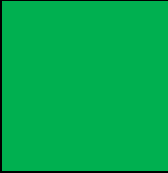
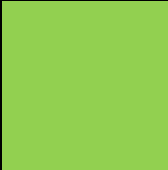






Supplementary Table S1. Summary of the Objective Response Measure (ORM) scoring method

ORM	Abbreviation	Description	OR Score	Heat Map
Progressive Disease 1	PD1	- HuCD45 ⁺ never drops below 1% in PB - Event before the end of study - LGD value of <1.5 times EFS of control group	0	
Progressive Disease 2	PD2	- HuCD45 ⁺ never drops below 1% in PB - Event before the end of study - LGD value of ≥1.5 times EFS of control group	2	
Stable Disease	SD	- HuCD45 ⁺ never drops below 1% - No event before the end of study period	4	
Partial Response	PR	- HuCD45 ⁺ below 1% for one week only	6	
Complete Response	CR	- HuCD45 ⁺ below 1% for two consecutive weeks	8	
Maintained Complete Response	MCR	- HuCD45 ⁺ below 1% for the last three weeks of study	10	

Supplementary Table S2. Details of known chromosomal translocations in the xenograft panel.

ALL lineage	Xenograft]	Known Chromosomal Abnormalities
MLL-ALL	MLL-1	t(1;11)
	MLL-2	t(4;11)
	MLL-3	t(11;17)
	MLL-5	t(10;11)
	MLL-6	t(11;19)
	MLL-7	t(4;11)
	MLL-8	<i>MLL</i> -Rearranged
	MLL-14	Complex t(11;19)
	ALL-3	t(11;19)
BCP-ALL	ALL-4	t(9;22) BCR-ABL
	ALL-7	t(17;19)(q21;q13)
	ALL-11	del(12)(p13) del(13)(q12)
T-ALL	ALL-31	del(6)(q21),del(11)(q23)[4]/46,XY[14]
	ALL-33	t(11;14)(p13;q32)[11]/46,idem,t(1;8;9)(q32.1;p21;p22)[8]/46,XY[1]

Supplementary Table S3. Top 100 discriminating genes for each xenograft subtype identified by microarray analysis of gene expression

Top 100 up- and down-regulated genes (MLL-ALL specific): calculated with LimmaGP. Selection criteria: *P* value less than 0.05 and FDR less than 0.05

Gene ID	Expression	Unadjusted p-value from moderated t-test	FDR(BH)
MEIS1	Upregulated	3.24E-16	1.12E-11
C10ORF140	Upregulated	8.54E-16	1.48E-11
LOC730417	Upregulated	1.77E-13	2.04E-09
CSPG4	Upregulated	3.91E-13	3.39E-09
LOC652226	Upregulated	1.23E-12	8.54E-09
CCNA1	Upregulated	5.97E-12	3.45E-08
VLDLR	Upregulated	9.86E-12	4.79E-08
LTK	Upregulated	1.10E-11	4.79E-08
LOC153684	Upregulated	8.36E-11	2.90E-07
ITPKA	Upregulated	1.09E-10	3.15E-07
RPS6KA4	Upregulated	1.17E-10	3.15E-07
CPEB2	Upregulated	1.18E-10	3.15E-07
THBS4	Upregulated	1.34E-10	3.32E-07
PLA2G4B	Upregulated	2.69E-10	6.11E-07
KCNG1	Upregulated	3.12E-10	6.11E-07
BASP1	Upregulated	3.26E-10	6.11E-07
SPIB	Upregulated	3.26E-10	6.11E-07
NMUR1	Upregulated	3.52E-10	6.11E-07
PLD1	Upregulated	3.68E-10	6.11E-07
C11ORF24	Upregulated	3.70E-10	6.11E-07
FBLN1	Upregulated	8.89E-10	1.40E-06
HTRA3	Upregulated	9.51E-10	1.44E-06
GREM1	Upregulated	1.04E-09	1.51E-06
RTN4R	Upregulated	1.20E-09	1.66E-06
C20ORF103	Upregulated	1.49E-09	1.87E-06
SPATA6	Upregulated	1.51E-09	1.87E-06
SERINC2	Upregulated	1.69E-09	2.02E-06
ZCCHC5	Upregulated	2.37E-09	2.66E-06
C16ORF74	Upregulated	2.74E-09	2.97E-06
TBC1D8	Upregulated	3.03E-09	3.19E-06
M160	Upregulated	3.92E-09	4.00E-06
KLRAQ1	Upregulated	5.20E-09	5.15E-06
VAT1L	Upregulated	5.42E-09	5.22E-06
CD163L1	Upregulated	5.59E-09	5.24E-06
CDH11	Upregulated	7.44E-09	6.50E-06
GAS2L3	Upregulated	7.49E-09	6.50E-06
C16ORF93	Upregulated	8.41E-09	7.12E-06
CEBPA	Upregulated	1.12E-08	8.66E-06

HS.201858	Upregulated	1.12E-08	8.66E-06
SCARNA5	Upregulated	1.19E-08	8.84E-06
HS.362932	Upregulated	1.20E-08	8.84E-06
LOC728175	Upregulated	1.36E-08	9.72E-06
CD72	Upregulated	1.56E-08	1.06E-05
FLJ35024	Upregulated	1.82E-08	1.21E-05
HS.549989	Upregulated	1.87E-08	1.23E-05
TUBB6	Upregulated	2.26E-08	1.43E-05
TBC1D24	Upregulated	2.37E-08	1.47E-05
PLEKHG3	Upregulated	2.42E-08	1.47E-05
LOC388312	Upregulated	2.97E-08	1.77E-05
TXNDC5	Upregulated	3.13E-08	1.84E-05
LOC100128163	Upregulated	3.31E-08	1.91E-05
IGF2BP2	Upregulated	3.51E-08	1.99E-05
DAD1L	Upregulated	3.79E-08	2.09E-05
PARVB	Upregulated	4.94E-08	2.59E-05
DERL3	Upregulated	4.94E-08	2.59E-05
REEP3	Upregulated	5.24E-08	2.67E-05
PRNP	Upregulated	5.31E-08	2.67E-05
FLT3	Upregulated	5.52E-08	2.72E-05
NLRP3	Upregulated	5.56E-08	2.72E-05
LILRB4	Upregulated	6.70E-08	3.23E-05
FLJ12355	Upregulated	7.09E-08	3.36E-05
JMJD7	Upregulated	7.51E-08	3.48E-05
CACNA2D4	Upregulated	9.47E-08	4.25E-05
PWWP2	Upregulated	9.60E-08	4.25E-05
FCRLB	Upregulated	1.05E-07	4.50E-05
PAN3	Upregulated	1.07E-07	4.52E-05
LOC100129186	Upregulated	1.10E-07	4.60E-05
C9ORF21	Upregulated	1.15E-07	4.75E-05
CD151	Upregulated	1.21E-07	4.96E-05
PCDHGA5	Upregulated	1.29E-07	5.16E-05
TP53INP2	Upregulated	1.36E-07	5.32E-05
CIB3	Upregulated	1.47E-07	5.65E-05
EHD4	Upregulated	1.54E-07	5.87E-05
LOC730077	Upregulated	1.59E-07	5.99E-05
TRAF1	Upregulated	1.61E-07	5.99E-05
LOC100130869	Upregulated	1.70E-07	6.20E-05
LOC100128139	Upregulated	1.75E-07	6.33E-05
ACTA2	Upregulated	1.81E-07	6.42E-05
TAPT1	Upregulated	1.81E-07	6.42E-05
MGC24125	Upregulated	1.94E-07	6.74E-05
SERPINB8	Upregulated	2.06E-07	7.09E-05
FLJ39653	Upregulated	2.55E-07	8.60E-05

