Supplement 1. 281 genes associated with lymphoid and myeloid malignant diseases tested by sequencing from bone marrow mononuclear cells.

NFKBIA, NFKBIE, NOTCH1, NOTCH2, NOTCH3, NOTCH4, NPM1, NRAS, NT5C2, NTRK1, P2RY8, PALB2, PAX5, PDGFRA, PDGFRB, PDS5B, PHF6, PIGA, PIK3CA, PIK3CD, PIK3R1, PIM1, PIM2, PLCG1, PLCG2, PML, POT1, PPM1D, PRDM1, PRF1, PRKCB, PRKD2, PRKDC, PRPF8, PRPS1, PSMB5, PTEN, PTPN1, PTPN11, PTPRD, RAD21, RAF1, RASA2, RB1, RBBP6, RELN, RET, RHOA, RPL10, RRAGC, RUNX1, SAMHD1, SBDS, SETBP1, SETD1B, SETD2, SETDB1, SF1, SF3B1, SGK1, SH2B3, SH2D1A, SMARCA4, SMC1A, SMC3, SMO, SOCS1, SP140, SPEN, SRP72, SRSF2, STAG2, STAT3, STAT5B, STAT6, SUFU, SUZ12, SYK, TAL1, TBL1XR1, TCF3, TERC, TERT, TET1, TET2, TMEM30A, TMSB4X, TNFAIP3, TNFRSF14, TOX, TP53, TPMT, TRAF2, TRAF3, U2AF1, UBE2A, UBR5, USP7, VAV1, VHL, WHSC1, WT1, XBP1, XPO1, ZAP70, ZBTB7A, ZFP36L1, ZMYM3, ZNF292, ZRSR2, ABCB1, ABL1, AKT1, ALK, ANKRD26, APC, ARAF, ARID1A, ARID1B, ARID2, ARID5B, ASXL1, ASXL2, ATG2B, ATM, ATRX, B2M, BACH2, BCL10, BCL2, BCL6, BCL7A, BCOR, BCORL1, BIRC3, BLM, BPGM, BRAF, BRCA1, BRCA2, BRIP1, BTG1, BTG2, BTK, CALR, CARD11, CBL, CBLB, CBLC, CCND1, CCND3, CCR4, CD28, CD58, CD79A, CD79B, CDC25C, CDKN1A, CDKN1B, CDKN2A, CDKN2B, CDKN2C, CEBPA, CHD2, CHD8, CIITA, CNOT3, CREBBP, CRLF2, CSF1R, CSF3R, CSMD1, CSNK1A1, CTCF, CUX1, CXCR4, CYLD, DDR2, DDX3X, DDX41, DIS3, DKC1, DNM2, DNMT3A, DNMT3B, DTX1, DUSP2, EBF1, EED, EGFR, EGLN1, EGR1, ELANE, EP300, EPHA7, EPOR, ERBB2, ERBB3, ETNK1, ETV6, EZH2, FAM46C, FAS, FAT1,

FAT4, FBXO11, FBXW7, FGFR1, FGFR2, FGFR3, FLT3, FOXO1, FYN, G6PD, GAB2, GATA1, GATA2, GATA3, GFI1, GNA13, GNAI2, GNAS, GNB1, GSKIP, HAX1, HIST1H1B, HIST1H1C, HIST1H1D, HIST1H1E, HNRNPK, HRAS, HUWE1, HVCN1, ID3, IDH1, IDH2, IGLL5, IKZF1, IKZF2, IKZF3, IL7R, IRF2BP2, IRF4, IRF8, ITPKB, JAK1, JAK2, JAK3, JUNB, KDM6A, KIT, KLF2, KLHL6, KMT2A, KMT2B, KMT2C, KMT2D, KRAS, KRT20, LCOR, LMO2, LTB, LYN, MAP2K1, MAP3K1, MAP3K14, MAPK1, MAX, MCL1, MED12, MEF2B, MET, MFHAS1, MPL, MTOR, MYC, MYCN, MYD88, MYOM2, NF1, NFE2.

Supplement 2. 56 fusion genes and over-expressed genes about acute leukemia tested by RT-PCR from bone marrow mononuclear cells.

