

Supporting Information

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Pioneer Factor Improves CRISPR-Based C-To-G and C-To-T Base Editing

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Figure S1. (A) Base editing efficiency of ABEmax and SoxN-ABE at VISTA, HEK4-site3 and EMX1site3 in HEK293T cells. (B) Base editing efficiency of ABEmax and SoxM-ABE at VISTA, HEK4-site3 and EMX1-site3 in HEK293T cells. (C) Base editing efficiency of GBE, SoxN-GBE and Znf704N-GBE at EMX1-site3 and RP11 site in HEK293T cells. (D) Base editing efficiency of CBE, SoxM-CBE and Znf704M-CBE at MSSK1-site1and FANCF site in HEK293T cells.



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Figure S2. (A) Cas9 expression from HEK293T cell lysis between GBE and SadN-GBE. (B) Cas9 expression from HEK293T nuclear extract between GBE and SadN-GBE.



Figure S3. (A) Editing efficiency between GBE and SadN-GBE at three endogenous genomic loci in HeLa cells. (B) Efficiency at position C6 between GBE and SadN-GBE at three loci in HeLa cells. (C) Average C-to-G editing at position C6 at three targets edited by GBE and SadN-GBE in HeLa cells. (D) Efficiency among CBE and SadM-CBE at three endogenous genomic loci in HeLa cells. (E) Average editing efficiencies from three loci at C2-C18 of the protospacer by CBE and SadM-CBE. (F) The indel frequency across the protospacer of pioneer-BEs at three loci in HeLa cells. ***P<0.001 (Student's t-test); ns, not significant (Student's t-test).

Table S1: Clonging PCR oligos					
Protein		Clone oligo (5'-3')			
FOXA1	Oligo-up	ATGTTAGGAACTGTGAAGATGGAAGGGC			
	Oligo-dn	GCTTCCTCCGCTACTTCCTCCGC			
SOV2	Oligo-up	ATGTACAACATGATGGAGACGGAGC			
30A2	Oligo-dn	CATGTGTGAGAGGGGGCAGTGTGC			
	Oligo-up	ATGGACGAGCAGCCCAGGC			
I DAI	Oligo-dn	GTTGGAGGTATCAGAGTGAACACTGCC			
$\mathbf{D}\mathbf{A}\mathbf{V7}$	Oligo-up	ATGGCGGCCCTTCCCGGC			
$\Gamma A \Lambda I$	Oligo-dn	GGTGAACTGTTCCATCTGGCTGG			
ZNE70 4	Oligo-up ATGACCTTCACATTTCAGTC	ATGACCTTCACATTTCAGTC			
ZIN1704	Oligo-dn	GTCGAGGAACCTCTGGCA			
SONJ HMC	Oligo-up	CGCGTCAAGCGGCCCATGA			
30A2-HMO	Oligo-dn	CCGGTATTTATAATCCGGGTGCTCCT			
SOV1 PPD	Oligo-up	AAGAAGGATAAGTACACGCTGC			
SUA2-KDD	Oligo-dn	GTAGCCCAGCTGGTC			
SOV2 SAD	SOX2 SAD Oligo-up GA	GACGTGAGCGCCCTGCAGTACAACTCC			
50A2-5AD	Oligo-dn	CATGTGTGAGAGGGGGCAGTGTGCC			

Table S2-1:	Clone oligos	and deep s	equencing olgios	s of sgRNA	-Regular site
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APE1 CCCCACAGAAAACTACGGGC Dilgo-up GCCTGGATTAAGAAGAAAGGATTAG BMX1-site1 GCTGGCATTACAAACCTGCC Oligo-up AGAGAGAGCACAGATTTAG EMX1-site1 GCTGGCATTACAAACCTGCC Oligo-up AGAGAGAGCACAGATTTGGTGGG RP11 GCAATCTGGGTGGAATGGTT Oligo-up GGTGTGGAAGATAGCACTTCAAC RP11 GCAATCTGGGTGGAATGGTT Oligo-up GTGTGGAAAACTACAC MRA GTATTCTAGAATGCAGGCA Oligo-up GTGTGGAAGATGATGGTG DNMT3B AGAGCCCCCCCCTCAAAGAGA Oligo-up GGCTGTTTGTGTGGC DNMT3B AGAGCCCCCCCCTCAAAGAGA Oligo-up TGACGTTGTGGGAGTGGT DNMT3B AGAGCCCCCCCCTCCAAGGGAGG Oligo-up TGACGTTGGGCAGTAGGTG CDK6 GTGAACATTATCAAATGG Oligo-up TGACGTGTCGGCAGTAGCG Digo-dn CTGCCCTCCACAGGCGGGATCAGGG Oligo-up GTGGCGGATACCAGG MSK1-site1 GACCCACGGCGGGATCAGGG Oligo-up GTGGGGCGGACCAGG TET2-site2 CCTTTCTAACAAATCCTAA Oligo-up GTGCGGCGGAACCAGGCGGG TET2-site2 CGTTCCACACACAAATCCTAA Oligo-up GGCGCGTGCCAACCCCGGGGGGTGC <tr< th=""><th></th><th>Table 52-1. Clone ongos and the</th><th>cep sequencing</th><th>Deen sequencing alige (5' 2')</th></tr<>		Table 52-1. Clone ongos and the	cep sequencing	Deen sequencing alige (5' 2')
AFE:1 CCCCACAGAAAACIACGGC Ougo-up CACTIGGATIAAAAAAAAAAGGATITAG EMX1-site1 GCTGGCATTACAAAACTGCC Oligo-dn ATATCAATTTCCAACTTTCCAAC RP11 GCAATCTGGGTGGAATGGTT Oligo-dn ATATCAATTTCCAATTGCTAAG HRA GTATTCTAGAATGCAGGGCA Oligo-up GTGTGGAAGATAGATGATG MRA GTATTCTAGAATGCAGGGCA Oligo-up GTGTGGAAGATAGATGAGG Digo-dn GTGTGGAAGATAGATGAGG Oligo-up GGCTGTTTGTTTGTGGC DNMT3B AGAGCCCCCCCCTCAAAGAGA Oligo-up GGCTGTTTGTGTGGC DNMT3B AGAGCCCCCCCCTCCAAGGCC Oligo-up GGCTGTTTGGTGGCAATGCG Oligo-dn CTGCTGCTGCGGCAGGGG Oligo-up GGCTGTTGTGTGGCCCCGG CDK6 GTGAACAATTATCAAATGG Oligo-up GGCTGTCAATGCGGAGACAC Oligo-dn CTAGCCATGCAGGCGGCGGCACCAGGG Oligo-up ATCCCAACCATGCGCGGGCGCGCG MSSK1-site1 GACCCACGGCGGGGATCAGGG Oligo-up GACCATCAACCATGGCC Oligo-dn CGTGGCCAACCACTGGGCTGC Oligo-up GGCTGCCACCCCCGG TET2-site1 TTGCTCTGCTTCTCCCCA Oligo-up GGCTGCACAACCAGTGGCAAGG MSSK1-site2 CGTCGCCGATCTCCACAGGG Oligo-up GGCTGCACAACCAGTGGCAAGGA MSSK1-site2 GGCTGCCCATCCACAGGG Oligo-up GGCTGCACAACCAGTGGGAAAGA MSS		Target site sequence (5'-5')	01	
Oligo-dn GGAAGGAGGCAACAGACTTTAG EMX1-site1 GCTGGCATTACAAACCTGCC Oligo-dn ATTATCAATTTCCACACTTTGGGGG RP11 GCAATCTGGGTGGAATGGTT Oligo-up GTCCAGTGAGTATTGTCTAAAG MBA GTATTCTAGAATGCAGGGCA Oligo-up GTCCAGTGAGTATTCTGTCTAAG MIRA GTATTCTAGAATGCAGGGCA Oligo-up GTGTGGAAGATAGATGGC Digo-dn CTGCCATCCACATTCTGTCCCC Oligo-dn CTGCCATCGAGTGGATGAGTG DNMT3B AGAGCCCCCCCCTCAAAGAGA Oligo-up GGCTGTTTGTCTGTGGCC Oligo-dn CTGCCCTTCCTCCTCCCCCCCCCCCC Oligo-up TGACGTTTGGGCCCCAGT EMX1-site2 TGCCCCTCCCTCCCTCGCGCC Oligo-up GGAGCGGGAATACGGG Oligo-up MSSK1-site1 GACCCACGGCGGGGATCAGGG Oligo-up CTGCGCCTGCAATACCGAGAC Oligo-up MSSK1-site2 CGTCGCCGATCTTCACAGGG Oligo-up TGCGGCTGAAGAGG Oligo-up MSSK1-site2 CGTCGCCGATCTTCACAGGG Oligo-up TGCGGCTGAAGGGGAAGC Oligo-up TGCGGCCGAAGCCCCCCCCCGGGGAAGC MSSK1-site2 CGTCGCCGATCTTCACAGGG Oligo-up GCGCGCCAACACCAGGGGAAGC Oligo-up GCGCGCCAAC	APEI	UUUUAUAGAAAACTACGGGC	Oligo-up	GCUIGGATIAAGAAGAAAGGATIAG