CERCAM	Upregulated	2.60E-07	8.67E-05
BRE	Upregulated	2.66E-07	8.78E-05
DEPDC7	Upregulated	2.79E-07	8.94E-05
APOBEC3B	Upregulated	2.81E-07	8.94E-05
UBXN11	Upregulated	2.96E-07	9.33E-05
HS.335525	Upregulated	3.04E-07	9.51E-05
CA5B	Upregulated	3.07E-07	9.51E-05
STON1	Upregulated	3.28E-07	9.98E-05
ZDHHC14	Upregulated	3.29E-07	9.98E-05
SH3BP1	Upregulated	3.32E-07	9.98E-05
AGTRAP	Upregulated	3.41E-07	0.000101148
P2RX7	Upregulated	3.52E-07	0.000102671
FCRLA	Upregulated	3.55E-07	0.000102671
LDLRAP1	Upregulated	3.55E-07	0.000102671
CATSPER1	Upregulated	3.82E-07	0.000109388
SH3PXD2B	Upregulated	4.37E-07	0.000122186
FAM176B	Upregulated	4.88E-07	0.000133584
PANX2	Upregulated	5.40E-07	0.000145152
PWWP2B	Upregulated	5.48E-07	0.00014599
EXD2	Downregulated	5.07E-11	1.95E-07
PVRIG	Downregulated	1.45E-09	1.87E-06
GPR56	Downregulated	1.84E-09	2.13E-06
ZNF827	Downregulated	5.94E-09	5.43E-06
OCIAD2	Downregulated	8.93E-09	7.38E-06
CD2AP	Downregulated	9.67E-09	7.80E-06
ZNRD1	Downregulated	1.37E-08	9.72E-06
GIMAP6	Downregulated	1.50E-08	1.04E-05
C10ORF57	Downregulated	2.22E-08	1.42E-05
C14ORF129	Downregulated	3.72E-08	2.08E-05
HS.202577	Downregulated	4.96E-08	2.59E-05
GBP1	Downregulated	5.01E-08	2.59E-05
RYK	Downregulated	7.17E-08	3.36E-05
ALS2CR4	Downregulated	7.66E-08	3.50E-05
ZBTB20	Downregulated	9.75E-08	4.25E-05
ABLIM1	Downregulated	9.81E-08	4.25E-05
ITPR3	Downregulated	1.23E-07	4.96E-05
LTB	Downregulated	1.36E-07	5.32E-05
RPP21	Downregulated	1.64E-07	6.04E-05
RAB23	Downregulated	1.88E-07	6.60E-05
GK5	Downregulated	2.38E-07	8.10E-05
MED28	Downregulated	2.69E-07	8.80E-05
ZNF544	Downregulated	2.73E-07	8.84E-05
ARHGAP15	Downregulated	3.34E-07	9.98E-05
CD27	Downregulated	4.03E-07	0.000114648

C14ORF45	Downregulated	4.13E-07	0.000116496
ZNF329	Downregulated	4.68E-07	0.000129934
YOD1	Downregulated	4.89E-07	0.000133584
C1ORF19	Downregulated	5.34E-07	0.000144832
TMEM156	Downregulated	5.51E-07	0.00014599
HS.372654	Downregulated	6.22E-07	0.000160985
HS.193784	Downregulated	6.33E-07	0.000161357
ZC3H12B	Downregulated	6.40E-07	0.000162083
MOCS2	Downregulated	6.75E-07	0.000167173
PAQR3	Downregulated	7.33E-07	0.000180328
RASA2	Downregulated	7.58E-07	0.000185123
GXYLT1	Downregulated	8.27E-07	0.000197796
ZMYM2	Downregulated	8.54E-07	0.000202997
FLJ23584	Downregulated	8.90E-07	0.000208931
SPAG16	Downregulated	9.21E-07	0.000213114
ARMCX2	Downregulated	1.08E-06	0.000239751
SCAPER	Downregulated	1.13E-06	0.000248229
ACBD7	Downregulated	1.19E-06	0.00025742
CHMP2B	Downregulated	1.20E-06	0.00025764
ARRDC3	Downregulated	1.29E-06	0.000270566
ZNF776	Downregulated	1.31E-06	0.000273114
TSPAN7	Downregulated	1.32E-06	0.000273124
KLHL12	Downregulated	1.36E-06	0.000280086
FZD6	Downregulated	1.39E-06	0.000283114
MTMR15	Downregulated	1.48E-06	0.000297459
CTHRC1	Downregulated	1.53E-06	0.000305704
AMZ2	Downregulated	1.90E-06	0.000363297
ZNF606	Downregulated	2.05E-06	0.000380055
GSPT2	Downregulated	2.09E-06	0.000381857
RBM33	Downregulated	2.43E-06	0.000430548
MBIP	Downregulated	2.65E-06	0.000461982
MLL	Downregulated	2.67E-06	0.000463676
MGC29506	Downregulated	2.75E-06	0.000468326
PIK3R3	Downregulated	2.75E-06	0.000468326
DGKA	Downregulated	2.88E-06	0.000480802
FAM117B	Downregulated	2.91E-06	0.000483238
CASD1	Downregulated	3.06E-06	0.00050573
STAT5B	Downregulated	3.20E-06	0.000516678
CRY1	Downregulated	3.22E-06	0.000516678
ICAM3	Downregulated	3.25E-06	0.000519401
LNX2	Downregulated	3.36E-06	0.000531838
MAGEE1	Downregulated	4.14E-06	0.00062479
TIGD2	Downregulated	4.36E-06	0.000644606
GCLM	Downregulated	4.53E-06	0.000649445