BCR-ABL1 P210, BCR-ABL1 P190, BCR-ABL1 P230, PML-RARA L (bcr-1), PML-RARA V(bcr-2), PML-RARA S (bcr-3), BCR/PDGFRA, CDK5RAP2/PDGFRA, ETV6-PDGFRA, FIP1L1-PDGFRA, KIF5BE/PDGFRA, STRNE6/PDGFRA, TEL/PDGFRB, AML1-ETO, CBFβ-MYH11, PRKAR1A-RARα, NUMA1-RARα, FIP1L1-RARα, STAT5b-RARα, PLZF-RARα, NPM1/RARα, DEK-CAN, SET-CAN, AML1-MDS1/EVI1, AML1-MTG16, NPM1/MLF1, TEL-AML1, TCF3-PBX1, TCF3-HLF, MLL/AF4, MLL-AF5, MLL/AF6, MLL/AF9, MLL/AF10, MLL-AF17, MLL/ENL, MLL/ELL, MLL-AFX, MLL/AF1q, MLL/AF1p, MLL/SEPT6, ETV6/JAK2, ETV6/ABL1, SIL-TAL1, CALM/AF10, TLS/ERG, HLXB9/ETV6, NUP98-PMX1, NUP98-HoxA9, NUP98-HoxA11, NUP98-HoxA13, NUP98-HoxC11, NUP98-HoxD13, WT1, HOX11, HOX11L2

Supplement 3. The newly-discovered fusion genes tested by RNA sequencing from bone marrow mononuclear cells.

ACBD6-RRP15, ACSL3-ETV1, ACTB-GLI1, AGPAT5-MCPH1, AGTRAP-BRAF,ATIC-ALK, BBS9-PKD1L1, BCR-ABL, BCR-ABL1, BCR-JAK2,CANT1-ETV4, CARS-ALK, CBFA2T3-GLIS2, CBFB-MYH11, CCDC6-RET,CDH11-USP6, CDKN2D-WDFY2, CENPK-KMT2A, CEP89-BRAF, CHCHD7-PLAG1,CLCN6-BRAF, CLIP1-ROS1, CLTC-ALK, CLTC-TFE3, CNBP-USP6,COL1A2-PLAG1, CRTC1-MAML2, CRTC3-MAML2, CTAGE5-GEMIN2, CTNNB1-PLAG1,DEK-CAN, DHH-RHEBL1, DNAJB1-PRKACA, EIF3E-RSPO2, EIF3K-CYP39A1,ERC1-RET, ERC1-ROS1, ERO1A-FERMT2, ESRP1-RAF1, ETV6-ABL1,ETV6-NTRK3, ETV6-PDGFRA, ETV6-PDGFRB, ETV6-RUNX1, EWSR1-ATF1,EWSR1-ERG, EWSR1-ETV1, EWSR1-ETV4, EWSR1-FEV, EWSR1-FLI1, EWSR1-NFATC2, EWSR1-NR4A3, EWSR1-PATZ1, EWSR1-PBX1, EWSR1-POU5F1, EWSR1-WT1, EWSR1-YY1, EWSR1-ZNF384, EWSR1-ZNF444, EZR-ERBB4, FBXL18-RNF216, FCHSD1-BRAF, FGFR1-PLAG1, FGFR1-TACC1, FGFR1-ZNF703, FIP1L1-PDGFRA, FIP1L1-RARA, FN1-ALK, FUS-ATF1, FUS-CREB3L1, FUS-ERG, FUS-FEV, GATM-BRAF, GMDS-PDE8B, GNAI1-BRAF, GPBP1L1-MAST2, HACL1-RAF1, HAS2-PLAG1, HERPUD1-BRAF, HEY1-NCOA2, HMGA2-ALDH2, HMGA2-CCNB1IP1, HMGA2-COX6C, HMGA2-EBF1, HMGA2-FHIT, HMGA2-NFIB, HMGA2-RAD51B, HMGA2-WIF1, HNRNPA2B1-ETV1, HOOK3-RET, IRF2BP2-CDX1, JAZF1-PHF1, JAZF1-SUZ12, JPT1-USH1G, KIF5B-ALK, KLK2-ETV1, KLK2-ETV4, KMT2A-ABI1,