EMAI-site1 GCTGGCATTACAAACCTGCC Oilgo-up AGAGAGAGGCACAGATTTGGTGGG RP11 GCAATCTGGGTGGAATGGTT Oilgo-up GTCCAGTGAGTATTGTCTAACG Oilgo-dn GAGGTGCAATTGACACACTTTCAACG Oilgo-dn GGGTGGGAAGATGGT HIRA GTATTCTAGAATGCAGGCA Oilgo-dn CTGCCATCACATTCTACC DNMT3B AGAGCCCCCCCTCCAAAGAGA Oilgo-dn CTGCCATCACATTCTAGTC DNMT3B AGAGCCCCCCCCTCCCTGGCCC Oilgo-dn CAGGTGTGAGAGATGGG EMX1-site2 TGCCCCTCCCTCCCTGGCCC Oilgo-dn CTAGCTTTGTGGGCAATGCG CDK6 GTGAACAATTATCAAAATGG Oilgo-dn CTAGCCTAGAGGGCGACACG Oilgo-dn CTAGCCTACGAGGGGATCAGGG Oilgo-dn CTAGCCATGAGGGGACCACG MSSK1-site1 GACCCACGGCGGGGATCAGGG Oilgo-dn CTAGCCATGAGGGCGTACCACG MSSK1-site2 CCTTCTGCTGCTTCTTCTCCCA Oilgo-dn ATGCCAACCTGCAGGGCGCGC TET2-site1 TTGCTCTGCTTCTTCACAAGGG Oilgo-dn AGGCGAGCGGGGAAGGC MSSK1-site2 CGTCCCATCACCACAGGG Oilgo-dn AGGCGAGCGGGGAAGGC MSSK1-site2 CGTCCCATCACCCGGAC Oilgo-dn AGCCAACCAGTGGGAAGG MSSK1-site2 CGTCCCATCACCCGGAC Oilgo-d			Oligo-dn	GGAAGTGAAGGAACAGACATTTAG
Oligo-dn ATTATACAATTTCCACACTTTCAAC RP11 GCAATCTGGGTGGAATGGTT Oligo-up GTCCAGTGAGTATTGTCTAAGG HIRA GTATTCTAGAATGCAGGCA Oligo-up GTGTGGAAGATAGATGAG HIRA GTATTCTAGAATGCAGGCA Oligo-up GGCTGTTTGTCTAGTC DNMT3B AGAGCCCCCCCCTCAAAGAGA Oligo-up GGCTGTTTGTCTTGTGGGC DNMT3B AGAGCCCCCCCCCCCCGCCC Oligo-up GGCTGTTTGTGTGGGCATGGG EMX1-site2 TGCCCCTCCCTCGCCC Oligo-up CTGGTTGTGGGCATGCG CDK6 GTGAACAATTATCAAAATGG Oligo-up GTGTTCAATGGGCGGGACACC Oligo-dn CTGGCCCATGCAGGGGGATCAGGG Oligo-up GTGTTCAATGGGCGGGAACCACG Oligo-dn CTGCGCCGCAATCACGG Oligo-up GTGTGCAATGCGCAGACC MSSK1-site1 GACCCACGGCGGGGATCAGGG Oligo-up ATGCCAACCTCCCCACTGG TET2-site2 CCTTTCTAACAAATCCTAAA Oligo-up GCGCGCCACACCAGGGGATCATGG TET2-site2 CGTCGCCGATCTTCACAGGG Oligo-up GGCGCGCACAACCAGTGGAAAGT MSSK1-site2 CGTCGCCGATCTCCACAGG Oligo-up GGCGCGCACAACCAGTGGAAAGT FANCF AAGTTCGCTAATCCCGGAAC Oligo-up GGCGCGCCACAACAAGGAAGT FANCF AAGTTCGCTAATCCCCCGGAAG Oligo-up GGCGGGGTTGGGGAAAGT FEMX-sg1 GCTCCCATCACATCAACCGG Oligo	EMX1-site1	GUTGGCATTACAAACCTGCC	Oligo-up	AGAGAGAGGCACAGATTTGGTGGG
RP11 GCAAICIGGGIGGAAIGGIT Oligo-up GICCAGTGAGTAITGTCTAAGG HIRA GTATTCTAGAATGCAGGGCA Oligo-up GTGTGGAAGATAGATGAG DIMT3B AGAGCCCCCCCTCAAAGAGA Oligo-up GTGTGGAAGATAGATGAG DIMT3B AGAGCCCCCCCTCAAAGAGA Oligo-up GGCGTGTTGTGTGGGAGTGAGTG DNMT3B AGAGCCCCCCCTCCTGGCCC Oligo-up GGGTGTTGAGGATGGGATGGGAGTGG EMX1-site2 TGCCCCTCCCTCCCTGGCCC Oligo-up TGGTGTGTGAGGAGTGGGG CDK6 GTGAACAATTATCAAAATGG Oligo-up GTGTTGCAATGGCGAGTACCACG Oligo-dn CTAGCCATGGAGGAGTACCACG Oligo-up GTGTTGCAATGCGAGAGC MSSK1-site1 GACCCACGGCGGGGATCAGGG Oligo-up GTGTGCAATGCGAGAGC TET2-site2 CCTTTCTAACAAATCCTAAA Oligo-up GTGCGCCTGCCTGGCGCGC MSSK1-site2 CGTCGCCGATCTTCACAGGG Oligo-up GGGCGCCACAACCAGGGTGGC MSSK1-site2 CGTCCCATCACACCCAGGG Oligo-up GGGCGCCACAACCAGGGAGA Oligo-dn GCACCCCCGGAAGC Oligo-up GGGCGCCCCAGGGAAGC MSSK1-site2 CGTCCCATCACACCCGGGAC Oligo-up GGGCGCCAGAAGAAGC MSSK1-site2 GCTCCCATCACCACCGGGAAC Oligo-up			Oligo-dn	ATTATCAATTTCCACACTTTCAAC
Oilgo-dn GAGTCTCCAATTGTCTACC HIRA GTATTCTAGAATGCAGGGCA Oilgo-up GTGTGGAAGATAGATGAGG Dilgo-dn CTGCCATCACAATTCTAGTC DNMT3B AGAGCCCCCCCCTCAAAGAGA Oilgo-up GGCTGTTTGTCTTGTGGC DIIgo-dn AAGGCAGCTGGGATGAGTG Oilgo-up GGAGTGGGAGATGAGTG EMX1-site2 TGCCCCTCCCTCGCCGGGCCC Oilgo-up TGAGTGTTGAGGCCCCAGT Oligo-dn CTGCTCGTGGCAATGCG Oilgo-up AGACTTTAAGCCAGAGACCACGG CDK6 GTGAACAATTATCAAAATGG Oilgo-up GTGTTCAATGGCCGGAGACCAGG MSSK1-site1 GACCCACGGCGGGGATCAGGG Oilgo-up GTGTTCAATGGCCGTGCACCCGC MSSK1-site1 TTGCTCTGCTTCTTCTCCCA Oilgo-up ACTGGGAGACCTGGCGTGC TET2-site1 TTGCTCTGCTTCTTCTCCCA Oilgo-up GCTGCTTTCGAAGAGCTGGC TET2-site2 CCTTTCTAACAAATCCTAAA Oilgo-up GCGCCCAACTGCAGGGTGAGAGG MSSK1-site2 CGTCGCCGATCTTCACAGGG Oilgo-up GGGCCCACAACCAGGGGAGAAGC Oilgo-dn GCCCACCAGCGGGGAAGAGT Oilgo-up GGGCTGCACAACCAGGGGGAAGAGT MSSK1-site2 CGTCCCATCACATCAACCGG Oilgo-up GGGCGCACAACCAGGGGAAGAGT Oilgo-dn CCCAGGCTGGGGAAGAGT Oilgo-dn CCCGGGGGGGAAGAGT FANCF AAGTTCGAATGAGCAGGAGA Oilgo-up GTGAAGGTGGGTAAGCCAG	RP11	GCAATCTGGGTGGAATGGTT	Oligo-up	GTCCAGTGAGTATTGTCTAAGG
HIRA GTATTCTAGAATGCAGGGCA Oligo-up GTGTGGAAGATAGATGAG DNMT3B AGAGCCCCCCCTCAAAGAGA Oligo-up GCCTGTTTGTCTTGTGGC DIgo-up GCCCGTTTGTCTTGTGGC Oligo-up GCCGTGTTGGGCAGGGGATGAGTG EMX1-site2 TGCCCCTCCCTCCCTGGCCC Oligo-up TGGCTGTGGGAATGAGGG CDK6 GTGAACAATTATCAAAATGG Oligo-up AGACTTTAAGCCAGGACAC Oligo-dn CTAGCCATGATGGCGGGGACCAGG Oligo-up AGACTTTAAGCCAGAGACAC Oligo-dn CTAGCCATGATGGCGGGTACCAGG Oligo-up AGACTTTAAGCCAGAGAC Oligo-dn CTGCTGCCTGCATGCCCGC Oligo-up AGCCCAACGGCGGGACCAGG MSSK1-site1 GACCCACGGCGGGGATCAGGG Oligo-up ATCCCAACCTCCCACCCCG Oligo-dn CTTGCGCCTGCAATACCGG Oligo-up ATCCCAACCTCCCACCCCCG Oligo-dn AGTGGAGACCTGGGGGGACATGG Oligo-up GGCCCGTGCCAATGG MSSK1-site2 CGTCCCCATCACAGGG Oligo-up GGGCCCCAGTGGCAATGG MSSK1-site2 CGTCCCATCACATCACGGG Oligo-up GGGCCCCAGGGGACATGG MSSK1-site2 CGTCCCATCACATCACGGG Oligo-up GGGCCCCAGTGGCAAAGAGGA MSSK1-site2 CGTCCCATCACATCAACCGG Oligo-up GGGCGCCAGATGGGCAGAGGA FANCF AAGTTCGATGTCCTCCCCAT Oligo-up GTGAAGGTGTGGTTCCAGAA MSSK1			Oligo-dn	GAGGTCTCCAATTGTCTACC