SUMO2	Downregulated	4.62E-06	0.000658257
ZNF256	Downregulated	5.05E-06	0.000708826
ZKSCAN5	Downregulated	5.11E-06	0.000711624
HS.436879	Downregulated	5.30E-06	0.000731962
ZDHHC23	Downregulated	5.51E-06	0.000745208
PARD3	Downregulated	5.54E-06	0.000745208
FBXO21	Downregulated	5.72E-06	0.000765619
ZSCAN18	Downregulated	6.07E-06	0.000800486
TM7SF2	Downregulated	6.51E-06	0.000849335
ZNF254	Downregulated	6.58E-06	0.000854752
SLC46A3	Downregulated	6.74E-06	0.000865946
CD247	Downregulated	6.85E-06	0.000874084
ARAP2	Downregulated	7.56E-06	0.000943081
PLCH1	Downregulated	8.04E-06	0.000986068
C7ORF44	Downregulated	8.11E-06	0.000986855
NET1	Downregulated	8.41E-06	0.001004032
C5ORF53	Downregulated	8.51E-06	0.001007948
USP38	Downregulated	8.88E-06	0.001047329
MRFAP1L1	Downregulated	8.95E-06	0.001052602
PLCG1	Downregulated	9.60E-06	0.001113858
ATP6V1G2	Downregulated	1.03E-05	0.001161025
LMAN1	Downregulated	1.05E-05	0.001188103
CNN3	Downregulated	1.11E-05	0.00124501
GOLGA8B	Downregulated	1.20E-05	0.001320749
TRIM37	Downregulated	1.20E-05	0.001320749
GRK5	Downregulated	1.21E-05	0.001328226
C6ORF125	Downregulated	1.23E-05	0.001340874
NCK1	Downregulated	1.29E-05	0.001374926
BEX4	Downregulated	1.29E-05	0.001374926
PELO	Downregulated	1.30E-05	0.001378652
PECAM1	Downregulated	1.31E-05	0.001386144
ZFYVE20	Downregulated	1.34E-05	0.001410124

Top 100 up- and down-regulated genes (BCP-ALL specific): calculated with LimmaGP.
 Selection criteria: *P* value less than 0.05 and FDR less than 0.05

Gene ID	Expression	Unadjusted p-value from moderated t-test	FDR(BH)
LARGE	Upregulated	5.70E-14	1.98E-09
MME	Upregulated	2.19E-13	3.80E-09
PCDH18	Upregulated	1.82E-12	2.10E-08
GRIK5	Upregulated	4.74E-12	3.62E-08
ODZ4	Upregulated	5.22E-12	3.62E-08
MAML2	Upregulated	1.11E-11	6.39E-08
SH2D4B	Upregulated	3.03E-11	1.37E-07
LOC440030	Upregulated	3.16E-11	1.37E-07
ELK3	Upregulated	3.73E-11	1.41E-07
SGCE	Upregulated	4.07E-11	1.41E-07
ALOX5	Upregulated	9.91E-11	3.13E-07
C10ORF10	Upregulated	1.13E-10	3.27E-07
HS.197670	Upregulated	2.57E-10	6.87E-07
CYBB	Upregulated	4.13E-10	1.02E-06
GAB1	Upregulated	5.97E-10	1.38E-06
MSMP	Upregulated	9.70E-10	2.10E-06
HPS4	Upregulated	1.37E-09	2.79E-06
SRRD	Upregulated	1.89E-09	3.65E-06
LOC54103	Upregulated	2.11E-09	3.86E-06
PION	Upregulated	2.38E-09	4.12E-06
TTC21A	Upregulated	3.03E-09	4.79E-06
LZTS2	Upregulated	4.34E-09	6.55E-06
NAV1	Upregulated	5.16E-09	7.46E-06
EGLN1	Upregulated	8.98E-09	1.25E-05
HS.151692	Upregulated	9.66E-09	1.25E-05
CBLN3	Upregulated	9.74E-09	1.25E-05
CORO2B	Upregulated	1.27E-08	1.57E-05
TBC1D9	Upregulated	1.54E-08	1.84E-05
ID3	Upregulated	1.61E-08	1.86E-05
PLEKHG4B	Upregulated	2.14E-08	2.39E-05
CAMSAP1L1	Upregulated	2.78E-08	3.01E-05
ARHGEF5	Upregulated	3.25E-08	3.41E-05
ECM2	Upregulated	3.57E-08	3.65E-05
MYO5C	Upregulated	3.91E-08	3.88E-05
POU4F1	Upregulated	5.34E-08	5.12E-05
INO80	Upregulated	5.88E-08	5.37E-05
LOC645993	Upregulated	6.94E-08	6.17E-05
LOC643888	Upregulated	7.19E-08	6.23E-05
FOXO1	Upregulated	7.52E-08	6.36E-05
HRK	Upregulated	9.03E-08	7.46E-05

