin-like, containing PHD and RING finger domains, 2
DTX3	deltex 3 homolog (Drosophila)
RASA3	RAS p21 protein activator 3
ZFP64	zinc finger protein 64 homolog (mouse)
DCT	dopachrome tautomerase (dopachrome delta-isomerase, tyrosine-related
GTF3A	General transcription factor IIIA
ING3	inhibitor of growth family, member 3
Transferase activity (13)	
AK3L1	adenylate kinase 3-like 1
TPST1	tyrosylprotein sulfotransferase 1
MTR	5-methyltetrahydrofolate-homocysteine methyltransferase
TBK1	TANK-binding kinase 1
JAK2	Janus kinase 2 (a protein tyrosine kinase)
ATM	ataxia telangiectasia mutated (includes complementation groups A, C
STK24	serine/threonine kinase 24 (STE20 homolog, yeast)
NEK7	NIMA (never in mitosis gene a)-related kinase 7
CDK6	cyclin-dependent kinase 6
PNPT1	polyribonucleotide nucleotidyltransferase 1
TLK1	tousled-like kinase 1
LOC196541	Hypothetical protein LOC196541
PAN3	PAN3 polyA specific ribonuclease subunit homolog (S. cerevisiae)
Transcription factor activity (9)	
NFE2L2	nuclear factor (erythroid-derived 2)-like 2
DDIT3	DNA-damage-inducible transcript 3
MYOG	myogenin (myogenic factor 4)
STAT1	signal transducer and activator of transcription 1, 91kDa
MYC	v-myc myelocytomatosis viral oncogene homolog (avian)
REL	v-rel reticuloendotheliosis viral oncogene homolog (avian)
TFAP2C	transcription factor AP-2 gamma (activating enhancer binding protein 2 gamma)
HOXC5	homeobox C5
HOXC4	homeobox C4

Additional file 1 (continued)

Gene ID	Gene Name
Signal transducer activity (7)	
STAT1	signal transducer and activator of transcription 1, 91kDa
GNAS	GNAS complex locus
REL	v-rel reticuloendotheliosis viral oncogene homolog (avian)
TBK1	TANK-binding kinase 1
GNG4	guanine nucleotide binding protein (G protein), gamma 4
RGS1	regulator of G-protein signalling 1
RGS2	regulator of G-protein signalling 2, 24kDa
Protein serine/threonine kinase activity (6)	
ATM	ataxia telangiectasia mutated (includes complementation groups A, C
CDK6	cyclin-dependent kinase 6
NEK7	NIMA (never in mitosis gene a)-related kinase 7
TLK1	tousled-like kinase 1
TBK1	TANK-binding kinase 1
STK24	serine/threonine kinase 24 (STE20 homolog, yeast)
Protein binding (27)	
PARD6G	par-6 partitioning defective 6 homolog gamma (C. elegans)
CTNND2	catenin (cadherin-associated protein), delta 2 (neural
UHRF2	ubiquitin-like, containing PHD and RING finger domains, 2
XPO1	exportin 1 (CRM1 homolog, yeast)
NARG1L	NMDA receptor regulated 1-like
RHOBTB3	Rho-related BTB domain containing 3
DTX3	deltex 3 homolog (Drosophila)
ING3	inhibitor of growth family, member 3
SNAP25	synaptosomal-associated protein, 25kDa
RCBTB1	regulator of chromosome condensation (RCC1) and BTB (POZ) domain
PCNA	proliferating cell nuclear antigen
CDK6	cyclin-dependent kinase 6
TNFAIP6	tumor necrosis factor, alpha-induced protein 6
TH1L	TH1-like (Drosophila)
VPS4B	vacuolar protein sorting 4 homolog B (S. cerevisiae)
ITGB6	integrin, beta 6
KBTBD6	kelch repeat and BTB (POZ) domain containing 6
HSPB1	heat shock 27kDa protein 1
FKBP1A	FK506 binding protein 1A, 12kDa
BRCA2	breast cancer 2, early onset
CDH4	cadherin 4, type 1, R-cadherin (retinal)
RAD21	RAD21 homolog (S. pombe)
PRSS3	protease, serine, 3 (mesotrypsin)
STAT1	signal transducer and activator of transcription 1, 91kDa
MYC	v-myc myelocytomatosis viral oncogene homolog (avian)
ATM	ataxia telangiectasia mutated (includes complementation groups A, C
ATP5E	ATP synthase, H ⁺ transporting, mitochondrial F1 complex, epsilon