DNMT3B AGAGCCCCCCCTCAAAGAGA Oligo-up GGCTGTTGTCTGGGC Oligo-dn AAGGCAGCTGGGATGAGTG EMX1-site2 TGCCCCTCCCTGGCCC Oligo-up TGAGTGTTGAGGCCCCAGT Oligo-dn CTGCTTCGTGGGCATGCG CDK6 GTGAACAATTATCAAAATGG Oligo-up AGACTTTAAGCCAGGAGCAC Oligo-dn CTAGCCATGGCGGCGGCGCACCACG Oligo-up GTGTTCAATGGCGGCGCCACGG Oligo-up AGACCTTCACACGCGCGGGGGATCAGGG Oligo-up ATCCCAACGGCGGGGGACCACG Oligo-up ATCCCAACGCCGCGGGGGACCACG Oligo-up GTGTCAATGGCGCACCACG Oligo-up GTGTCAATGGCGGCGC TET2-site1 TTGCTCTGCTTCTTCTCCCA Oligo-up GTGGGAACCTGGGCTGC MSSK1-site2 CCTTTCTAACAAATCCTAAA Oligo-up GCTGCTTTCGTAGAGAAGC Oligo-up GGCGCCAGGGGGGGACAATGCG Oligo-up GGCGCCAGAGGGTTGGCT MSSK1-site2 CGTCGCCGATCTTCACAGGG Oligo-up GGCGCAGAGGGTTGGCT FANCF AAGTTCGCTAATCCCGGAAC Oligo-up GGCGCAGAACGATGGGAAAGT FANCF AAGTTCGCTAATCCCGGAAC Oligo-up GTGAAGGTGTGGTTCCAGAA Oligo-up GGCCGCACAACCACTGGA Oligo-up GTGAAGGTGTGGTTCCGGAA Oligo-up GTGAAGGTGTGGTTCCAGAA Oligo-up GTGAAGGTGTGGTTCCAGAA Oligo-up GTGAAGGTGTGGTTCCAGAA Oligo-up GTGAAGGTGTGGTTCCAGAA Oligo-up GTGAAGGTGTGGTTCCAGAA Oligo-up GTGAAGGTGTGGTTCCAGAA Oligo-up GTGAAGGTGTGGTTCCAGAA Oligo-up CCAAGACGAGTGGGTTGGTGG TCCAGAACTACAAACATACAATG Oligo-up CCGAAACGAAGGTGTGGTTCCAGAA Oligo-up CGGAGGTGAGCCAAGAAAG Oligo-up CGGAAGGTGTGGTTCCAGAA Oligo-up CGGAAGGTGTGGTTCCAGAA Oligo-up CGGAAGGTGTGGTTCCAGAA Oligo-up CGGAAACGAAAGGAT Oligo-up CGGAAACGAAAACGAAAGG Oligo-up CGGAAACGAAAAGGGGGAAAGAT Oligo-up CAGTGGAAGCCAAGAAAG Oligo-up CAGTGAAGCCAAGAAAG Oligo-up CAGTGAAGCCAAGAAAG Oligo-up CAGTGAAGCCAAGAAAG Oligo-up CAGTGAAGCCAAGAAAG Oligo-up CAGTGAAGCCAAGAAAG Oligo-up CAGTGAAGCCAAGAAAG Oligo-up CAGTGAAGCCAAGAAAG Oligo-up CAGTGAAACCAAACGAAAGGAT Oligo-up CAGTGAAACCAAACGAAAGGAT Oligo-up CAGTGAAACCAAACGAAAGGAT Oligo-up CAGTGAAACCAAACGAAAGGAT Oligo-up CAGTGAAACCAAACGAAGGAG Oligo-up CAGTGAAACCAAACGAATGACTGTG Oligo-up CAGTGAACCCACCTAGC Oligo-up CAGTGAACCCAACCAAGGAAGAT Oligo-up CAGTGAACCAAACCAAGGAAGGA VISTA GAACAAAACAAAACATACAATGCCCCGCCTC Oligo-up TTGGGACGCAACGGAGGAAAACGAATACAATTGATTAGAACGCATGGGAAACCAAGCAATGAATCAATTGGTTAGGAAGCCAGTGGAAACCAAGCAATGAATG	HIRA	GTATTCTAGAATGCAGGGCA	Oligo-up	GTGTGGAAGATAGATGAG
DNMI3B AGAGCCCCCCCCCCAAAGAGA Oligo-up GGCTGTTGTCTTGTGGC Oligo-un AAGGCAGCTGGGATGAGTG FMX1-site2 TGCCCCTCCCTCGCGGCC Oligo-up TGAGGTGTGGGCCCCAGT Oligo-up AGACTTTAAGCCAGAGACAC Oligo-up AGACTTTAAGCCAGAGACC Oligo-up GTGTTCAATGGGCGGTACCACG Oligo-up GTGTTCAATGGGCGGTACCACG Oligo-up GTGTTCAATGGGCGGTACCACG Oligo-up ATCCCAACGTCCCCACCTCG Oligo-up GTGTCCAATGGGCGGGACCAGG Oligo-up GTGTCCAACGGGCACCCCCG TET2-site1 TTGCTCTGCTTCTTCCCCA Oligo-up ATCCCAACCTCCCACCTCC Oligo-up GTGTGCAACGGCGGGGACCAGG Oligo-up GTGGCCAACTGGGCGGGGACCAGG Oligo-up GTGGCCAACCTCGCCGC TET2-site2 CCTTTCTAACAAATCCTAAA Oligo-up GCTGCTTTCGTAGAGAAGC Oligo-un GACACTACAGGGTTGCT MSSK1-site2 CGTCGCCGATCTTCACAGGG Oligo-up TGGGCCAGATGGTCAATGG Oligo-un GACACTACAGGGTTGCT MSSK1-site2 CGTCGCCGATCTTCACAGGG Oligo-up GGCGCACAACCAGCGGTGGAGAGGT FANCF AAGTTCGCTAATCCCGGAAC Oligo-up GGCGCCCACACCAGCGGGGAGAGGT Oligo-un CCCAGGCTGTCTCAGAGG Oligo-un CCGGGGTAGCGAGGGT EMX-sg1 GCTCCCATCACACCGG Oligo-up GTGAAGGTGTGGTTCCAGAA Oligo-up GTGAAGGTGTGGTTCCAGAA Oligo-up GTGAAGGTGTGGTTCCAGAA Oligo-up GTGAAGGTGTGGTTCCAGAA Oligo-up GTGAAGGTGTGGTTCCAGAA Oligo-up GTGAAGGTGTGGTTCCAGAA Oligo-up GTGAAGGTGTGGTTCCAGAA Oligo-up CCGGGAAAGCCAAGAAAG Oligo-un CCCGGGTAAGCCAAGAAAG Oligo-un CCGGGGTAAGCCAAGAAAG Oligo-un CCGGGGTAAGCCAAGAAAG Oligo-un CCGGGGTAAGCCAAGAAAG Oligo-un CCGGGGTAAGCCAAGAAAG Oligo-un CCGGGGTAAGCCAAGAAAG Oligo-un CCGGGTAAGCCAAGAAAG Oligo-un CCGGGAAAGTAATAACAAAAGAAAGAAAGTAAAGAAAGTGGGAAAGT Oligo-un CCGGGGTAAGCCAAGAAAG VISTA GAACAAAACATACAATAGCCGC Oligo-un CCGGAGTGAACCAACCTAACGAGAGGA VISTA GAACCAAAAGCATAGACTGC Oligo-un CCGGGTAAGCCAACCTAACGAGAGGA VISTA GAACCAAAAGCATAGACTGC Oligo-un CCGGGTAAGCCAGCAGCAGCATGGGAAAGCCATGGAATACCATGGGAAAGCCATGGAAAGCCGTGGAAAGCCATGGAAAACCAGAAAGCAAGC			Oligo-dn	CTGCCATCACAATTCTAGTC
Oligo-dn AAGGCAGCTGGGATGAGTG EMX1-site2 TGCCCTCCCTCGCTGGCCC Oligo-up TGAGTGTTGAGGCCCCAGT Oligo-dn CTGGCTTCGTGGCAATGCG Oligo-up AGACTTTAAGCCAGAGACAC Oligo-dn CTAGCCATGATGTGCTGC Oligo-dn CTAGCCATGATGTGCTGC MSSK1-site1 GACCCACGGCGGGGATCAGGG Oligo-up GTGTTCAATGGGCGGTACCACG Oligo-dn CTTGCGCCTGCAATACCGAGAC Oligo-up ATGCCAACCTCCCACCTGG TET2-site1 TTGCTCTGCTTCTTCTCCCA Oligo-up AGCCAACGGGGGGAGAC TET2-site2 CCTTTCTAACAAATCCTAAA Oligo-up GCTGCTTCTGTAGAGAAGC Oligo-dn AGGCGCAGATGGTCAATGG Oligo-up GCTGCTTCTGCTAAGGAGAC MSSK1-site2 CGTCGCCGATCTTCACAGGG Oligo-up GCTGCCAGATGGTCAATGG MSSK1-site2 CGTCCCATCACATCAACGG Oligo-up GGCTGCACAACCAGTGGAA Oligo-dn AGCCGGCTTCTGGAGAC Oligo-up GGCTGCACAACCAGTGGAA Oligo-dn CCAGGCTCTCTGGAGAC Oligo-up GGCTGCACAAACCAGAGAAGA EMX-sg1 GCTCCCATCACATCAACCGG Oligo-up GTGAAGGTGTGGTTCCAGAA Oligo-dn CTCGTGGGTTGTGGTTG Oligo-dn CTCGTGGGTTGTGGTG EMX-sg2 GACATCGATGTCCTCCCCAT Oligo-up CGGGAAGCAGAGGAGAAGAT VINT TGAAACAAAAACATACAATAG Oligo-up <td>DNMT3B</td> <td>AGAGCCCCCCCTCAAAGAGA</td> <td>Oligo-up</td> <td>GGCTGTTTGTCTTGTGGC</td>	DNMT3B	AGAGCCCCCCCTCAAAGAGA	Oligo-up	GGCTGTTTGTCTTGTGGC
EMX1-site2 TGCCCCTCCCTCCCTGGCCC Oligo-up TGAGTGTTGAGGCCCCAGT Oligo-up CGCTTCGTGGCAATGCG Oligo-up GAGCTTTAAGCCAGGAGACAC Oligo-dn CTAGCCATGGTGCTGC Oligo-up GTGTTCAATGGCGGTACCACG MSSK1-site1 GACCCACGGCGGGATCAGGG Oligo-up GTGTTCAATGGCGGTACCACG Oligo-dn CTGCCCTGCCACCTCCGAGGAC Oligo-up GTGTTCAATGGCGGTACCACG TET2-site1 TTGCTCTGCTTCTTCTCCCA Oligo-up GTGCCTGCGCTGGCGCGC TET2-site2 CCTTTCTAACAAATCCTAAA Oligo-up GCTGCTTCGTAGAGAAGC MSSK1-site2 CGTCGCCGATCTTCACAAGGG Oligo-up GCTGCCTGCAGGTGGCAATGG MSSK1-site2 CGTCCCATCACATCACGGAAC Oligo-up GGCTGCACAACCAGGGAGA Oligo-dn AGGGTGTGGGTGGAGAAGT Oligo-up GGCTGCACAACCAGTGGAA FANCF AAGTTCGCATATCCCGGAAC Oligo-up GGCTGCACAACCAGTGGAA Oligo-dn CCCGGGGGTTGGTGGTTCCAGAA Oligo-up GTGAAGGTGTGGTTCCAGAA EMX-sg1 GCTCCCATCACATCACCGG Oligo-up GTGAAGGTGTGGTTCCAGAA Oligo-dn CTCGTGGGTTATAGCCAAACAA Oligo-up CTGGGGTAATTAGCAAAAACATACAATAG TET2-site3 AGATTCTGAATGACCACGAGAG <td></td> <td></td> <td>Oligo-dn</td> <td>AAGGCAGCTGGGATGAGTG</td>			Oligo-dn	AAGGCAGCTGGGATGAGTG
