

Figure S1. Establishment of *BCR-ABL1*-transformed pro-B cells. (A and B) The pro-B cells were transduced with *BCR-ABL1* or EV, respectively. Cells were sorted by flow cytometry with the human CD4 antibody after 72 h. Sorting efficiency is presented as (A) scatter plots and a (B) histogram. EV, empty vector.

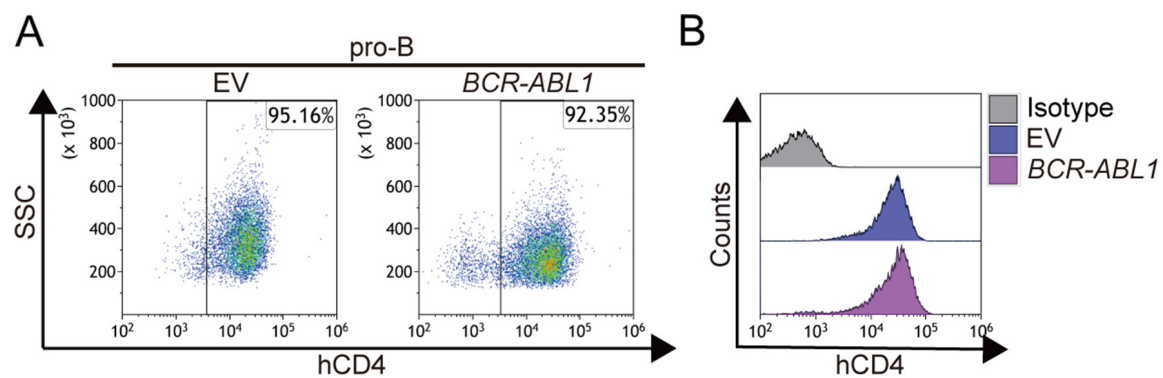


Figure S2. Aid-knockout *BCR-ABL1*-transformed pro-B cells were generated by CRISPR/Cas9-mediated deletion. The depleting efficiency was confirmed by western blotting. The protein levels were quantified by the ImageJ program and normalized to actin. Aid, activation-induced cytidine deaminase; WT, wild-type; KO, knockout. ** $P < 0.01$.

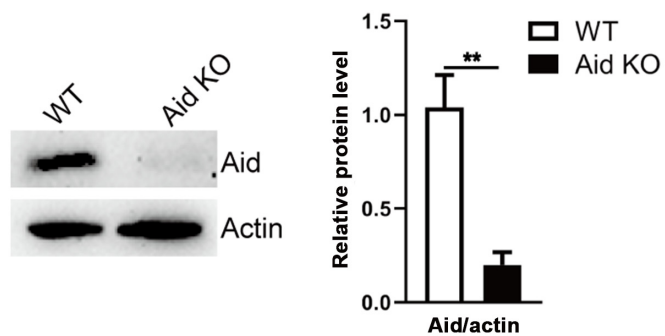


Figure S3. Amplification of the *ABL1* kinase domain. (A-B) PCR reactions were performed to amplify the *ABL1* kinase domain in WT, Blnk-KO3 and Foxo1-KO3 *BCR-ABL1*-transformed pro-B cells. (A) *BCR-ABL1* fusion oncogene amplification (1,500 bp). (B) *ABL1* kinase domain amplification (852 bp). (C) PCR with the *ABL1* kinase domain primer was used to select the *ABL1* kinase domain-containing positive clones. WT, wild-type; Blnk, B-cell linker; Foxo1, forkhead box protein O1; KO, knockout.