Additional file 1 (continued)

Gene ID	Gene Name
Nucleotide binding (17)	
AK3L1	adenylate kinase 3-like 1
DNAH5	dynein, axonemal, heavy polypeptide 5
GNAS	GNAS complex locus
LEMD3	LEM domain containing 3
TBK1	TANK-binding kinase 1
JAK2	Janus kinase 2 (a protein tyrosine kinase)
MSH6	mutS homolog 6 (E. coli)
STK24	serine/threonine kinase 24 (STE20 homolog, yeast)
NEK7	NIMA (never in mitosis gene a)-related kinase 7
CDK6	cyclin-dependent kinase 6
TLK1	tousled-like kinase 1
MYO10	myosin X
DDX4	DEAD (Asp-Glu-Ala-Asp) box polypeptide 4
DDX6	DEAD (Asp-Glu-Ala-Asp) box polypeptide 6
RBMS1	RNA binding motif, single stranded interacting protein 1
VPS4B	Vacuolar protein sorting 4 homolog B (S. cerevisiae)
PAN3	PAN3 polyA specific ribonuclease subunit homolog (S. cerevisiae)
Metal ion binding (12)	
ZCCHC2	zinc finger, CCHC domain containing 2
ZNF516	zinc finger protein 516
MTR	5-methyltetrahydrofolate-homocysteine methyltransferase
DNAJA1	DnaJ (Hsp40) homolog, subfamily A, member 1
UHFR2	ubiquitin-like, containing PHD and RING finger domains, 2
ATP5E	ATP synthase, H ⁺ transporting, mitochondrial F1 complex, epsilon
DTX3	deltex 3 homolog (Drosophila)
RASA3	RAS p21 protein activator 3
ZFP64	zinc finger protein 64 homolog (mouse)
DCT	dopachrome tautomerase (dopachrome delta-isomerase, tyrosine-related
GTF3A	General transcription factor IIIA
ING3	inhibitor of growth family, member 3
Hydrolase activity (8)	
DDX4	DEAD (Asp-Glu-Ala-Asp) box polypeptide 4
ATP5E	ATP synthase, H ⁺ transporting, mitochondrial F1 complex, epsilon
NUDT15	nudix (nucleoside diphosphate linked moiety X)-type motif 15
DDX6	DEAD (Asp-Glu-Ala-Asp) box polypeptide 6
EYA2	eyes absent homolog 2 (Drosophila)
PIGN	phosphatidylinositol glycan, class N
PRSS1	protease, serine, 1 (trypsin 1)
ACOT12	Acyl-CoA thioesterase 12
DNA binding (8)	
ATM	ataxia telangiectasia mutated (includes complementation groups A, C
RBMS1	RNA binding motif, single stranded interacting protein 1
ZFP64	zinc finger protein 64 homolog (mouse)

Additional file 1 (continued)