Oligo-dn CTGCTTCGTGGCAATGCG CDK6 GTGAACAATTATCAAAATGG Oligo-up AGACTTTAAGCCAGGAGACAC Oligo-dn CTAGCATGATGTGCTGC Oligo-up GTGTTCAATGGGCGGTACCACG MSSK1-site1 GACCCACGGCGGGGATCAGGG Oligo-up GTGTTCAATGGGCGGTACCACG TET2-site1 TTGCTCTGCTTCTTCTCCCA Oligo-up ATCCCAACCTCCCACCTGGGGGTGC TET2-site2 CCTTTCTAACAAATCCTAAA Oligo-up GCTGGCTTGGTGAGAGAAGC Oligo-dn GACACTACAGGGTTTGCT Oligo-up GGCGGCCAATGGTCAATGG MSSK1-site2 CGTCGCCGATCTTCACAGGG Oligo-up TGGGCCAGATGGTCAATGG MSSK1-site2 CGTCGCCGATCTTCACAGGG Oligo-up GGCTGACAACCAGGGAGAGT FANCF AAGTTCGCTAATCCCGGAAC Oligo-up GGCTGCACAACCAGTGGA Oligo-dn CCAGGCTCTCTGGAGAGAG Oligo-up GTGAAGGTGTGGTTCCAGAA EMX-sg1 GCTCCCATCACATCAACCGG Oligo-up GTGAAGGTGTGGTTCCAGAA Oligo-dn CTCGTGGGTTTGTGGTTG Oligo-dn CTCGGGGTTGTGGTTG EMX-sg1 GACATCGATGTCCTCCCCAT Oligo-up GTGAAGGTGTGGTTCCAGAA Oligo-dn CTCGTGGGTTGTGGTTG Oligo-up CTGGGGGTAAGCAGAAAA TET2-site3 AGATTCTGAAACATACATAG Oligo-up CTGGGGTAAGCCAGAAAAGAAG Oligo-dn CTCGTGGGAAAGAAGAGC Oli	EMX1-site2	TGCCCCTCCCTCCCTGGCCC	Oligo-up	TGAGTGTTGAGGCCCCAGT
CDK6GIGAACAATIAICAAAAIGGOligo-upAGACTITAAGCCAGAGACAC Oligo-unMSSK1-site1GACCCACGGCGGGGATCAGGGOligo-upGTGTTCAATGGGCGGTACCACG Oligo-upMSSK1-site1GACCCACGGCGGGGATCAGGGOligo-upATCCCAACCTCCCACGGGGGGAC Oligo-dnTE12-site1TTGCTCTGCTTCTTCTCCCAOligo-upATCCCAACCTGGGCTGCTE12-site2CCTTTCTAACAAATCCTAAAOligo-upGCTGCTTTCGTAGAGAGAC Oligo-dnGACACTACAGGGTTGGCTMSSK1-site2CGTCGCCGATCTTCACAGGGOligo-upTGGGCCAGATGGTCAATGG Oligo-dnGACACTACAGGGTTGGCTMSSK1-site2CGTCGCCGATCTTCACAGGGOligo-upGGCTGCACAACCAGTGGA Oligo-dnGCCTGCCACAACCAGTGGA AGCCAGGGTGGGAGAAGTFANCFAAGTTCGCTAATCCCGGAACOligo-upGTGAAGGTGTGGTTCCAGAA Oligo-upGTGAAGGTGTGGTTCCAGAA Oligo-dnCCCAGGCTCTCTGGAGTGCEMX-sg1GCTCCCATCACATCAACCGGOligo-upGTGAAGGTGTGGTTCCAGAA Oligo-dnCTCGTGGGGTTGTGGGTTGEMX-sg2GACATCGATGTCCTCCCCATOligo-upGTGAAGGTGTGGTTCCAGAA Oligo-dnCTCGTGGGTTGTGGTTGTE12-site3AGATTCTGAATGAGCAGGAGOligo-upTCGGGGTAAGCCAGAAAAGWINTTGAAACAAAACATACAATAGOligo-upCGAAAACAGAAAGAGAAGAGA Oligo-dnACAGTGAGCTCATCTGACTHEK4-site2GTACACTTGTGCAGCTCACCOligo-upCAGTGGCTCACACCTACGGVEGFA-site1ATGTTCTTGCTGTTGTTGTTGTTGTTOligo-upCAAGGAGCACACCTACGGVEGFA-site1ATGTTCTTGCTGTTGTGTGTTOligo-upCCAAGGAATAATAGACCCTGGVEGFA-site1ATGTTCTTGCCGCTGCCCCOligo-upCCCAGTGGACAACATCAGTGGAGAGCAGGAGGA <t< td=""><td></td><td></td><td>Oligo-dn</td><td>CTGCTTCGTGGCAATGCG</td></t<>			Oligo-dn	CTGCTTCGTGGCAATGCG
Oligo-dn CTAGCCATGATGTGCTGC MSSK1-site1 GACCCACGGCGGGGATCAGGG Oligo-up GTGTTCAATGGGCGGTACCACG Oligo-up GTGTCAATGCGGCGGACCACG Oligo-up GTGTCAATGCGGCGGACCACG TET2-site1 TTGCTCTGCTTCTTCTCCCA Oligo-up ATCCCAACCTCCCACCTCG Oligo-dn AGTGGAGACCTGGGGTGC Oligo-up GCTGCTTTCGTAGAGAAGC TET2-site2 CCTTTCTAACAAATCCTAAA Oligo-up GCTGCTTTCGTAGAGAAGC MSSK1-site2 CGTCGCCGATCTTCACAGGG Oligo-up GGGCCAGATGGTCATGG MSSK1-site2 CGTCGCCGATCTTCACAGGG Oligo-up GGGCCAGACGGGGAAGAGT FANCF AAGTTCGCTAATCCCGGAAC Oligo-up GGCTGCACAACCAGTGGA Oligo-dn CCAGGCTCTCTTGGAGGAGAG Oligo-up GTGAAGGTGTGGTTCCAGAA EMX-sg1 GCTCCCATCACATCAACCGG Oligo-up GTGAAGGTGTGGTTCCAGAA Oligo-dn CTCGTGGGTTTGTGGTTG Oligo-up GTGAAGGTGTGGTTCCAGAA TET2-site3 AGATTCTGAATGAGCAGGAG Oligo-up CCGGGGTAAGCCAAGAAAG Oligo-dn CTGTGCAATGGGGAAACATACAATAG Oligo-up CGGGGGGAAAAGGGAAAGAT TET2-site3 AGATTCTGAATGACAGACGAGAG Oligo-up CGAAAACAAAAAGTAAGACTT Oligo-dn CTGTGCAATGGGGAAAGAT Oligo-up CGAAAACAAAAAGGAAAAGGAT TET2-site3 AGATTCTGAATGACA	CDK6	GIGAACAATTATCAAAATGG	Oligo-up	AGACTTTAAGCCAGAGACAC
MSSK1-site1 GACCCACGGCGGGGATCAGGG Oligo-up GTGTTCAATGGGCGGTACCACG Oligo-dn CTTGCGCCTGCAATACCGAGAC Oligo-up ATCCCAACCTCCCACCTCG TET2-site1 TTGCTTGCTTCTTCTCCCA Oligo-up ATCCCAACCTCCCACCTGGC TET2-site2 CCTTTCTAACAAATCCTAAA Oligo-up GCTGCTTTCGTAGAGAAGC Oligo-dn GACACTACAGGGTTTGCT Oligo-up GCTGCCAGATGGTCAATGG MSSK1-site2 CGTCGCCGATCTTCACAGGG Oligo-up TGGGCCAGATGGTCAATGG MSSK1-site2 CGTCCCCATCACCGGAAC Oligo-up GGCGCACAACCAGTGGAGAAGT FANCF AAGTTCGCTAATCCCGGAAC Oligo-up GCCCAGGCTGTCTTGGAGTGTC EMX-sg1 GCTCCCATCACATCAACCGG Oligo-up GTGAAGGTGTGGGTTCCAGAA Oligo-dn CTCGTGGGTTGTGGTTG Oligo-dn CTCGTGGGTTGTGGTTG TET2-site3 AGATTCTGAATGAGCAGGAG Oligo-up GTGAAAGGTGAGAAAAGAAAGAAGAT Oligo-dn CTCGTGGGTAAGCCAAGAAAGAAGAT Oligo-up CGGAAAACAAAAAAGAATAAAAGAATAAAAGAACTT ZWINT TGAAACAAAAACATACAATAG Oligo-up CTGGGGGTAAGCCAAGAAAGAAGAT HEK4-site2 GTACACTTGTGCAACCTCAC Oligo-up ACAGTGAGCTAACCAAGACAT VEGFA-site1 AT			Oligo-dn	CTAGCCATGATGTGCTGC
Oligo-dn CTTGCGCCTGCAATACCGAGAC TET2-site1 TTGCTCTGCTTCTTCTCCCA Oligo-up ATCCCAACCTCCCACCTCG Oligo-dn AGTGGAGACCTGGGCTGC Oligo-up GCTGCTTTCGTAGAGAAGC TET2-site2 CCTTTCTAACAAATCCTAAA Oligo-up GCTGCCTTCGTAGAGAAGC MSSK1-site2 CGTCGCCGATCTTCACAGGG Oligo-up TGGGCCAGATGGTCAATGG MSSK1-site2 CGTCGCCGATCTTCACAGGG Oligo-up GGCTGCACAACCAGTGGA FANCF AAGTTCGCTAATCCCGGAAC Oligo-up GGCTGCACAACCAGTGGA PANCF AAGTTCGCTAATCCCGGAAC Oligo-up GGCTGCACAACCAGTGGA Oligo-dn CCAGGCTCTCTTGGAGTGTC Oligo-dn CCAGGCTGCCACAACCAGTGGA PANCF AAGTTCGCAATCAACCGG Oligo-up GGCTGCACAACCAGTGGAAC PANCF AAGTTCGATGACCTCCCCCAT Oligo-up GTGAAGGTGTGGTTCCAGAA PANCF AAGTTCGAATGACCAGGAG Oligo-up GTGAAGGTGTGGTTCCAGAA PANCF AAGTTCGAATGACCAGAGAG Oligo-up GTGAAGGTGTGGTTCCAGAA PANCF AGGTTCGAATGTCCTCCCCAT Oligo-up GTGGAGGTGGGTTCCAGAA PANCF AAGTTCGAATGACCACCCAT Oligo-up CTCGTGGGTTAATTACCACTT PANCF AGATTCGAATGACAAAACATACAATAG Oligo-up CGGGGGGAAAGCAAAGAAAGAAT PANTTCTGAAACAAAAACATACAATAGAATG Oligo-up CG	MSSK1-site1	GACCCACGGCGGGGATCAGGG	Oligo-up	GTGTTCAATGGGCGGTACCACG