KMT2A-ABI2, KMT2A-ACTN4, KMT2A-EPS15, KMT2A-MLLT11, KMT2A-AFF1, KMT2A-AFDN, KMT2A-MLLT3, KMT2A-AFX, KMT2A-ARHGAP26, KMT2A-ARHGEF12, KMT2A-BTBD18, KMT2A-CBL, KMT2A-CREBBP, KMT2A-CT45A2, KMT2A-DAB2IP, KMT2A-EEFSEC, KMT2A-ELL, KMT2A-FOXO3, KMT2A-FOXO4, KMT2A-FRYL, KMT2A-GAS7, KMT2A-GMPS, KMT2A-KMT2AT10, KMT2A-KMT2AT11, KMT2A-KMT2AT3, KMT2A-KMT2AT6, KMT2A-KNL1, KMT2A-MAPRE1, KMT2A-MYO1F, KMT2A-NCKIPSD, KMT2A-NRIP3, KMT2A-PDS5A, KMT2A-PTD, KMT2A-SARNP, KMT2A-SEPT2, KMT2A-SEPT5, KMT2A-SEPT6, KMT2A-SORBS2, KMT2A-TET1, KMT2A-TOP3A, KMT2A-ZFYVE19, KTN1-RET, LRIG3-ROS1, LSM14A-BRAF, MBOAT2-PRKCE, MBTD1-CXorf67, MEAF6-PHF1, MEF2D-DAZAP1, MEF2D-FOXJ2, MEF2D-HNRNPUL1, MEF2D-SS18, MKRN1-BRAF, MYB-NFIB, MYO5A-ROS1, NAB2-STAT6, NACC2-NTRK2, NCOA4-RET, NFIA-EHF, NFIX-MAST1, NONO-TFE3, NOTCH1-GABBR2, NPM1-ALK, NPM-RARA, NTN1-ACLY, NUMA1-RARA, NUP107-LGR5, NUP214-ABL1, NUP98-HOXA13, NUP98-HOXA9, NUP98-HOXC11, NUP98-HOXD13, NUP98-KDM5A, P2RY8-CRLF2, PAX3-FOXO1, PAX3-NCOA1, PAX3-NCOA2, PAX5-JAK2, PAX8-PPARG, PCM1-JAK2, PCM1-RET, PLA2R1-RBMS1, PLXND1-TMCC1, PPFIBP1-ALK, PPFIBP1-ROS1, PRCC-TFE3, PRKAR1A-RARA, PRKAR1A-RET, QKI-NTRK2, RAF1-DAZL, RANBP2-ALK, RBM14-PACS1, RBM15-MKL1, RGS22-SYCP1, RNF130-BRAF, RPN1-EVI1, RUNX1-MDS1, RUNX1-MTG16, SEC16A-NOTCH1, SEC31A-ALK, SEC31A-JAK2, SEPT8-AFF4, SET-CAN, SHTN1-ROS1, SIL-TAL1, SLC22A1-CUTA, SLC26A6-PRKAR2A, SLC34A2-ROS1, SLC45A3-ELK4, SLC45A3-

ERG, SLC45A3-ETV1, SLC45A3-ETV5, SND1-BRAF, SS18L1-SSX1, SS18-SSX1, SS18-SSX2, SS18-SSX4, SS18-USP6, SSH2-SUZ12, STAT5B-RARA, STIL-TAL1, STRN-ALK, SUSD1-PTBP3, TBL1XR1-TP63, TCEA1-PLAG1, TCF12-NR4A3, TCF3-HLF, TCF3-PBX1, TEL-JAK2, TEL-PDGFRB, TEL-RUNX1, TFG-ALK, TFG-NR4A3, TLS-ERG, TMPRSS2-ETV1, TMPRSS2-ETV4, TMPRSS2-ETV5, TP53-NTRK1, TPM3-ROS1, TPM4-ALK, TPR-ALK, TPR-NTRK1, TRIM24-BRAF, TRIM33-RET, UBE2L3-KRAS, VCL-ALK, VTI1A-TCF7L2, WDCP-ALK, ZC3H7B-BCOR, ZCCHC8-ROS1, ZNF384-ARID1B, ZNF384-BMP2K, ZNF384-CREBBP, ZNF384-SYNRG, ZNF384-TAF15, ZNF384-TCF3, ZNF700-MAST1, ZSCAN30-BRAF.