Gene ID	Gene Name
PCNA	proliferating cell nuclear antigen
UHRF2	ubiquitin-like, containing PHD and RING finger domains, 2
MTERF	mitochondrial transcription termination factor
GTF3A	General transcription factor IIIA
ZNF516	zinc finger protein 516
Calcium ion binding (8)	
STAT1	signal transducer and activator of transcription 1, 91kDa
GCA	grancalcin, EF-hand calcium binding protein
PRSS3	protease, serine, 3 (mesotrypsin)
SLC25A12	solute carrier family 25 (mitochondrial carrier, Aralar), member 12
HGF	hepatocyte growth factor (heparoietin A; scatter factor)
PRSS2	protease, serine, 2 (trypsin 2)
CDH4	cadherin 4, type 1, R-cadherin (retinal)
PRSS1	protease, serine, 1 (trypsin 1)
ATP binding (15)	
AK3L1	adenylate kinase 3-like 1
DNAH5	dynein, axonemal, heavy polypeptide 5
TBK1	TANK-binding kinase 1
JAK2	Janus kinase 2 (a protein tyrosine kinase)
MSH6	mutS homolog 6 (E. coli)
STK24	serine/threonine kinase 24 (STE20 homolog, yeast)
NEK7	NIMA (never in mitosis gene a)-related kinase 7
CDK6	cyclin-dependent kinase 6
TLK1	tousled-like kinase 1
MYO10	myosin X
DDX4	DEAD (Asp-Glu-Ala-Asp) box polypeptide 4
VPS4B	vacuolar protein sorting 4 homolog B (S. cerevisiae)
PAN3	PAN3 polyA specific ribonuclease subunit homolog (S. cerevisiae)
DDX6	DEAD (Asp-Glu-Ala-Asp) box polypeptide 6
ACOT12	Acyl-CoA thioesterase 12
Binding (5)	
RTTN	rotatin
KIAA0372	Hypothetical protein KIAA0372
RANBP6	RAN binding protein 6
SLC25A12	solute carrier family 25 (mitochondrial carrier, Aralar), member 12
APRIN	androgen-induced proliferation inhibitor
Nucleic acid binding (5)	
ZCCHC2	zinc finger, CCHC domain containing 2
DDX4	DEAD (Asp-Glu-Ala-Asp) box polypeptide 4
ZFP64	zinc finger protein 64 homolog (mouse)
<u>DDX6</u>	DEAD (Asp-Glu-Ala-Asp) box polypeptide 6
BRCA2	breast cancer 2, early onset

Additional file 1 (continued)

Gene ID	Gene Name
Peptidase activity (5)	
USP15	ubiquitin specific peptidase 15
PRSS3	protease, serine, 3 (mesotrypsin)
CTSE	cathepsin E
PRSS2	protease, serine, 2 (trypsin 2)
PRSS1	protease, serine, 1 (trypsin 1)
RNA binding (5)	
RBMS1	RNA binding motif, single stranded interacting protein 1
DDX6	DEAD (Asp-Glu-Ala-Asp) box polypeptide 6
PNPT1	polyribonucleotide nucleotidyltransferase 1
XPO1	exportin 1 (CRM1 homolog, yeast)
GTF3A	General transcription factor IIIA
Unfolding protein binding (4)	
TBCE	tubulin-specific chaperone e
TBCA	tubulin-specific chaperone a
CRYAB	crystallin, alpha B
DNAJA1	DnaJ (Hsp40) homolog, subfamily A, member 1
Receptor Activity (4)	
ITGB6	integrin, beta 6
LY75	lymphocyte antigen 75
FKBP1A	FK506 binding protein 1A, 12kDa
OPN3	opsin 3 (encephalopsin, panopsin)
Sequence-specific DNA binding (4)	
DDIT3	DNA-damage-inducible transcript 3
HOXC5	homeobox C5
HOXC4	homeobox C4
NFE2L2	nuclear factor (erythroid-derived 2)-like 2
Structural constituent of ribosome (4)	
RPS27A	ribosomal protein S27a
KIAA0372	Hypothetical protein KIAA0372
RPS23	ribosomal protein S23
RPS6	ribosomal protein S6
Transporter activity (4)	
SLC2A10	solute carrier family 2 (facilitated glucose transporter), member 10
TM9SF2	transmembrane 9 superfamily member 2
SLC25A12	solute carrier family 25 (mitochondrial carrier, Aralar), member 12
ATP5G3	ATP synthase, H ⁺ transporting, mitochondrial F0 complex, subunit C3

Additional file 1 (continued)