TET2-site1 TTGCTCTGCTTCTTCTCCCA Oligo-up ATCCCAACCTCCCACCTCG Oligo-dn AGTGGAGACCTGGGCTGC Oligo-up GCTGCTTTCTAACAAATCCTAAA Oligo-up GCTGCTTTCTGTAGAGAAGC MSSK1-site2 CGTCGCCGATCTTCACAGGG Oligo-up GCGCCAGATGGTCAATGG Oligo-dn AGCCAGACGGTGGAGAAGT MSSK1-site2 CGTCGCCGATCTTCACAGGG Oligo-up GGCCGCAGACGGTGGAGAAGT Oligo-dn AGCCAGACGGTGGAGAAGT FANCF AAGTTCGCTAATCCCGGAAC Oligo-up GGCTGCACAACCAGTGGA Oligo-dn CCAGGCTCTCTTGGAGTGC EMX-sg1 GCTCCCATCACATCAACCGG Oligo-up GTGAAGGTGTGGTTCCAGAA Oligo-dn CTCGTGGGTTGGTGGTTG EMX-sg2 GACATCGATGTCCTCCCCAT Oligo-up GTGAAGGTGTGGTTCGTGGTTG GIgo-dn CTCGTGGGTTGGTGGTTG ZWINT TGAAACAAAACATACAATAG Oligo-up CTGGGGTAAGCCAAGAAGAT Oligo-dn CTGTGCAACCTACCAGC HEK4-site2 GTACACTTGTGCAACCTCAC Oligo-up ACAGTGGAGCAAGAAAGATAAAAGACCATACAAGC Oligo-up CGACACCAACCAACCTAGG VEGFA-site1 ATGTTCTTGCTGTTGTTGTT Oligo-up CAGTGGCTCACACCTAGT Oligo-up CAGTGGCTCACACCTAGT VISTA GAACACAAAAGCATAGACTGC Oligo-up			Oligo-dn	CTTGCGCCTGCAATACCGAGAC
Oligo-dn AGTGGAGACCTGGGCTGC TET2-site2 CCTTTCTAACAAATCCTAAA Oligo-up GCTGCTTTCGTAGAGAGAGC Oligo-dn GACACTACAGGGTTGCT Oligo-up GGCGCCGATCGCAATGG MSSK1-site2 CGTGCCCGATCTTCACAGGG Oligo-up GGCGCCAGATGGGAGAGAGT FANCF AAGTTCGCTAATCCCGGAAC Oligo-up GGCTGCACAACCAGTGGA EMX-sg1 GCTCCCATCACATCAACCGG Oligo-up GTGAAGGTGTGGTTCCAGAA EMX-sg2 GACATCGATGTCCTCCCCAT Oligo-up GTGAAGGTGTGGTTCCAGAA Oligo-dn CTCGTGGGGTTTGTGGTTG Oligo-dn CTCGTGGGGTTGGTGGTTCCAGAA EMX-sg2 GACATCGATGTCCTCCCCAT Oligo-up GTGAAGGTGTGGTTCCAGAA Oligo-dn CTCGTGGGGTTTGTGGTTG Oligo-dn CTCGTGGGGTTTGTGGTTG ZWINT TGAAACAAAACATACAATAG Oligo-up CGGAAAACAGAAAAGTAGAGAA Oligo-dn CTTGTCATGGAAAGGAAAGTGGGAAAGAT Oligo-up CGAAAACAGAAAAGTAGACAT ZWINT TGAAACAAAACATACAATAG Oligo-up CGAAACAGAAAAGTGGGAAAGAT Oligo-dn ACAGTGAGCTCACCACCACCAGC Oligo-up CGTGAAACAAAACATACAGC VEGFA-site1 ATGTTCTTGCTGTTGTTGTTGTT Oligo-up CAGTGGCTCAACCTACACCTGG VEGFA-site2 GAACACAAAAGCATAGACTGC Oligo-up CAGTGGAATCAATTGTTAGAGCCTGG VEGFA-site2 GTACACTT	TET2-site1	TTGCTCTGCTTCTTCTCCCA	Oligo-up	ATCCCAACCTCCCACCTCG
TET2-site2 CCTTTCTAACAAATCCTAAA Oligo-up GCTGCTTTCGTAGAGAAGC Oligo-dn GACACTACAGGGTTTGCT MSSK1-site2 CGTCGCCGATCTTCACAGGG Oligo-up TGGGCCAGATGGTCAATGG MSSK1-site2 CGTCGCCGATCTTCACAGGG Oligo-up TGGGCCAGATGGTCAATGG FANCF AAGTTCGCTAATCCCGGAAC Oligo-up GGCTGCACAACCAGTGGA EMX-sg1 GCTCCCATCACATCAACCGG Oligo-up GTGAAGGTGTGGGTTCCAGAA Oligo-dn CTCGTGGGTTTGTGGGTTG Oligo-up GTGAAGGTGTGGGTTCCAGAA EMX-sg1 GCTCCCATCACATCAACCGG Oligo-up GTGAAGGTGTGGTTCCAGAA Oligo-dn CTCGTGGGTTTGTGGGTTG Oligo-up GTGAAGGTGTGGTTCCAGAA TET2-site3 AGATTCTGAATGAGCAGGAG Oligo-up TCGGGGTAAGCCAAGAAAG Oligo-dn CTTGTCATGGTAATTAGCACTT Oligo-up TCGGGGTAAGCCAAGAAAG ZWINT TGAAACAAAACATACAATAG Oligo-up CGAAAACAGAAAGTGGGGAAAGAT Oligo-dn ACGTGACCACCATCAACCT Oligo-up ACGTGGACAACAAAAGATACAT HEK4-site2 GTACACTTGTGCAACCTCAC Oligo-up ATTTCTGTCAACCCACTACAGC VEGFA-site1 ATGTTCTTGCTGTTGTTGTT Oligo-up CAGTGGCTCAACCACACAGAGGAG <td></td> <td></td> <td>Oligo-dn</td> <td>AGTGGAGACCTGGGCTGC</td>			Oligo-dn	AGTGGAGACCTGGGCTGC
Oligo-dn GACACTACAGGGTTTGCT MSSK1-site2 CGTCGCCGATCTTCACAGGG Oligo-up TGGGCCAGATGGTCAATGG Oligo-dn AGCCAGACGGTGGAGAAGT Oligo-up GGCTGCACAACCAGTGGA FANCF AAGTTCGCTAATCCCGGAAC Oligo-up GCCAGCACTCTTGGAGTGGC EMX-sg1 GCTCCCATCACATCAACCGG Oligo-up GTGAAGGTGTGGGTTCCAGAA EMX-sg2 GACATCGATGTCCTCCCCAT Oligo-up GTGAAGGTGTGGGTTCCAGAA EMX-sg2 GACATCGAATGAGCAGGAG Oligo-up CTCGTGGGTTTGTGGTTG TET2-site3 AGATTCTGAATGAGCAGGAG Oligo-up TCGGGGTAAGCCAAGAAAG Oligo-dn CTTGTCATGGTAATTAGCACTT Oligo-dn CTTGTGCAGAAAAGAAAGA ZWINT TGAAACAAAAACATACAATAG Oligo-up CGAAAACAGAAAGTGGGAAAGAT Oligo-dn ACAGTGAGCTCATCTGACT Oligo-dn ACAGTGAGCTCATCTGACT HEK4-site2 GTACACTTGTGCAACCTCAC Oligo-up ACAGTGAGCTCACCACCTACAGC VEGFA-site1 ATGTTCTTGCTGTTGTTGTT Oligo-up CGTGAAAACAAAATAATAGACCCTGG VEGFA-site2 GACACCAAAAGCATAAGACTGC Oligo-up CGTGAAACAAAACACTAACATGGTG VEGFA-site2 GACACCAAAAGCATAGACTGC Oligo-up CAGTGGCTCAACCTACCAGCTGG VEGFA-site2 GACACCAAAAGCATAGACTGC Oligo-up CAGTGGACACACAACCAGAGAGA VISTA GAACA	TET2-site2	CCTTTCTAACAAATCCTAAA	Oligo-up	GCTGCTTTCGTAGAGAAGC
MSSK1-site2 CGTCGCCGATCTTCACAGGG Oligo-up TGGGCCAGATGGTCAATGG Oligo-dn AGCCAGACGGTGGAGAAGT Oligo-up GGCTGCACAACCAGTGGA FANCF AAGTTCGCTAATCCCGGAAC Oligo-up GGCTGCACAACCAGTGGA EMX-sg1 GCTCCCATCACATCAACCGG Oligo-up GTGAAGGTGTGGTTCCAGAA EMX-sg2 GACATCGATGTCCTCCCCAT Oligo-up GTGAAGGTGTGGTTCCAGAA TET2-site3 AGATTCTGAATGAGCAGGAG Oligo-up CGGGGTAAGCCAAGAAAGA Oligo-dn CTTGTCATGGTAATTAGCACTT Oligo-up TGGGGCTAACGAAAAAAGAAAGA ZWINT TGAAACAAAACATACAATAG Oligo-up CGAAAACAGAAAAGTGGGAAAGAT Oligo-dn CTTGTCATGGAAGCAAGCA Oligo-up CGAAAAACAGAAAAGTGGGAAAGAT VEGFA-site1 ATGTTCTGCTGTTGTTGTTGTTGTT Oligo-up CAGTGGCTCAACCTAACGC VEGFA-site2 GAACACAAAGCATAGACTGC Oligo-up CAGTGGACTAACTGTAGAGAGGA VISTA GAACACAAAGCATAGACTGC Oligo-up CGTGAAGCTAAGCCAGGAGAGA VEGFA-site2 GACCCCCTCCACCCGGCCTC Oligo-up CAGTGAGCTAACTGTGACAGAGAGA VEGFA-site2 GACCCCCTCCACCCCGGCCTC Oligo-up CCCAAGTGAAGCCAGTGGAATAGC			Oligo-dn	GACACTACAGGGTTTGCT
Oligo-dnAGCCAGACGGTGGAGAAGTFANCFAAGTTCGCTAATCCCGGAACOligo-upGGCTGCACAACCAGTGGAOligo-dnCCAGGCTCTCTTGGAGTGTCOligo-upGTGAAGGTGTGGTTCCAGAAEMX-sg1GCTCCCATCACATCAACCGGOligo-upGTGAAGGTGTGGTTCCAGAAOligo-dnCTCGTGGGTTTGTGGTTGOligo-upGTGAAGGTGTGGTTCCAGAAEMX-sg2GACATCGATGTCCTCCCCATOligo-upGTGAAGGTGTGGTTCCAGAADigo-dnCTCGTGGGTTTGTGGTTGOligo-upTCGGGGTAAGCCAAGAAAGTET2-site3AGATTCTGAATGAGCAGGAGOligo-upTCGGGGTAAGCCAAGAAAGWINTTGAAACAAAACATACAATAGOligo-upCGAAAACAGAAAGTGGGAAAGATDigo-dnACAGTGAGCTCATCTGACTOligo-upACAGTGAGCTCATCTGACTHEK4-site2GTACACTTGTGCAACCTCACOligo-upACAGTGGCTCACCACCTAGGVEGFA-site1ATGTTCTTGCTGTTGTTGTTOligo-upCAGTGGCTCACACCTAGTVISTAGAACACAAAAGCATAGACTGCOligo-upGGCTGAAGCTAACTGTGACAGCATGTGVEGFA-site2GACCCCCTCCACCCCGCCTCOligo-upTGGGATCCCGCAGCTGAATACVEGFA-site2GACCCCCTCCACCCCGCCTCOligo-upTGGGATCCCGCAGCTGAATACVEGFA-site2GACCCCCTCCACCCCGCCTCOligo-upCCCAAGTGAGAAGCCAGTGGAATACVEGFA-site2GACCCCCTCCACCCCGCCTCOligo-upTGGGATCCCGCAGCTGGAATACVEGFA-site2GACCCCCTCCACCCCGCCTCOligo-upTGGGATCCCGCAGCTGAATAC	MSSK1-site2	CGTCGCCGATCTTCACAGGG	Oligo-up	TGGGCCAGATGGTCAATGG