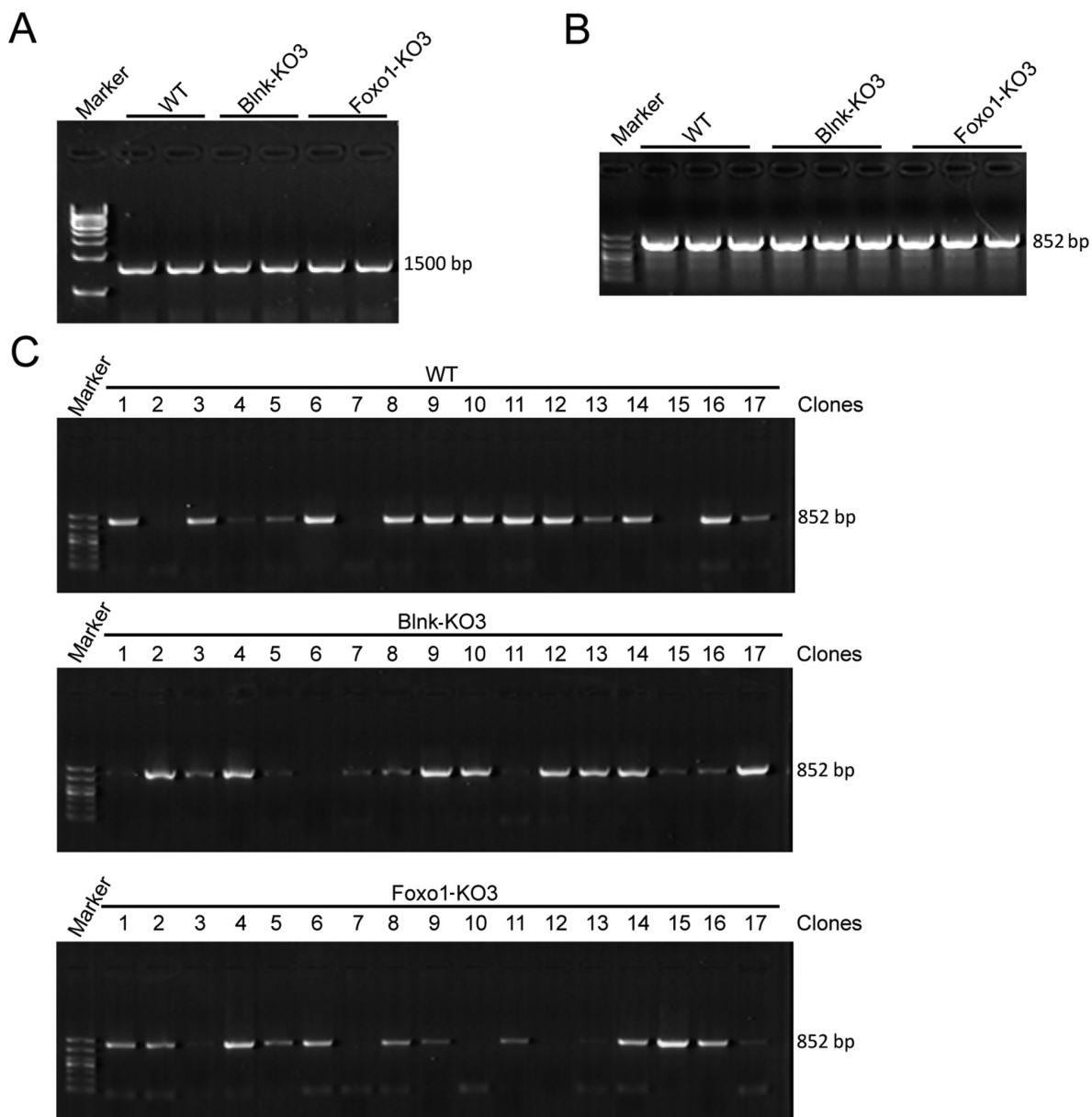


Table SI. gRNA used for generation of knockout cell lines.

gRNA	Oligo 1 (5'→3')	Oligo 2 (5'→3')
<i>AID</i> KO (exon3)	CACCGGCCGGTGTTACCGCGTCA CCTGG	AAACCCAGGTGACGCGGTAAC ACCGGCC
<i>BLNK</i> KO1 (exon2)	CACCGCATGATATTAAGAACAATG AAGG	AAACCCTTCATTGTTCTTAATAT CATGC
<i>BLNK</i> KO2 (exon2)	CACCGGAACAATGAAGGTGGAAT AATGG	AAACCCATTATTCCACCTTCATT GTTCC
<i>BLNK</i> KO3 (exon6)	CACCGTCGGAGTCCGAATGTTTCAT CTGG	AAACCCAGATGAACATTTCGGA CTCCGAC
<i>FOXO1</i> KO1 (exon1)	CACCGCAGCGGCTCGAAGTCCGG GTCGG	AAACCCGACCCGGACTTCGAG CCGCTGC
<i>FOXO1</i> KO2 (exon1)	CACCGGGGTCGGTCTCCACCACC TGGGG	AAACCCCCAGGTGGTGGAGAC CGACCCC
<i>FOXO1</i> KO3 (exon1)	CACCGCTCCACCACCTGGGGCGC TTCGG	AAACCCGAAGCGCCCCAGGTG GTGGAGC
Non-targeting control	CACCGCATCGTAACACACGTACG AGTGG	AAACCCACTCGTACGTGTGTTA CGATGC
<i>AID</i> , activation-induced cytidine deaminase; KO, knockout; <i>BLNK</i> , B-cell linker; <i>FOXO1</i> , forkhead box protein O1.		

Table SII. RT-qPCR primers.