Gene ID	Gene Name
Trypsin activity (3)	
PRSS1	protease, serine, 1 (trypsin 1)
PRSS2	protease, serine, 2 (trypsin 2)
PRSS3	protease, serine, 3 (mesotrypsin)
Protein-tyrosine kinase activity (3)	
JAK2	Janus kinase 2 (a protein tyrosine kinase)
NEK7	NIMA (never in mitosis gene a)-related kinase 7
STK24	serine/threonine kinase 24 (STE20 homolog, yeast)
Magnesium ion binding (3)	
NEK7	NIMA (never in mitosis gene a)-related kinase 7
NUDT15	nudix (nucleoside diphosphate linked moiety X)-type motif 15
EYA2	eyes absent homolog 2 (Drosophila)
GTPase activator activity (3)	
RASA3	RAS p21 protein activator 3
RGS1	regulator of G-protein signalling 1
RGS2	regulator of G-protein signalling 2, 24kDa
ATP-dependent helicase activity (3)	
DDX4	DEAD (Asp-Glu-Ala-Asp) box polypeptide 4
DDX6	DEAD (Asp-Glu-Ala-Asp) box polypeptide 6
INTS6	integrator complex subunit 6
Calmodulin binding (2)	
RGS1	regulator of G-protein signalling 1
RGS2	regulator of G-protein signalling 2, 24kDa
Chaperone binding (2)	
TBCE	tubulin-specific chaperone e
TBCA	tubulin-specific chaperone a
Double-stranded DNA binding (2)	
RBMS1	RNA binding motif, single stranded interacting protein 1
MTERF	mitochondrial transcription termination factor
GTP binding (3)	
AK3L1	adenylate kinase 3-like 1
GNAS	GNAS complex locus
ARL15	ADP-ribosylation factor-like 15
GTPase activity (2)	
GNAS	GNAS complex locus
RHOBTB3	Rho-related BTB domain containing 3

Additional file 1 (continued)

Gene ID	Gene Name
Hydrogen-transporting ATP/ase synthase activity, rotational mechanism (2)	
ATP5E	ATP synthase, H ⁺ transporting, mitochondrial F1 complex, epsilon
ATP5G3	ATP synthase, H ⁺ transporting, mitochondrial F0 complex, subunit C3
Identical protein binding (2)	
BCL2	B-cell CLL/lymphoma 2
CLDN4	Claudin 4
Isomerase activity (2)	
DCT	dopachrome tautomerase (dopachrome delta-isomerase, tyrosine-related
FKBP1A	FK506 binding protein 1A, 12kDa
Kinase activity (2)	
AK3L1	adenylate kinase 3-like 1
STK24	serine/threonine kinase 24 (STE20 homolog, yeast)
Protein dimerization activity (2)	
DDIT3	DNA-damage-inducible transcript 3
NFE2L2	nuclear factor (erythroid-derived 2)-like 2
Receptor binding (2)	
JAK2	Janus kinase 2 (a protein tyrosine kinase)
ANGPTL1	angiopoietin-like 1
Serine-type endopeptidase activity (2)	
PRSS3	protease, serine, 3 (mesotrypsin)
HGF	hepatocyte growth factor (hepapoitin A; scatter factor)
Single-stranded DNA binding (2)	
RBMS1	RNA binding motif, single stranded interacting protein 1
BRCA2	breast cancer 2, early onset
Structural molecule activity (2)	
CTNND2	catenin (cadherin-associated protein), delta 2 (neural)
CLDN4	Claudin 4
Sugar binding (2)	
LY75	lymphocyte antigen 75
LGALS8	lectin, galactoside-binding, soluble, 8 (galectin 8)
3'-5'-exoribonuclease activity	
PNPT1	polyribonucleotide nucleotidyltransferase 1
Acetyltransferase activity	
NARG1L	NMDA receptor regulated 1-like

Additional file 1 (continued)