FANCF AAGTTCGCTAATCCCGGAAC Oligo-up GGCTGCACAACCAGTGGA EMX-sg1 GCTCCCATCACATCAACCGG Oligo-up GTGAAGGTGTGGTTCCAGAA EMX-sg2 GACATCGATGTCCTCCCCAT Oligo-up GTGAAGGTGTGGGTTCCAGAA EMX-sg2 GACATCGATGTCCTCCCCAT Oligo-up GTGAAGGTGTGGGTTCCAGAA TET2-site3 AGATTCTGAATGAGCAGGAG Oligo-up TCGGGGTAAGCCAAGAAAG Oligo-dn CTCGTGGGTTAGTGGTTG Oligo-up TCGGGGTAAGCCAAGAAAG ZWINT TGAAACAAAACATACAATAG Oligo-up CGAAAACAGAAAGTGGGAAAGAT Oligo-dn CTTGTCATGTGACACCT Oligo-up CGAAAACAGAAAGTGGGAAAGAT HEK4-site2 GTACACTTGTGCAACCTCAC Oligo-up ACAGTGACCTCACCACCTACAGC VEGFA-site1 ATGTTCTTGCTGTTGTTGTTGTT Oligo-up CGTGAAATCAATAGACCTGG VISTA GAACACAAAGCATAGACTGC Oligo-up CGTGAAGCTAACTGTGACAGCATGTG VEGFA-site2 GACCCCCTCCACCCCGCCTC Oligo-up CGTGAAATCAATTGTTAGAGAGGA VISTA GAACACAAAGCATAGACTGC Oligo-up GGCTGAGCTAACTGTGACAGCATGTG VEGFA-site2 GACCCCCTCCACCCCGCCTC Oligo-up CCTGAAGTGAAGCCAGTGGAATAC			Oligo-dn	AGCCAGACGGTGGAGAAGT
Oligo-dn CCAGGCTCTCTTGGAGTGTC EMX-sg1 GCTCCCATCACATCAACCGG Oligo-up GTGAAGGTGTGGTTCCAGAA Oligo-dn CTCGTGGGTTTGTGGTTG EMX-sg2 GACATCGATGTCCTCCCCAT Oligo-up GTGAAGGTGTGGTTCCAGAA TET2-site3 AGATTCTGAATGAGCAGGAG Oligo-up CTCGTGGGTAGCCAAGAAAG Oligo-dn CTCGTGGGTAAGCCAAGAAAG Oligo-up TCGGGGTAAGCCAAGAAAG ZWINT TGAAACAAAACATACAATAG Oligo-up CGAAAACAGAAAGTGGGAAAGAT ZWINT TGAAACAATACAATACAATAG Oligo-up ACAGTGAGCTCATCTGACT HEK4-site2 GTACACTTGTGCAACCTCAC Oligo-up ACAGTGAGCTCAACCACACCAGC VEGFA-site1 ATGTTCTTGCTGTTGTTGTT Oligo-up CAGTGGCTCAACCTAGT VISTA GAACACAAAGCATAGACTGC Oligo-up GGCTGAGCTAACTGTGACAGCATGTG VEGFA-site2 GACCCCCTCCACCCCGCCTC Oligo-up CAGTGGACTAACTGTGACAGCATGTG VEGFA-site2 GAACACAAAGCATAGACTGC Oligo-up CAGTGGCTCAACCTAGT VEGFA-site2 GAACACAAAGCATAGACTGC Oligo-up CAGTGGCTCAACCTAGT VEGFA-site2 GAACACAAAGCATAGACTGC Oligo-up CAGTGGACTAACTGTGACACCTAGT	FANCF	AAGTTCGCTAATCCCGGAAC	Oligo-up	GGCTGCACAACCAGTGGA
EMX-sg1 GCTCCCATCACATCAACCGG Oligo-up GTGAAGGTGTGGTTCCAGAA Oligo-dn CTCGTGGGTTTGTGGTTG EMX-sg2 GACATCGATGTCCTCCCCAT Oligo-up GTGAAGGTGTGGTTCCAGAA Oligo-dn CTCGTGGGTTTGTGGTTG Oligo-dn CTCGTGGGTTGTGGTTG TET2-site3 AGATTCTGAATGAGCAGGAG Oligo-up TCGGGGTAAGCCAAGAAAG Oligo-dn CTTGTCATGGTAATTAGCACTT Oligo-dn CTTGTCATGGTAATTAGCACTT ZWINT TGAAACAAAACATACAATAG Oligo-up CGAAAACAGAAAGTGGGAAAAGAT Oligo-dn ACAGTGAGCTCATCTGACT Oligo-dn ACAGTGAGCTCATCTGACT HEK4-site2 GTACACTTGTGCAACCTCAC Oligo-up ACAGTGAGCTCACCACCTACAGC VEGFA-site1 ATGTTCTTGCTGTTGTTGTT Oligo-up CAGTGGCTCACACCTAGT VISTA GAACACAAAGCATAGACTGC Oligo-up GGCTGAGCTAACTGTGACAGCATGGG VISTA GAACACAAAAGCATAGACTGC Oligo-up GGCTGAGCTAACTGTGACAGCAGGAAGCAGGAAGCCAGTGGAATAC VEGFA-site2 GACCCCCTCCACCCCCCCCCCC Oligo-up GGCTGAGCTAACTGTGACAGCATGGG VISTA GAACCCCACCCCCCCCCCCCCCCCCCCCCCCCCCCCCC			Oligo-dn	CCAGGCTCTCTTGGAGTGTC
EMX-sg2 GACATCGATGTCCTCCCCAT Oligo-up GTGAAGGTGTGGTTCCAGAA Digo-dn CTCGTGGGTTTGTGGTTG Oligo-dn CTCGTGGGTTTGTGGTTG TET2-site3 AGATTCTGAATGAGCAGGAG Oligo-up TCGGGGTAAGCCAAGAAAG Oligo-dn CTTGTCATGGTAATTAGCACTT Oligo-up CGGAAAACAGAAAGTGGGAAAGAT ZWINT TGAAACAAAACATACAATAG Oligo-up CGAAAACAGAAAGTGGGAAAGAT Oligo-dn ACAGTGAGCTCATCTGACT Oligo-up ACAGTGAGCTCATCTGACT HEK4-site2 GTACACTTGTGCAACCTCAC Oligo-up ATTTCTGTCAACCCACTACAGC VEGFA-site1 ATGTTCTTGCTGTTGTTGTT Oligo-up CGTGAAATCAATTGTTAGAGAGGA VISTA GAACACAAAAGCATAGACTGC Oligo-up GGCTGAGCTAACTGTGACAGCATGTG VISTA GAACACAAAAGCATAGACTGC Oligo-up GGCTGAGCTAACTGTGACAGCATGTG VEGFA-site2 GACCCCCTCCACCCCGCCTC Oligo-up GGCTGAGCTAACTGTGACAGCATGTG VEGFA-site2 GACCCCCTCCACCCCGCCTC Oligo-up GGCTGAGCTAACTGTGACAGCATGTG VEGFA-site2 GACCCCCTCCACCCCGCCTC Oligo-up GGCTGAGCTAACTGTGACAGCATGTG VEGFA-site2 GACCCCCTCCACCCCGCCTC Oligo-up TTGGGATCCCGCAGCTGA	EMX-sg1	GCTCCCATCACATCAACCGG	Oligo-up	GTGAAGGTGTGGGTTCCAGAA
EMX-sg2 GACATCGATGTCCTCCCCAT Oligo-up GTGAAGGTGTGGTTCCAGAA Digo-dn CTCGTGGGTTTGTGGTTG TET2-site3 AGATTCTGAATGAGCAGGAG Oligo-up TCGGGGTAAGCCAAGAAAG ZWINT TGAAACAAAACATACAATAG Oligo-up CGAAAACAGAAAGTGGGAAAGAT ZWINT TGAAACAAAACATACAATAG Oligo-up CGAAAACAGAAAGTGGGAAAGAT HEK4-site2 GTACACTTGTGCAACCTCAC Oligo-up ACAGTGAGGCTCACCACCAGC VEGFA-site1 ATGTTCTTGCTGTTGTTGTT Oligo-up CGTGAAATCAATTGTTAGAGAGGA VISTA GAACACAAAAGCATAGACTGC Oligo-up GGCTGAGCTAACTGTGACAGCAGGAGA VEGFA-site2 GACCCCCTCCACCCCGCCTC Oligo-up CGTGAAGCTAACTGTGACAGCATGTG VISTA GAACACAAAAGCATAGACTGC Oligo-up GGCTGAGCTAACTGTGACAGCATGTG VEGFA-site2 GACCCCCTCCACCCCCGCCTC Oligo-up GGCTGAGCTAACTGTGACAGCATGTG VEGFA-site2 GACCCCCTCCACCCCCCCCCCCCCCCCCCCCCCCCCCCC			Oligo-dn	CTCGTGGGTTTGTGGTTG
Oligo-dn CTCGTGGGTTTGTGGTTG TET2-site3 AGATTCTGAATGAGCAGGAG Oligo-up TCGGGGTAAGCCAAGAAAG Oligo-dn CTTGTCATGGTAATTAGCACTT Oligo-up CGAAAACAGAAAGTGGGAAAGAT ZWINT TGAAACAAAACATACAATAG Oligo-up CGAAAACAGAAAGTGGGAAAGAT Oligo-dn ACAGTGAGCTCATCTGACT Oligo-up ACAGTGAGCTCATCTGACT HEK4-site2 GTACACTTGTGCAACCTCAC Oligo-up ATTTCTGTCAACCCACTACAGC VEGFA-site1 ATGTTCTTGCTGTTGTTGTT Oligo-up CAGTGGCTCACACCTAGT VISTA GAACACAAAAGCATAGACTGC Oligo-up GGCTGAGCTAACTGTGACAGCAGGA VEGFA-site2 GACCCCCTCCACCCCGCCTC Oligo-up GGCTGAGCTAACTGTGACAGCATGTG VISTA GAACACAAAAGCATAGACTGC Oligo-up GGCTGAGCTAACTGTGACAGCAGTGG VEGFA-site2 GACCCCCTCCACCCCGCCTC Oligo-up TTGGGATCCCGCAGCTGA	EMX-sg2	GACATCGATGTCCTCCCCAT	Oligo-up	GTGAAGGTGTGGGTTCCAGAA