LOC643002	Upregulated	9.28E-08	7.48E-05
GNG7	Upregulated	1.01E-07	7.97E-05
ELFN2	Upregulated	1.07E-07	8.22E-05
LOC401074	Upregulated	1.14E-07	8.56E-05
IFI16	Upregulated	1.23E-07	9.05E-05
OSBPL10	Upregulated	1.33E-07	9.45E-05
FAM19A1	Upregulated	1.49E-07	0.000103583
SLC35E3	Upregulated	1.52E-07	0.000103644
RAI14	Upregulated	1.57E-07	0.000104407
HMX2	Upregulated	1.61E-07	0.000104407
SPTA1	Upregulated	1.63E-07	0.000104407
LGR5	Upregulated	2.71E-07	0.000170931
HS.370872	Upregulated	2.94E-07	0.000182107
MS4A1	Upregulated	3.35E-07	0.000202258
MYRIP	Upregulated	3.38E-07	0.000202258
TCF4	Upregulated	4.07E-07	0.000234822
DIP2C	Upregulated	4.18E-07	0.000234822
LOC100130506	Upregulated	4.24E-07	0.000234822
GIMAP4	Upregulated	4.54E-07	0.000242083
RHPN2	Upregulated	4.83E-07	0.000253635
NLRP12	Upregulated	4.90E-07	0.000253898
TCL6	Upregulated	5.19E-07	0.00026486
ITPR1	Upregulated	5.58E-07	0.000280455
CEACAM6	Upregulated	6.07E-07	0.000296539
APBB1IP	Upregulated	6.16E-07	0.000296805
LOC654113	Upregulated	6.68E-07	0.000317681
LOC100128757	Upregulated	7.30E-07	0.000342168
ZNF821	Upregulated	7.53E-07	0.000348261
SEMA6C	Upregulated	8.23E-07	0.000375862
LOC651647	Upregulated	8.49E-07	0.000377414
LDOC1	Upregulated	9.04E-07	0.000396909
CMTM8	Upregulated	9.22E-07	0.000399806
RIMKLB	Upregulated	9.40E-07	0.000400529
LOC649864	Upregulated	1.04E-06	0.000435087
LEMD3	Upregulated	1.05E-06	0.000435087
ST3GAL6	Upregulated	1.15E-06	0.000469162
EIF2AK3	Upregulated	1.27E-06	0.000514248
ZNF311	Upregulated	1.36E-06	0.000540058
ENAH	Upregulated	1.37E-06	0.000540058
OR2A9P	Upregulated	1.40E-06	0.000544914
INTS3	Upregulated	1.41E-06	0.000545083
MC1R	Upregulated	1.48E-06	0.00056392
ZNF608	Upregulated	1.63E-06	0.000612876
ZKSCAN4	Upregulated	1.68E-06	0.000618784

GRB7	Upregulated	1.72E-06	0.000628611
BACH2	Upregulated	1.74E-06	0.000628667
SBF2	Upregulated	1.81E-06	0.000646614
PEG10	Upregulated	1.87E-06	0.000661596
SLC26A4	Upregulated	2.16E-06	0.000740864
CCDC121	Upregulated	2.16E-06	0.000740864
S100A13	Upregulated	2.30E-06	0.000782396
SERPINB9	Upregulated	2.59E-06	0.000846882
RCBTB1	Upregulated	2.63E-06	0.000851613
WFS1	Upregulated	2.84E-06	0.000912213
AOX2P	Upregulated	2.99E-06	0.000950555
SLC16A14	Upregulated	3.05E-06	0.000962169
LTBP2	Upregulated	3.16E-06	0.000988527
ZSCAN12	Upregulated	3.74E-06	0.001157897
CHD7	Upregulated	3.81E-06	0.001170646
CRIM1	Upregulated	4.05E-06	0.001232402
CKMT2	Upregulated	4.16E-06	0.001245554
NUCB2	Downregulated	2.92E-09	4.79E-06
MTX2	Downregulated	5.46E-08	5.12E-05
BTG3	Downregulated	1.28E-07	9.22E-05
CTSC	Downregulated	3.72E-07	0.000218843
MGC4677	Downregulated	4.26E-07	0.000234822
TRIM66	Downregulated	4.40E-07	0.000238521
LOC442597	Downregulated	5.69E-07	0.000282251
ANXA6	Downregulated	8.34E-07	0.000375927
IL2RG	Downregulated	9.47E-07	0.000400529
CECR1	Downregulated	1.64E-06	0.000612876
LOC284422	Downregulated	2.05E-06	0.000718344
CHST12	Downregulated	2.36E-06	0.000795501
ZDHHC4	Downregulated	2.45E-06	0.000817377
TMSB15A	Downregulated	2.53E-06	0.000836647
DHRS7	Downregulated	5.65E-06	0.001594068
OSBPL5	Downregulated	5.79E-06	0.001606709
TBC1D2B	Downregulated	5.98E-06	0.001618293
TMEM71	Downregulated	7.79E-06	0.001889662
ARL8B	Downregulated	7.90E-06	0.001889662
ARHGEF3	Downregulated	8.10E-06	0.001925156
HS.569162	Downregulated	9.72E-06	0.002248058
ZFAND2B	Downregulated	1.14E-05	0.002544035
PIP4K2A	Downregulated	1.43E-05	0.003062939
LOC643035	Downregulated	1.69E-05	0.003458364
C20ORF100	Downregulated	1.72E-05	0.003466129
CAPG	Downregulated	1.93E-05	0.003758139
TRPV2	Downregulated	1.94E-05	0.003761128

SIGIRR	Downregulated	2.22E-05	0.004126678
UBL7	Downregulated	2.40E-05	0.004351804
ANKRD33	Downregulated	2.54E-05	0.004511105
CTSD	Downregulated	2.71E-05	0.004664718
COMMD1	Downregulated	3.40E-05	0.005456284
LOC100130291	Downregulated	4.01E-05	0.006100822
SLC9A3R1	Downregulated	4.11E-05	0.006147663
PFKP	Downregulated	4.16E-05	0.006194037
RAB37	Downregulated	4.42E-05	0.006441318
NCRNA00152	Downregulated	4.47E-05	0.006490674
LOC728969	Downregulated	4.49E-05	0.006496993
CD96	Downregulated	4.57E-05	0.006577918
NUDT2	Downregulated	4.72E-05	0.006703517
HS.57079	Downregulated	5.72E-05	0.007847191
SRD5A3	Downregulated	5.89E-05	0.007920798
CSGALNACT2	Downregulated	5.93E-05	0.007920798
ICAM2	Downregulated	6.13E-05	0.008031425
FAH	Downregulated	6.42E-05	0.00824887
HCST	Downregulated	6.78E-05	0.00860183
PLEKHA9	Downregulated	6.79E-05	0.00860183
LOC100127983	Downregulated	6.87E-05	0.008616344
LDOC1L	Downregulated	6.92E-05	0.008634214
KIAA0182	Downregulated	7.20E-05	0.008919127
MINPP1	Downregulated	7.49E-05	0.009252712
FDFT1	Downregulated	8.42E-05	0.010034022
PXMP3	Downregulated	8.70E-05	0.010300337
PTTG1IP	Downregulated	9.27E-05	0.010886402
FAS	Downregulated	0.000103351	0.011812466
ARL4C	Downregulated	0.000103505	0.011812466
ANXA1	Downregulated	0.000106635	0.01196698
CPT1A	Downregulated	0.000107618	0.01196698
SQLE	Downregulated	0.000111049	0.012269841
KCNK17	Downregulated	0.000123944	0.013271936
SLC11A2	Downregulated	0.000143851	0.014897824
SEMA4D	Downregulated	0.000152437	0.015558398
IL27RA	Downregulated	0.000152472	0.015558398
LOC648189	Downregulated	0.000161031	0.016235814
NSMAF	Downregulated	0.00016145	0.016235814
TBXAS1	Downregulated	0.000168402	0.016740776
TESC	Downregulated	0.000170917	0.016912285
TMEM170B	Downregulated	0.000174864	0.017089429
CD84	Downregulated	0.000178785	0.017329084
MYO1G	Downregulated	0.000179364	0.017329084
HINT2	Downregulated	0.000179814	0.017329084