Gene ID	Gene Name
Actin binding	
MYO10	myosin X
Adenylate kinase activity	
AK3L1	adenylate kinase 3-like 1
Aminopeptidase activity	
DPP4	dipeptidyl-peptidase 4 (CD26, adenosine deaminase complexing protein)
ATPase activity	
DNAH5	dynein, axonemal, heavy polypeptide 5
ATPase activity, coupled	
VPS4B	vacuolar protein sorting 4 homolog B (<i>S. cerevisiae</i>)
Catalytic activity	
EYA2	eyes absent homolog 2 (<i>Drosophila</i>)
Cathepsin E activity	
CTSE	cathepsin E
Cobalamin binding/ Cobalt ion binding	
MTR	5-methyltetrahydrofolate-homocysteine methyltransferase
Copper ion binding	
DCT	dopachrome tautomerase (dopachrome delta-isomerase, tyrosine-related)
Cysteine-type endopeptidase activity	
USP15	ubiquitin specific peptidase 15
Damaged DNA binding	
MSH6	mutS homolog 6 (<i>E. coli</i>)
Dihydropteroate synthase activity	
MTR	5-methyltetrahydrofolate-homocysteine methyltransferase
Dipeptidyl-peptidase IV activity	
DPP4	dipeptidyl-peptidase 4 (CD26, adenosine deaminase complexing protein)
DNA polymerase processivity factor activity	
PCNA	proliferating cell nuclear antigen
Dopachrome isomerase activity	
DCT	dopachrome tautomerase (dopachrome delta-isomerase, tyrosine-related)

Additional file 1 (continued)

Gene ID	Gene Name
Ephrin receptor binding	
EFNB2	ephrin-B2
G-protein coupled photoreceptor activity	
OPN3	opsin 3 (encephalopsin, panopsin)
Growth factor activity	
HGF	hepatocyte growth factor (hepatopoietin A; scatter factor)
Guanyl nucleotide binding	
GNAS	GNAS complex locus
Heat shock protein binding	
DNAJA1	DnaJ (Hsp40) homolog, subfamily A, member 1
Hematopoietin/interferon-class (D200 domain) cytokine receptor signal transducer activity	
STAT1	signal transducer and activator of transcription 1, 91kDa
Homocysteine S-methyltransferase activity	
MTR	5-methyltetrahydrofolate-homocysteine methyltransferase
Hyaluronic acid binding	
TNFAIP6	tumor necrosis factor, alpha-induced protein 6
Janus kinase activity	
JAK2	Janus kinase 2 (a protein tyrosine kinase)
Ligase activity	
UHRF2	ubiquitin-like, containing PHD and RING finger domains, 2
Lipid binding	
ATP5G3	ATP synthase, H ⁺ transporting, mitochondrial F0 complex, subunit C3
Low-density lipoprotein receptor binding	
DNAJA1	DnaJ (Hsp40) homolog, subfamily A, member 1
Manganese ion binding	
NUDT15	nudix (nucleoside diphosphate linked moiety X)-type motif 15
Methionine synthase/ Methyltransferase activity	
MTR	5-methyltetrahydrofolate-homocysteine methyltransferase
Microtubule motor activity	
DNAH5	dynein, axonemal, heavy polypeptide 5

Additional file 1 (continued)

Gene ID	Gene Name
Motor activity	
MYO10	myosin X
Neutral amino acid transporter activity	
SLC1A4	solute carrier family 1 (glutamate/neutral amino acid transporter), member 4
Oxidoreductase activity	
DCT	dopachrome tautomerase (dopachrome delta-isomerase, tyrosine-related)
Pepsin A activity	
CTSE	cathepsin E
Peptidyl-prolyl cis-trans isomerase activity	
FKBP1A	FK506 binding protein 1A, 12kDa
Polyribonucleotide nucleotidyltransferase activity	
PNPT1	polyribonucleotide nucleotidyltransferase 1
Prolyl oligopeptidase activity	
DPP4	dipeptidyl-peptidase 4 (CD26, adenosine deaminase complexing protein)
Protein kinase activity	
PAN3	PAN3 polyA specific ribonuclease subunit homolog (<i>S. cerevisiae</i>)
Protein transporter activity	
XPO1	exportin 1 (CRM1 homolog, yeast)
Protein tyrosine phosphatase activity	
EYA2	eyes absent homolog 2 (<i>Drosophila</i>)
Protein tyrosine sulfotransferase activity	
TPST1	tyrosylprotein sulfotransferase 1
Rhodopsin-like receptor activity	
OPN3	opsin 3 (encephalopsin, panopsin)
Ribosome binding	
NARG1L	NMDA receptor regulated 1-like
RNA helicase activity	
DDX6	DEAD (Asp-Glu-Ala-Asp) box polypeptide 6
RNA polymerase III transcription factor activity	
GTF3A	General transcription factor IIIA
RNA splicing factor activity, transesterification mechanism	
TXNL4A	thioredoxin-like 4A