Gene	Forward primer (5'→3')	Reverse primer (5'→3')
<i>BLNK</i>	AAGTCAAAGGCCCTCCAAGT	CGGAGTCCGAATGTTTCATCT
<i>PTEN</i>	ACACCGCCAAATTTAACTGC	TACACCAGTCCGTCCCTTTC
<i>BTK</i>	TCCTGGAGGAGAGCAACCTA	CTTCGAGTCATGTGCTTGGA
<i>PLCγ1</i>	CCCTTTCTGAGTTCCAGCAG	TCCACACGCTGTTCTCTTTG
<i>PLCγ2</i>	TTGAGCTCTCGGACTTGTT	TGACAATGCTGTCTGCCTTC
<i>FOXO1</i>	AAGAGCGTGCCCTACTTCAA	CTCCCTCTGGATTGAGCATC
<i>FOXO3A</i>	CAACCAAGGAAATGCTCCTC	CTGTGCCCCTTATCCTTGAA
<i>FOXO4</i>	GGTGCCCTACTTCAAGGACA	GGTTCAGCATCCACCAAGAG
<i>BIM</i>	CAACACAAACCCCAAGTCCT	CATTTGCAAACACCCTCCTT
<i>TRAIL</i>	CCCTGCTTGCAGGTAAAGAG	GTTGCTTCTCCGAGTGATCC
<i>CDKN1B</i>	TTGGGTCTCAGGCAAACCTCT	TCTGTTCTGTTGGCCCTTTT
<i>GADD45A</i>	AAGCTGCTCAACGTAGACCC	GTCGTTCTCCAGTAGCAGCA
<i>AID</i>	CACGTGGCTGAGTTTCTGAG	GTCTGGTTAGCCGGACAGAA
<i>GAPDH</i>	AACTTTGGCATTGTGGAAGG	ACACATTGGGGGTAGGAACA

RT-qPCR, reverse transcription-quantitative PCR; *BLNK*, B-cell linker; *FOXO1*, forkhead box protein O1; *AID*, activation-induced cytidine deaminase.

Table SIII. Antibodies used for western blotting.

Antigen	Product no.	Manufacturer	Dilution
Bcr-Abl	2862	Cell Signaling Technology, Inc.	1:1000
Aid	14-5959-82	Invitrogen: Thermo Fisher Scientific, Inc.	1:300
Blnk	12168	Cell Signaling Technology, Inc.	1:1000
Foxo1 (phospho S256)	ab131339	Abcam	1:1000
Foxo1	2880	Cell Signaling Technology, Inc.	1:1000
p-Akt (Ser473)	4060	Cell Signaling Technology, Inc.	1:1000
Akt	4691	Cell Signaling Technology, Inc.	1:1000
Crkl (phospho Y207)	ab52908	Abcam	1:1000
Crkl	ab32126	Abcam	1:1000
β -Actin	8457	Cell Signaling Technology, Inc.	1:1000
Aid, activation-induced cytidine deaminase; Blnk, B-cell linker; Foxo1, forkhead box protein O1.			

Table SIV. PCR primers for *ABL1* kinase domain.

Gene	Primer (5'→3')
<i>BCR</i> exon 13 F	TTCAGAAGCTTCTCCCTGACAT
<i>ABL1</i> exon 9 R	CTTCGTCTGAGATACTGGATTCCT
<i>ABL1</i> exon 3 F	GTGCGTGAGAGTGAGAGCAG
<i>ABL1</i> exon 8 R	GGTAGCAATTTCCCAAAGCA

Table SV. Kinase domain sequencing of *BCR-ABL1* oncogene.

Cell type	<i>ABL1</i> exons 3-8	Clones with mutation	Amino acid change
WT cell	1257 AAG→AAA	1/54	K419K
	Wild-type	53/54	
Blnk-KO3 cells	1135 AAG→AAT	2/71	K378N
	1190 GCT→GTT	1/71	A397V
	1236 GCC→GCA	1/71	A412A
	wild type	68/71	
Foxo1-KO3 cells	466 AGC→GGC	1/55	S156G
	835 A insertion	1/55	279 frameshift mutation
	924 GAG→GAA	1/55	E308E
	929 CCG→CAG	1/55	P310Q
	949 GAG→GAA	1/55	E316E
	970 CTG→ATG	1/55	L324M
	1013 GTG→GGG	1/55	V338G
	1016 GTG→GGG	1/55	V339G
	1024 CTG→CTT	1/55	L341L
	1025 TAC→GAC	1/55	Y342D
	1033 ACT→CCT	1/55	T345P
	Wild-type	44/55	
WT, wild-type; Blnk, B-cell linker; Foxo1, forkhead box protein O1; KO, knockout.			