ITGAL	Downregulated	0.000189584	0.01788126
SLC35C2	Downregulated	0.00019739	0.018463162
LOC646674	Downregulated	0.000198242	0.018463162
ATP1B1	Downregulated	0.000198259	0.018463162
SYNJ2	Downregulated	0.0001985	0.018463162
TOX2	Downregulated	0.000210802	0.019246265
SLA	Downregulated	0.000221429	0.019921121
LOC731042	Downregulated	0.00024944	0.021420992
SEPW1	Downregulated	0.000251421	0.021436248
SYNC1	Downregulated	0.000259115	0.021872798
LDHA	Downregulated	0.000260444	0.021931623
SLC45A4	Downregulated	0.000261584	0.021974294
LOC653752	Downregulated	0.000265891	0.022067213
AADAT	Downregulated	0.000267163	0.022067213
IPP	Downregulated	0.000283531	0.022870054
SSBP3	Downregulated	0.00030249	0.023871345
DNMT3B	Downregulated	0.000303889	0.023871345
TM2D3	Downregulated	0.000312828	0.024225998
SLC25A20	Downregulated	0.000323563	0.024718689
LOC642513	Downregulated	0.000330382	0.025081584
LOC100130503	Downregulated	0.000331867	0.02513926
FLJ45337	Downregulated	0.000336462	0.025266722
KLHL23	Downregulated	0.000345136	0.025695629
IRX5	Downregulated	0.000369223	0.026854971
IQGAP2	Downregulated	0.000373058	0.026964332
FHOD1	Downregulated	0.000388577	0.027774751
CD7	Downregulated	0.0003961	0.028218284
KIAA1797	Downregulated	0.00039784	0.028282742
C9ORF142	Downregulated	0.000407872	0.028761578
HEG1	Downregulated	0.000414831	0.029075078

Top 100 up- and down-regulated genes (T-ALL specific): calculated with LimmaGP. Selection criteria: *P* value less than 0.05 and FDR less than 0.05

Gene ID	Expression	Unadjusted p-value from moderated t-test	FDR(BH)
CD3D	Upregulated	4.39E-43	1.52E-38
SH2D1A	Upregulated	7.67E-26	4.44E-22
TRAT1	Upregulated	2.01E-24	6.34E-21
CD3G	Upregulated	2.01E-23	5.15E-20
CD3E	Upregulated	5.14E-21	9.54E-18
RAB32	Upregulated	9.23E-21	1.60E-17
ITM2A	Upregulated	1.04E-18	1.33E-15
HS.554324	Upregulated	1.48E-18	1.84E-15
ITK	Upregulated	7.72E-18	8.64E-15
BCL11B	Upregulated	1.11E-17	1.16E-14
CD247	Upregulated	1.57E-17	1.56E-14
CD2	Upregulated	2.53E-17	2.31E-14
HS.572649	Upregulated	2.94E-17	2.55E-14
UBASH3A	Upregulated	3.10E-17	2.62E-14
MAL	Upregulated	3.89E-17	3.22E-14
PRTFDC1	Upregulated	7.32E-17	5.65E-14
GRAP2	Upregulated	1.58E-16	1.17E-13
LAT	Upregulated	1.97E-16	1.43E-13
SRPK2	Upregulated	4.46E-16	3.04E-13
KIAA0748	Upregulated	1.02E-15	6.31E-13
CAMK4	Upregulated	1.25E-15	7.46E-13
PLS1	Upregulated	2.02E-15	1.19E-12
BIVM	Upregulated	2.32E-15	1.34E-12
NGFRAP1	Upregulated	5.89E-15	3.30E-12
MKRN3	Upregulated	7.68E-15	4.17E-12
TOX	Upregulated	1.62E-14	8.14E-12
HHIP	Upregulated	1.71E-14	8.50E-12
HNRPLL	Upregulated	2.62E-14	1.25E-11
PRKCQ	Upregulated	4.52E-14	2.09E-11
HS.520349	Upregulated	5.94E-14	2.63E-11
CLIP4	Upregulated	6.00E-14	2.63E-11
RGL4	Upregulated	6.57E-14	2.81E-11
LOC439949	Upregulated	6.96E-14	2.94E-11
HS.46689	Upregulated	7.43E-14	3.11E-11
LCK	Upregulated	1.09E-13	4.41E-11
SERPINA10	Upregulated	2.62E-13	9.55E-11
SLAMF6	Upregulated	2.85E-13	1.02E-10
ANKRD20A1	Upregulated	3.78E-13	1.33E-10
NCK1	Upregulated	3.94E-13	1.37E-10
CD5	Upregulated	4.36E-13	1.47E-10