TET2-site3 AGATTCTGAATGAGCAGGAG Oligo-up TCGGGGTAAGCCAAGAAAG Oligo-dn CTTGTCATGGTAATTAGCACTT ZWINT TGAAACAAAACATACAATAG Oligo-up CGAAAACAGAAAGTGGGAAAGAT Oligo-dn ACAGTGAGCTCATCTGACT Oligo-dn ACAGTGAGCTCATCTGACT HEK4-site2 GTACACTTGTGCAACCTCAC Oligo-up ATTTCTGTCAACCCACTACAGC VEGFA-site1 ATGTTCTTGCTGTTGTTGTT Oligo-up CGTGAAATCAATTGTTAGAGAGGA VISTA GAACACAAAAGCATAGACTGC Oligo-up GGCTGAGCTAACTGTGACAGCAGGGAATAC VEGFA-site2 GACCCCCTCCACCCCGCCTC Oligo-up CCCAAGTGAGAAGCAAGCATGTG			Oligo-dn	CTCGTGGGTTTGTGGTTG
Oligo-dn CTTGTCATGGTAATTAGCACTT ZWINT TGAAACAAAACATACAATAG Oligo-up CGAAAACAGAAAGTGGGAAAGAT Oligo-dn ACAGTGAGCTCATCTGACT Oligo-up ACAGTGAGCTCATCTGACT HEK4-site2 GTACACTTGTGCAACCTCAC Oligo-up ATTTCTGTCAACCCACTACAGC VEGFA-site1 ATGTTCTTGCTGTTGTTGTT Oligo-up CGTGAAATCAATAGACCCTGG VISTA GAACACAAAGCATAGACTGC Oligo-up GGCTGAGCTAACTGTGACAGCAGTGG VEGFA-site2 GACCCCCTCCACCCCGCCTC Oligo-up GGCTGAGCTAACTGTGACAGCAGTGG	TET2-site3	AGATTCTGAATGAGCAGGAG	Oligo-up	TCGGGGTAAGCCAAGAAAG
ZWINT TGAAACAAAACATACAATAG Oligo-up CGAAAACAGAAAGTGGGGAAAGAT Oligo-dn ACAGTGAGCTCATCTGACT Oligo-up ATTTCTGTCAACCCACTACAGC HEK4-site2 GTACACTTGTGCAACCTCAC Oligo-up ATTTCTGTCAACCCACTACAGC VEGFA-site1 ATGTTCTTGCTGTTGTTGTT Oligo-up CAGTGGCTCACACCTAGT VISTA GAACACAAAGCATAGACTGC Oligo-up GGCTGAGCTAACTGTGACAGCATGGG VEGFA-site2 GACCCCCTCCACCCCGCCTC Oligo-up GGCTGAGCTAACTGTGACAGCATGTG			Oligo-dn	CTTGTCATGGTAATTAGCACTT
Oligo-dn ACAGTGAGCTCATCTGACT HEK4-site2 GTACACTTGTGCAACCTCAC Oligo-up ATTTCTGTCAACCCACTACAGC Oligo-dn GGCACAAGAATAATAGACCCTGG Oligo-up CAGTGGCTCACACCTAGT VEGFA-site1 ATGTTCTTGCTGTTGTTGTT Oligo-up CAGTGGCTCACACCTAGT VISTA GAACACAAAGCATAGACTGC Oligo-up GGCTGAGCTAACTGTGACAGCATGTG Oligo-dn CCCAAGTGAGAAGCCAGTGGAATAC Oligo-dn CCCAAGTGAGAAGCCAGTGGAATAC VEGFA-site2 GACCCCCTCCACCCCGCCTC Oligo-up TTGGGATCCCGCAGCTGA	ZWINT	TGAAACAAAACATACAATAG	Oligo-up	CGAAAACAGAAAGTGGGAAAGAT
HEK4-site2 GTACACTTGTGCAACCTCAC Oligo-up ATTTCTGTCAACCCACTACAGC Oligo-dn GGCACAAGAATAATAGACCCTGG Oligo-up GGCACAAGAATAATAGACCCTGG VEGFA-site1 ATGTTCTTGCTGTTGTTGTT Oligo-up CAGTGGCTCACACCTAGT VISTA GAACACAAAGCATAGACTGC Oligo-up GGCTGAGCTAACTGTGACAGCATGGG VEGFA-site2 GACCCCCTCCACCCCGCCTC Oligo-up TTGGGATCCCGCAGCTGA			Oligo-dn	ACAGTGAGCTCATCTGACT
VEGFA-site1 ATGTTCTTGCTGTTGTTGTT Oligo-up CAGTGGCTCACACCTAGT VISTA GAACACAAAGCATAGACTGC Oligo-up GGCTGAGCTAACTGTGACAGCATGGG VISTA GAACCCCCCCCCCCCCCCC Oligo-up GGCTGAGCTAACTGTGACAGCATGGG VEGFA-site2 GACCCCCTCCACCCCGCCTC Oligo-up TTGGGATCCCGCAGCTGA	HEK4-site2	GTACACTTGTGCAACCTCAC	Oligo-up	ATTTCTGTCAACCCACTACAGC
VEGFA-site1 ATGTTCTTGCTGTTGTTGTT Oligo-up CAGTGGCTCACACCTAGT Oligo-dn CGTGAAATCAATTGTTTAGAGAGGA VISTA GAACACAAAGCATAGACTGC Oligo-up GGCTGAGCTAACTGTGACAGCAGTGG Oligo-dn CCCAAGTGAGAAGCCAGTGGAAAAGC Oligo-dn CCCAAGTGAGAAGCCAGTGGAAAACC VEGFA-site2 GACCCCCTCCACCCCGCCTC Oligo-up TTGGGATCCCGCAGCTGA			Oligo-dn	GGCACAAGAATAATAGACCCTGG
VISTA GAACACAAAGCATAGACTGC Oligo-up GGCTGAGCTAACTGTGACAGCATGTG VISTA GAACACAAAGCCATGGACAGCCGC Oligo-up GGCTGAGCTAACTGTGACAGCAGTGG VEGFA-site2 GACCCCCTCCACCCCGCCTC Oligo-up TTGGGATCCCGCAGCTGA	VEGFA-site1	ATGTTCTTGCTGTTGTTGTT	Oligo-up	CAGTGGCTCACACCTAGT
VISTA GAACACAAAGCATAGACTGC Oligo-up GGCTGAGCTAACTGTGACAGCATGTG Oligo-dn CCCAAGTGAGAAGCCAGTGGAATAC VEGEA-site2 GACCCCCTCCACCCCGCCTC Oligo-up TTGGGATCCCGCAGCTGA			Oligo-dn	CGTGAAATCAATTGTTTAGAGAGGA
Oligo-dn CCCAAGTGAGAAGCCAGTGGAATAC	VISTA	GAACACAAAGCATAGACTGC	Oligo-up	GGCTGAGCTAACTGTGACAGCATGTG
VEGEA-site2 GACCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC			Oligo-dn	CCCAAGTGAGAAGCCAGTGGAATAC
	VEGFA-site2	GACCCCCTCCACCCCGCCTC	Oligo-up	TTGGGATCCCGCAGCTGA
Oligo-dn TCCGAAGCGAGAACAGCC			Oligo-dn	TCCGAAGCGAGAACAGCC
CTLA CTCCCTCAAGCAGGCCCCGC Oligo-up TTCCAGGGCAGCAGAAGAA	CTLA	CTCCCTCAAGCAGGCCCCGC	Oligo-up	TTCCAGGGCAGCAGAAGAA
Oligo-dn GCAGATGTAGTGTTTCCACAGG			Oligo-dn	GCAGATGTAGTGTTTCCACAGG
EMX1-site3 GCTAACTTACTGTGTAACCC Oligo-up AGATGGTTTGGACAGAGCTTCC	EMX1-site3	GCTAACTTACTGTGTAACCC	Oligo-up	AGATGGTTTGGACAGAGCTTCC
Oligo-dn TACCTTAAAGGGAAGGGACTAGGG			Oligo-dn	TACCTTAAAGGGAAGGGACTAGGG
MYC-site CACGGCCGACCAGCTGGAGA Oligo-up CCCTCCTACGTTGCGGTCA	MYC-site	CACGGCCGACCAGCTGGAGA	Oligo-up	CCCTCCTACGTTGCGGTCA
Oligo-dn CGAGAAGCCGCTCCACAT			Oligo-dn	CGAGAAGCCGCTCCACAT

Name sgRNA		Target site sequence (5'-3')		Deep sequencing oligo (5'-3')		
A1	RIOK2	GGCCACATTCACTTTCCCCA	Oligo-up	CGGCGGGTTTCTTACCGC		
			Oligo-dn	TATACTAAGACGCAGCGCGTGC		
A2	CAST	ATCTACTTCTCCGGATTGTT	Oligo-up	CACACACACACAGACCAATTTGTTTTTG		
			Oligo-dn	AGTTGTGCAACGAGAGAGCG		
A3	AFF1	CTGCACTTCAGACGAGCCCG	Oligo-up	TTGTGCTGTTGCTGGGCAGG		
			Oligo-dn	AATCCTGATGGACATCCGGGC		
A4	MED28	CAGTTCACGTTTCAGAAAAA	Oligo-up	TTCAGGCAGCTCCAGGCGC		
			Oligo-dn	CCCATTTGTGAATTAGTTGCTCGGATCCC		
A5	SLC11A1	CCCATCTCTTCTCTCCTTGA	Oligo-up	TTCCTGGGGACCCAGCAGG		
			Oligo-dn	TTGCCCAGGTACCCTCTGCA		
A6	RNF2	GTCATCTTAGTCATTACCTG	Oligo-up	ACGGAACTCAACCATTAAG		
			Oligo-dn	AGTGTTAGCCAACATACAG		
A7	TET2-site1	TTGCTCTGCTTCTTCTCCCA	Oligo-up	ATCCCAACCTCCCACCTCG		
			Oligo-dn	AGTGGAGACCTGGGCTGC		
A8	TET2-site2	CCTTTCTAACAAATCCTAAA	Oligo-up	GCTGCTTTCGTAGAGAAGC		
			Oligo-dn	GACACTACAGGGTTTGCT		
A9	VISTA	GAACACAAAGCATAGACTGC	Oligo-up	GGCTGAGCTAACTGTGACAGCATGTG		
		Oligo-dn	CCCAAGTGAGAAGCCAGTGGAATAC			