Additional file 1 (continued)

Gene ID	Gene Name
RNA-3'-phosphate cyclase activity	
RCL1	RNA terminal phosphate cyclase-like 1
S-adenosylmethionine-dependent methyltransferase activity	
LOC196541	Hypothetical protein LOC196541
Serine-type endopeptidase inhibitor activity	
NFE2L2	nuclear factor (erythroid-derived 2)-like 2
SH2 domain binding	
JAK2	Janus kinase 2 (a protein tyrosine kinase)
Table 3 (continued)	
Sodium:dicarboxylate symporter activity	
SLC1A4	solute carrier family 1 (glutamate/neutral amino acid transporter), member 4
Solute:cation symporter activity	
SLC25A12	solute carrier family 25 (mitochondrial carrier, Aralar), member 12
Structural constituent of eye lens	
CRYAB	crystallin, alpha B
Sugar porter activity	
SLC2A10	solute carrier family 2 (facilitated glucose transporter), member 10
Symporter activity	
SLC1A4	solute carrier family 1 (glutamate/neutral amino acid transporter), member 4
Syntaxin-1 binding	
SNPH	syntaphilin
Transcription corepressor activity	
DDIT3	DNA-damage-inducible transcript 3
Transcription termination factor activity	
MTERF	mitochondrial transcription termination factor
Translation initiation factor activity	
MTIF3	mitochondrial translational initiation factor 3
Transmembrane receptor activity	
CLDN4	Claudin 4
Ubiquitin thiolesterase activity	
USP15	ubiquitin specific peptidase 15

Additional file 1 (continued)

Gene ID	Gene Name
Cytokine activity	
CMTM3	CKLF-like MARVEL transmembrane domain containing 3
Serine esterase activity	
ACOT12	Acyl-CoA thioesterase 12
Transmembrane receptor activity	
INTS6	integrator complex subunit 6
Unknown function (33)	
SPAG4L	sperm associated antigen 4-like
BBS5	Bardet-Biedl syndrome 5
UFM1	ubiquitin-fold modifier 1
SERINC3	serine incorporator 3
THRAP6	thyroid hormone receptor associated protein 6
PDGFD	platelet derived growth factor D
SCRN3	secernin 3
LHX4	LIM homeobox 4
TRY6	Trypsinogen C
DNCL12	DNCL12
CIRH1A	cirrhosis, autosomal recessive 1A (cirhin)
SERINC5	serine incorporator 5
DCC1	defective in sister chromatid cohesion homolog 1 (<i>S. cerevisiae</i>)
DCL-1	type I transmembrane C-type lectin receptor
KRT71	keratin 71
C20orf52	chromosome 20 open reading frame 52, nuclear gene encoding mitochondrial protein
DEPDC6	DEP domain containing 6
DZI	DZI
IFT74	intraflagellar transport 74 homolog (<i>Chlamydomonas</i>)
C9orf46	chromosome 9 open reading frame 46
GPC5	glypican 5
NID	NID
C9orf123	chromosome 9 open reading frame 123
PCTRK3	PCTRK3
PNF2	PNF2
FLJ25715	hypothetical protein FLJ25715
CCDC104	coiled-coil domain containing 104
MLANA	melan-A
C13orf1	chromosome 13 open reading frame 1
BMO39	BMO39
MTX2	metaxin 2
MED10	mediator of RNA polymerase II transcription, subunit 10 homolog (<i>NUT2, S. cerevisiae</i>)
ANKRD32	ankyrin repeat domain 32