SLA2	Upregulated	5.22E-13	1.72E-10
CYP4F2	Upregulated	5.63E-13	1.83E-10
ACPL2	Upregulated	5.69E-13	1.83E-10
AKR1C4	Upregulated	7.57E-13	2.37E-10
LOC646576	Upregulated	8.12E-13	2.51E-10
DNASE2	Upregulated	9.30E-13	2.76E-10
LOC728431	Upregulated	1.17E-12	3.35E-10
CDRT4	Upregulated	1.17E-12	3.35E-10
LOC346887	Upregulated	1.59E-12	4.42E-10
TMIGD2	Upregulated	2.16E-12	5.80E-10
FZD6	Upregulated	2.66E-12	6.90E-10
TFDP2	Upregulated	2.93E-12	7.42E-10
HS.372654	Upregulated	3.06E-12	7.70E-10
JAM3	Upregulated	3.76E-12	9.27E-10
ENPP4	Upregulated	5.11E-12	1.23E-09
DTX3	Upregulated	8.06E-12	1.90E-09
CD7	Upregulated	8.37E-12	1.95E-09
FRMD6	Upregulated	9.64E-12	2.22E-09
GIMAP7	Upregulated	2.20E-11	4.70E-09
FHL2	Upregulated	2.70E-11	5.76E-09
SLC4A8	Upregulated	2.78E-11	5.81E-09
HS.511723	Upregulated	2.79E-11	5.81E-09
C14ORF135	Upregulated	2.80E-11	5.81E-09
FAM102A	Upregulated	2.89E-11	5.96E-09
LCMT1	Upregulated	2.99E-11	6.13E-09
USP44	Upregulated	3.41E-11	6.91E-09
RTBDN	Upregulated	3.89E-11	7.71E-09
HEMGN	Upregulated	4.27E-11	8.42E-09
AKR1C3	Upregulated	4.53E-11	8.69E-09
CD28	Upregulated	4.88E-11	9.20E-09
ZEB1	Upregulated	5.64E-11	1.05E-08
TSHR	Upregulated	5.80E-11	1.08E-08
IL27RA	Upregulated	6.24E-11	1.15E-08
NDST3	Upregulated	6.27E-11	1.15E-08
AZI2	Upregulated	6.58E-11	1.19E-08
PTPN22	Upregulated	6.78E-11	1.22E-08
NEIL3	Upregulated	7.39E-11	1.31E-08
EXTL2	Upregulated	7.83E-11	1.38E-08
LOC220930	Upregulated	8.33E-11	1.45E-08
ZNF167	Upregulated	9.64E-11	1.62E-08
CDH2	Upregulated	9.88E-11	1.66E-08
LOC729776	Upregulated	1.06E-10	1.72E-08
GATA3	Upregulated	1.10E-10	1.77E-08
S1PR1	Upregulated	1.12E-10	1.78E-08

C9ORF78	Upregulated	1.14E-10	1.80E-08
LANCL1	Upregulated	1.24E-10	1.92E-08
WBP5	Upregulated	1.32E-10	2.04E-08
ETS1	Upregulated	1.56E-10	2.39E-08
PHOSPHO2	Upregulated	1.58E-10	2.39E-08
C21ORF81	Upregulated	1.58E-10	2.39E-08
ELOVL5	Upregulated	1.60E-10	2.40E-08
TCF7	Upregulated	1.60E-10	2.40E-08
MGC26718	Upregulated	1.60E-10	2.40E-08
GALNT6	Upregulated	1.68E-10	2.49E-08
DSTN	Upregulated	1.70E-10	2.50E-08
ABCD3	Upregulated	1.76E-10	2.56E-08
PAQR3	Upregulated	1.78E-10	2.58E-08
MLLT11	Upregulated	1.78E-10	2.58E-08
ICOS	Upregulated	1.81E-10	2.60E-08
KCNK5	Upregulated	1.82E-10	2.61E-08
GIMAP6	Upregulated	1.87E-10	2.67E-08
HLA-DRA	Downregulated	4.61E-31	8.00E-27
LOC730415	Downregulated	1.21E-29	1.40E-25
HLA-DOA	Downregulated	3.52E-29	3.05E-25
HLA-DPA1	Downregulated	7.18E-28	4.98E-24
HLA-DRB6	Downregulated	9.53E-26	4.73E-22
HLX	Downregulated	1.23E-25	5.32E-22
HLA-DRB4	Downregulated	3.64E-25	1.40E-21
HLA-DMB	Downregulated	5.11E-25	1.77E-21
CD74	Downregulated	5.45E-24	1.58E-20
TCL1A	Downregulated	2.08E-23	5.15E-20
HLA-DMA	Downregulated	3.24E-23	7.50E-20
CD19	Downregulated	2.82E-21	6.11E-18
CIITA	Downregulated	4.32E-21	8.81E-18
ZNF296	Downregulated	5.23E-21	9.54E-18
UNC93B1	Downregulated	7.13E-20	1.18E-16
LOC100133583	Downregulated	2.40E-19	3.79E-16
EBF1	Downregulated	3.93E-19	5.93E-16
LOC643384	Downregulated	4.17E-19	6.03E-16
LRRK1	Downregulated	6.93E-19	9.62E-16
IL1B	Downregulated	7.52E-19	1.00E-15
HLA-DPB1	Downregulated	2.22E-18	2.65E-15
LOC642073	Downregulated	2.84E-18	3.29E-15
ADCY9	Downregulated	8.46E-18	9.17E-15
LILRB2	Downregulated	1.24E-17	1.26E-14
BANK1	Downregulated	1.67E-17	1.61E-14
SNX2	Downregulated	2.20E-17	2.06E-14
LOC100133678	Downregulated	2.62E-17	2.33E-14

HLA-DQA1	Downregulated	4.46E-17	3.59E-14
PTK2	Downregulated	5.28E-17	4.17E-14
RHBDF2	Downregulated	8.26E-17	6.23E-14
BTK	Downregulated	2.59E-16	1.83E-13
P4HA2	Downregulated	4.07E-16	2.83E-13
MEF2C	Downregulated	8.00E-16	5.34E-13
SLC2A5	Downregulated	8.28E-16	5.42E-13
LOC283340	Downregulated	9.64E-16	6.19E-13
CIDEB	Downregulated	9.90E-16	6.24E-13
LOC285296	Downregulated	1.19E-15	7.22E-13
GPRIN1	Downregulated	4.01E-15	2.28E-12
C17ORF60	Downregulated	6.06E-15	3.34E-12
VPREB3	Downregulated	8.40E-15	4.49E-12
PARP1	Downregulated	1.09E-14	5.74E-12
CHST15	Downregulated	1.23E-14	6.39E-12
PFTK1	Downregulated	1.60E-14	8.14E-12
PLXNB2	Downregulated	1.79E-14	8.75E-12
KLHL22	Downregulated	1.86E-14	8.95E-12
IRF8	Downregulated	4.41E-14	2.07E-11
LOC100130458	Downregulated	5.26E-14	2.40E-11
CD72	Downregulated	5.59E-14	2.52E-11
GPR132	Downregulated	6.09E-14	2.64E-11
FAM129C	Downregulated	8.26E-14	3.41E-11
SLC7A7	Downregulated	9.87E-14	4.03E-11
LILRA2	Downregulated	1.18E-13	4.69E-11
LY86	Downregulated	1.30E-13	5.12E-11
NUDT16	Downregulated	1.62E-13	6.32E-11
PRDX1	Downregulated	1.66E-13	6.39E-11
OTUD1	Downregulated	1.73E-13	6.59E-11
CD79B	Downregulated	1.84E-13	6.94E-11
ZEB2	Downregulated	2.05E-13	7.65E-11
LOC440864	Downregulated	2.61E-13	9.55E-11
PAOX	Downregulated	2.75E-13	9.93E-11
CCDC81	Downregulated	3.66E-13	1.30E-10
CTGF	Downregulated	4.16E-13	1.43E-10
MAP3K5	Downregulated	4.25E-13	1.44E-10
PIK3AP1	Downregulated	4.97E-13	1.66E-10
ADAM15	Downregulated	5.24E-13	1.72E-10
C13ORF1	Downregulated	5.99E-13	1.91E-10
WDFY4	Downregulated	6.19E-13	1.95E-10
LOC441481	Downregulated	8.17E-13	2.51E-10
SCARB1	Downregulated	8.58E-13	2.61E-10
ARSD	Downregulated	9.06E-13	2.73E-10
LOC255620	Downregulated	9.20E-13	2.75E-10