IA1	AC110614.	CCTTACAGACTAGAACAAAG	Oligo-up	CTTACTGGGCAGTTTTTATTGTCTTTCAACAC		
	1		Oligo-dn	GACAAAAGTGTCTAGTCACCTATAAGAAAAATCCC		
IA2	AK123816-	GAACTCTTATTCCTTGCTAG	Oligo-up	TGAAGAAAGCTGTCCTAAACATCCGT		
	I1		Oligo-dn	TACTGTAAAAGATAACAATACCAAGTGCTGG		
IA3	AK123816-	CCATTCTAACTGGTGTGAGA	Oligo-up	CTTCAAGAACCATGTTATCATTTTCCGCA		
	2-I11		Oligo-dn	TCGCCACACTGACTTCCCA		
IA4	chr5 a21 1	TTTAACTTCTCTCCTGAGTA	Oligo-up	TCCATTGTTCAACTCATTCTGCAATTAAGC		
	cm3-q21.1		Oligo-dn	AGTCATAATCTAAATTGTATTTCCTGGCAGTAAGT		
IA5	HCN1 site1	CTTCACTGTCTTGCTAAATA	Oligo-up	TCTGCTTGTTCATATTGGCAGTAACAAGGT		
	fictv1-site1		Oligo-dn	TATATTAGGAAACTACAAATTGTAACCTCTTATCCCTGA		
IA6	ch2 n12	CTTTTCTCTGTAATATCACG	Oligo-up	ACGGAACTCAACCATTAAG		
	cnz-prz		Oligo-dn	TAGTGCCTTTATAAAAGAGGCTCCAGAGA		
IA7	HCN1_site?	AACCTCTTATCCCTGATGGT	Oligo-up	TAAGATGCAGGACACAGTGTGCTAC		
	fictv1-site2		Oligo-dn	GGTTAAATGAGGTTCCTTGTCTGTCTCT		
IA8	EMX1-	GCTAACTTACTGTGTAACCC	Oligo-up	AGATGGTTTGGACAGAGCTTCC		
	site3		Oligo-dn	CTACCTTAAAGGGAAGGGACTAGGG		
IA9	HIR A	GTATTCTAGAATGCAGGGCA	Oligo-up	GTGTGGAAGATAGATGAG		
HIKA		Oligo-dn	CTGCCATCACAATTCTAGTC			

Table S	2-3: Clone	oligos and (deep seau	encing olgios	s of sgRNA-	Off-target site
						- ··· - · · · ·

	Table 52-5. Clone ongos and	i ueep sequenc	ing orgios of sgrave on-target site
sgRNA	Target site sequence (5'-3')		Deep sequencing oligo (5'-3')
EMX1-site3-OT1	GCTAACTTGCTGTGTGACCC	Oligo-up	TATGGTGGTGGTTGAATCAATCTATATTATGCTA
		Oligo-dn	ACATGTATTCTGCTCTTCTGTCCTCAC
EMX1-site3-OT2	CCTAACTTACTGTGTAAGCC	Oligo-up	CTGCAGGAGAAATAATCAGAGTTATAAAGTATATACCT
		Oligo-dn	GAAGGTCAAGGGATAGAAGGTTGCA
EMX1-site3-OT3	GCAATCTTACTCTGTCACCC	Oligo-up	CCTTGAGCCCAGGAGTAAGAGG
		Oligo-dn	GCATGGCCTTTGCCCTGAT
EMX1-site3-OT4	GCTTACTCACTGTGTATCCC	Oligo-up	GGGAGTTAGGAATTTGGGTTCTGAAGG
		Oligo-dn	GAGGCTTCATCTTAAATGGTTGTCAGGT
EMX1-site3-OT5	GCTGCCTTGCTGTGTGACCC	Oligo-up	ATGGAAGGAGCATTGGACAGAGAG
		Oligo-dn	GAGAATAATAGGCTGTGGCTAGGGTATTT
EMX1-site3-OT6	GCTATTTAACTGTGTGACCC	Oligo-up	CTCTATGGTGCATGGTTTGAGGATATTATCTT
		Oligo-dn	GCTCAAAGGGATCTCAGGTTTCTTATCAC
EMX1-site3-OT7	GGGTCACACAGCAAGTTAG	Oligo-up	AGGAAAGTCCACAGAACACAGAAATAGTTAAAG
		Oligo-dn	TGCCATCATCAGACAACACTTTACAAAATG
RP11-OT1	GGAAGCTGGGTGACATGGTT	Oligo-up	GTGGGAATTATGGGAGCTACAATTCAAGA
		Oligo-dn	ACTTTGTATTGGTCGCAAAGAAGGAAC
RP11-OT2	GCAATCGGGCTGGAATCTTT	Oligo-up	AGAGATGGCCTCCCAGATGTC
		Oligo-dn	GGCTTGTAGGAACGCTCAGTGA
RP11-OT3	GCAGTCACTGTGGAATGGTT	Oligo-up	TGCAAGCCCAAACAACAATATACCATTTC
		Oligo-dn	CCTGTGTTTAGCTTCTTATATCGCAGTTCT
RP11-OT4	GCTAACTGGGTGGTATGGTT	Oligo-up	CCCGTGAGTTAATGGTCTCCCTC
		Oligo-dn	CACCATAGTTGGCTCCTCTGGG
RP11-OT5	GCAACCTGGGTGGACTGTTT	Oligo-up	AGGGACAAGAGGATTGAGGTCAC
14 11 010	00.210010001001010111	Oligo-dn	GGAGTTTGGTGCCTGATACCATTG
RP11-OT6	GCAATCTGGGGTATATGGTT	Oligo-un	AGCACAACTCTGCAAGCTACTC
	00.2110100000111110011	Oligo-dn	ACAGCTTACACGGACTTCTCCTTT
RP11-OT7	GCAATCGGGATGGAATTGTG	Oligo-up	TGGCAGGCAGATCACAAACAG
		Oligo-dn	CCTCAGTGACAAGTGCATACCTCC
RP11-OT8	GCAATTTGTGTGGGAATGGTT	Oligo-up	TCTGAACTCTTTGCACTTTGGAGTGAC
		Oligo-dn	CAAATACCCTGTGGTTTGGCCC
HEK2	GAACACAAAGCATAGACTGC	Oligo-up	GGCTGAGCTAACTGTGACAGCATGTG
		Oligo-dn	CCCAAGTGAGAAGCCAGTGGAATAC
HEK2-OT1	GAACACAATGCATAGATTGC	Oligo-up	GTGTGGAGAGTGAGTAAGCCA
		Oligo-dn	ACGGTAGGATGATTTCAGGCA
HEK2-OT2	AAACATAAAGCATAGACTGC	Oligo-up	CACAAAGCAGTGTAGCTCAGG
		Oligo-dn	TTTTTGGTACTCGAGTGTTATTCAG
HEK3	GGCCCAGACTGAGCACGTGA	Oligo-up	GGAAACGCCCATGCAATTAGTC
		Oligo-dn	CTTGTCAACCAGTATCCCGGTG
HEK3-OT1	CACCCAGACTGAGCACGTGC	Oligo-up	TCCCCTGTTGACCTGGAGAA
		Oligo-dn	CACTGTACTTGCCCTGACCA
HEK3-OT2	GACACAGACTGGGCACGTGA	Oligo-up	TTGGTGTTGACAGGGAGCAA
		Oligo-dn	CTGAGATGTGGGCAGAAGGG
HEK3-OT3	AGCTCAGACTGAGCAAGTGA	Oligo-up	TGAGAGGGAACAGAAGGGCT
		Oligo-dn	GTCCAAAGGCCCAAGAACCT
HEK3-OT4	AGACCAGACTGAGCAAGAGA	Oligo-up	CCTAGCACTTTGGAAGGTCG
		Oligo-dn	GCTCATCTTAATCTGCTCAGCC
HEK4	GGCACTGCGGCTGGAGGTGG	Oligo-up	AAGGAAGGGAGGAAGGGC
		Oligo-dn	ACACACACAGGCCTG
HEK4-OT1	TGCACTGCGGCCGGAGGAGG	Oligo-up	GGCATGGCTTCTGAGACTCA
		Oligo-dn	CCCTTGCACTCCCTGTCTTT
HEK4-OT2	GGCTCTGCGGCTGGAGGGGG	Oligo-up	TTTGGCAATGGAGGCATTGG
		Oligo-dn	GAAGAGGCTGCCCATGAGAG
HEK4-OT3	GGCATCACGGCTGGAGGTGG	Oligo-up	TTCCACCAGAACTCAGCCC
		Oligo-dn	CCTCGGTTCCTCCACAACAC
-		0.150 011	00100010010010010

Supplemen	tary Table S3: PC	R oligo of genomic sites from different chromatin environments
Gene		Clone oligo (5'-3')
A1	Oligo-up	CGGCGGGTTTCTTACCGC
	Oligo-dn	TATACTAAGACGCAGCGCGTGC
16	Oligo-up	ACGGAACTCAACCATTAAG
AU	Oligo-dn	AGTGTTAGCCAACATACAG
14.2	Oligo-up	TGAAGAAAGCTGTCCTAAACATCCGT
142	Oligo-dn	TACTGTAAAAGATAACAATACCAAGTGCTGG
IA 3	Oligo-up	CTTCAAGAACCATGTTATCATTTTCCGCA
IAS	Oligo-dn	TCGCCACACTGACTTCCCA
FMX1_site3	Oligo-up	AGATGGTTTGGACAGAGCTTCC
EWIX1-Site5	Oligo-dn	CTACCTTAAAGGGAAGGGACTAGGG
DD11	Oligo-up	GTCCAGTGAGTATTGTCTAAGG
KI II	Oligo-dn	GAGGTCTCCAATTGTCTACC
EMX1_site3_OT1	Oligo-up	TATGGTGGTGGTTGAATCAATCTATATTATGCTA
LWIXI-site5-011	Oligo-dn	ACATGTATTCTGCTCTTCTGTCCTCAC
FMX1_site3_OT2	Oligo-up	CTGCAGGAGAAATAATCAGAGTTATAAAGTATATACCT
LWIAT-Site 5-012	Oligo-dn	GAAGGTCAAGGGATAGAAGGTTGCA
EMX1 site3 OT4	Oligo-up	CTCTATGGTGCATGGTTTGAGGATATTATCTT
EWIAT-Site5-014	Oligo-dn	GCTCAAAGGGATCTCAGGTTTCTTATCAC
RP11_OT2	Oligo-up	AGAGATGGCCTCCCAGATGTC
KI 11-012	Oligo-dn	GGCTTGTAGGAACGCTCAGTGA
RP11-OT5	Oligo-up	AGGGACAAGAGGATTGAGGTCAC
M 11-015	Oligo-dn	GGAGTTTGGTGCCTGATACCATTG
RP11-OT6	Oligo-up	AGCACAACTCTGCAAGCTACTC
GAPDH	Oligo-dn	ACAGCTTACACGGACTTCTCCTTT
	Oligo-up	TCTGGTGGCTGGCTCAGAA
	Oligo-dn	TGGTGGTCCAGGGGTCTTAC