MKNK2	Downregulated	9.68E-13	2.85E-10
GPX1	Downregulated	1.17E-12	3.35E-10
LRRC8C	Downregulated	1.19E-12	3.39E-10
PTK2B	Downregulated	1.41E-12	3.99E-10
CLECL1	Downregulated	1.54E-12	4.31E-10
SPI1	Downregulated	1.63E-12	4.50E-10
TBC1D14	Downregulated	1.65E-12	4.52E-10
ADAP2	Downregulated	1.96E-12	5.32E-10
LOC144481	Downregulated	2.18E-12	5.80E-10
C6ORF150	Downregulated	2.23E-12	5.91E-10
PLD6	Downregulated	2.48E-12	6.52E-10
GALNT14	Downregulated	2.67E-12	6.90E-10
SLC27A3	Downregulated	2.69E-12	6.90E-10
HS.568329	Downregulated	2.85E-12	7.28E-10
DENND3	Downregulated	3.70E-12	9.24E-10
KMO	Downregulated	3.77E-12	9.27E-10
DGKD	Downregulated	3.87E-12	9.46E-10
LOC100129034	Downregulated	4.18E-12	1.01E-09
BVES	Downregulated	5.36E-12	1.28E-09
CDYL	Downregulated	7.76E-12	1.85E-09
TOP2B	Downregulated	8.33E-12	1.95E-09
C7ORF23	Downregulated	9.68E-12	2.22E-09
CAP2	Downregulated	1.02E-11	2.34E-09
RPS6KA1	Downregulated	1.19E-11	2.71E-09
TLR6	Downregulated	1.24E-11	2.80E-09
CTNNA1	Downregulated	1.26E-11	2.82E-09
BCAS4	Downregulated	1.30E-11	2.88E-09
CSRP2	Downregulated	1.35E-11	2.99E-09
PHLPP1	Downregulated	1.51E-11	3.32E-09
HBEGF	Downregulated	1.54E-11	3.37E-09

Supplementary Table S4. Gene Set Enrichment Analysis (GSEA) of subtype specific genes

Top 30 genesets for MLL-ALL as analysed by GSEA

NAME	SIZE	Enrichment Score	Normalised Enrichment Score	FDR q-val
ROSS_LEUKEMIA_WITH_MLL_FUSIONS	75	-0.807	-3.322	0.000
MULLIGHAN_MLL_SIGNATURE_2_UP	392	-0.655	-3.316	0.000
MULLIGHAN_MLL_SIGNATURE_1_UP	359	-0.669	-3.290	0.000
ROSS_AML_WITH_MLL_FUSIONS	77	-0.743	-3.051	0.000
VERHAAK_GLIOMASTOMA_NEURAL	207	-0.554	-2.692	0.000
DIAZ_CHRONIC_MEYLOGENOUS_LEUKEMIA_DN	116	-0.596	-2.638	0.000
GAURNIER_PSMD4_TARGETS	73	-0.666	-2.597	0.000
MORI_IMMATURE_B_LYMPHOCYTE_UP	50	-0.703	-2.593	0.000
BASSO_CD40_SIGNALING_UP	101	-0.609	-2.590	0.000
VALK_AML_CLUSTER_15	30	-0.745	-2.577	0.000
GESERICK_TERT_TARGETS_DN	20	-0.838	-2.560	0.000
MARTENS_BOUND_BY_PML_RARA_FUSION	428	-0.504	-2.550	0.000
HADDAD_T_LYMPHOCYTE_AND_NK_PROGENITOR_DN	63	-0.633	-2.548	0.000
DIRMEIER_LMP1_RESPONSE_LATE_UP	55	-0.648	-2.533	0.000
VALK_AML_CLUSTER_5	32	-0.718	-2.527	0.000
LI_INDUCED_T_TO_NATURAL_KILLER_UP	290	-0.522	-2.509	0.000
ZHANG_TLX_TARGETS_DN	106	-0.566	-2.504	0.000
MCLACHLAN_DENTAL_CARIES_UP	235	-0.529	-2.491	0.000
RUTELLA_RESPONSE_TO_CSF2RB_AND_IL4_DN	299	-0.505	-2.468	0.000
VERHAAK_AML_WITH_NPM1_MUTATED_UP	180	-0.523	-2.455	0.000
AMIT_SERUM_RESPONSE_40_MCF10A	31	-0.692	-2.431	0.000
DIRMEIER_LMP1_RESPONSE_EARLY	66	-0.627	-2.427	0.000
RUTELLA_RESPONSE_TO_HGF_VS_CSF2RB_AND_IL4_UP	392	-0.466	-2.415	0.000
PID_BCR_5PATHWAY	65	-0.628	-2.392	0.000
ZHANG_TLX_TARGETS_36HR_UP	215	-0.497	-2.386	0.000
GOLUB_ALL_VS_AML_DN	24	-0.777	-2.384	0.000
PID_AVB3_OPN_PATHWAY	31	-0.718	-2.382	0.000
UZONYI_RESPONSE_TO_LEUKOTRIENE_AND_THROMBIN	37	-0.664	-2.379	0.000
HAHTOLA_MYCOSIS_FUNGOIDES_CD4_UP	64	-0.624	-2.374	0.000

Top 30 genesets for BCP-ALL as analysed by GSEA

NAME	SIZE	Enrichment Score	Normalised Enrichment Score	FDR q-val
HADDAD_B_LYMPHOCYTE_PROGENITOR	271	-0.722	-3.522	0.000
ROSS_AML_WITH_AML1_ETO_FUSION	71	-0.620	-2.552	0.000
KEGG_LEISHMANIA_INFECTION	70	-0.646	-2.526	0.000
BOQUEST_STEM_CELL_DN	207	-0.528	-2.391	0.000
ROSS_ACUTE_MYELOID_LEUKEMIA_CBF	77	-0.611	-2.377	0.000
SANA_RESPONSE_TO_IFNG_UP	74	-0.576	-2.336	0.000
ZHAN_MULTIPLE_MYELOMA_CD2_UP	44	-0.646	-2.334	0.000
GRAHAM_CML QUIESCENT_VS_NORMAL QUIESCENT_DN	47	-0.660	-2.328	0.000
KLEIN_PRIMARY EFFUSION_LYMPHOMA_DN	57	-0.657	-2.303	0.000
MORI_PLASMA_CELL_DN	30	-0.711	-2.298	0.000
KIM_LRRC3B_TARGETS	30	-0.704	-2.288	0.000
KEGG_ALLOGRAFT_REJECTION	38	-0.645	-2.277	0.000
SIG_PIP3_SIGNALING_IN_B_LYMPHOCYTES	36	-0.663	-2.274	0.000
PID_RET_PATHWAY	39	-0.615	-2.254	0.000
BASSO_CD40_SIGNALING_UP	101	-0.535	-2.249	0.000
KEGG_ANTIGEN_PROCESSING_AND_PRESENTATION	89	-0.577	-2.239	0.000
REACTOME_RNA_POL_I_PROMOTER_OPENING	59	-0.595	-2.230	0.000
KEGG_GRAFT_VERSUS_HOST_DISEASE	42	-0.641	-2.229	0.000
ROYLANCE_BREAST_CANCER_16Q_COPY_NUMBER_UP	53	-0.603	-2.224	0.001
KEGG_TYPE_I_DIABETES_MELLITUS	44	-0.640	-2.208	0.001
KEGG_AUTOIMMUNE_THYROID_DISEASE	53	-0.553	-2.166	0.001
PID_BCR_5PATHWAY	65	-0.559	-2.150	0.001
REACTOME_MEIOTIC_SYNAPSIS	72	-0.523	-2.150	0.001
BASSO_CD40_SIGNALING_DN	65	-0.561	-2.150	0.001
REACTOME_INTERFERON_GAMMA_SIGNALING	62	-0.558	-2.139	0.001
GAURNIER_PSMD4_TARGETS	73	-0.551	-2.134	0.001
HAHTOLA_MYCOSIS_FUNGOIDES_CD4_UP	64	-0.553	-2.131	0.001
SIG_CD40PATHWAYMAP	33	-0.643	-2.130	0.001
BOYLAN_MULTIPLE_MYELOMA_PCA3_DN	66	-0.543	-2.124	0.001

Top 30 genesets for T-ALL as analysed by GSEA

NAME	SIZE	Enrichment Score	Normalised Enrichment Score	FDR q-val
LEE_DIFFERENTIATING_T_LYMPHOCYTE	180	-0.663	-2.825	0.000
BIOCARTA_STATHMIN_PATHWAY	18	-0.892	-2.630	0.000
PID_CD8TCRDOWNSTREAMPATHWAY	65	-0.694	-2.600	0.000
PUJANA_BRCA2_PCC_NETWORK	406	-0.561	-2.533	0.003
PID_CD8TCRPATHWAY	53	-0.733	-2.478	0.007
FIGUEROA_AML_METHYLATION_CLUSTER_5_DN	47	-0.699	-2.472	0.006
ST_T_CELL_SIGNAL_TRANSDUCTION	44	-0.710	-2.469	0.005
PID_TCR_PATHWAY	66	-0.627	-2.468	0.004
KEGG_T_CELL_RECEPTOR_SIGNALING_PATHWAY	108	-0.610	-2.462	0.004
FARMER_BREAST_CANCER_CLUSTER_1	39	-0.807	-2.458	0.004
HERNANDEZ_MITOTIC_ARREST_BY_DOCETAXEL_2_UP	61	-0.673	-2.440	0.006
BIOCARTA_NO2IL12_PATHWAY	17	-0.912	-2.396	0.009
BIOCARTA_IL12_PATHWAY	21	-0.874	-2.395	0.008
MOREIRA_RESPONSE_TO_TSA_DN	18	-0.900	-2.374	0.010
FIGUEROA_AML_METHYLATION_CLUSTER_6_DN	36	-0.741	-2.351	0.012
VILIMAS_NOTCH1_TARGETS_UP	52	-0.698	-2.336	0.015
BIOCARTA_TOB1_PATHWAY	19	-0.830	-2.336	0.014
BIOCARTA_IL17_PATHWAY	15	-0.949	-2.325	0.014
HERNANDEZ_ABERRANT_MITOSIS_BY_DOCETACEL_2NM_UP	76	-0.621	-2.283	0.021
REACTOME_GENERATION_OF_SECOND_MESSENGER_MOLECULES	27	-0.723	-2.268	0.023
BIOCARTA_TCR_PATHWAY	44	-0.691	-2.267	0.022
LI_INDUCED_T_TO_NATURAL_KILLER_DN	112	-0.557	-2.248	0.024
SCHMIDT_POR_TARGETS_IN_LIMB_BUD_UP	25	-0.760	-2.210	0.030
BOYLAN_MULTIPLE_MYELOMA_C_D_DN	241	-0.490	-2.198	0.031
SHIPP_DLBCL_VS_FOLLICULAR_LYMPHOMA_DN	43	-0.670	-2.196	0.030
MULLIGHAN_MLL_SIGNATURE_1_DN	231	-0.480	-2.182	0.030
REACTOME_CHOLESTEROL_BIOSYNTHESIS	23	-0.709	-2.169	0.031
JAATINEN_HEMATOPOIETIC_STEM_CELL_DN	212	-0.507	-2.149	0.033
SASAKI_ADULT_T_CELL_LEUKEMIA	170	-0.499	-2.142	0.032