

Supplemental Information

Title

Generation of a rod-specific NRL reporter line in human pluripotent stem cells.

Authors/Affiliations

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Supplemental Table 1. Primers.

| | |
|----------------------------------|-----------------------------------|
| Cloning primers | |
| NRL 5' arm F -KpnI | GAGAGGTACCAAGGGAAAACGGGTCAGAAGGG |
| NRL 5' arm R-Sall | GAGAGTCGACTCTGGAGCTGGGCTGGGAGG |
| NRL 3' arm F-BamHI | GAGAGGATCCCCCTCTGAGGGCCGACCTGG |
| NRL 3' arm R-NotI | GAGAGCGGCCGCGCTGCGTTTTCCCTGTCCTGA |
| eGFP-Sall F | GAGAGTCGACATGGTGAGCAAGGGCGAGGAG |
| eGFP-polyA-MfeI R | GAGACAATTGGGAGATCCCTCGACCTGCAG |
| Site directed mutagenesis | |
| SDM-F | ATGGTGAGCAAGGGCGAG |
| SDM-R | TCTGGAGCTGGGCTGGGA |
| gRNAs | |
| NRL sgRNA 1A | TGACATATTCCATGGCCAGG |
| NRL sgRNA 1B | GTAAAGCGGGAACCCTCTGA |
| Genotyping primers | |
| NRL genotyping -F | TGTTACAAAGTCTAACTGCCC |
| eGFP-R | GGTGGTGAGATGAACTTCAGG |
| NRL 5'-F | CACCATCCCTCTGGCTTTCC |
| NRL 3'-R | GCAGGGTAGCCAGCCAGTAC |
| Copy number qPCR primers | |
| eGFP-F | AGCTAAACGGCCACAAGTTC |
| eGFP-R | AAGTCGTGCTGCTTCATGTG |
| NRL exon 3 qPCR-F | TGTCACCCTGAGCAAATCAG |
| NRL exon 3 qPCR-R | TTGTCTGGGGACTTCTTGG |
| Off target primers | |
| NRL sgRNA 1A OT1 F | TCGCCATCCAGTACAGATCC |
| NRL sgRNA 1A OT1 R | CCAGAAACAGGAACGCACGA |

| | |
|---------------------|---------------------------|
| NRL sgRNA 1A OT3 F | ATTCGTGGTGTCCAGAGGCTA |
| NRL sgRNA 1A OT3 R | TGGCATCGTAAGTGCAAATGA |
| NRL sgRNA 1A OT4 F | AGAAGAATGCCACGTCCTG |
| NRL sgRNA 1A OT4 R | CCCTCTCCAGAGTCCTCGAA |
| NRL sgRNA 1A OT5 F | ACCGGGTGCTCCCAGAATTA |
| NRL sgRNA 1A OT5 R | GCCAACACCGACAAGTTTGG |
| NRL sgRNA 1A OT7 F | ACATTGCTGTGGGCGATACA |
| NRL sgRNA 1A OT7 R | GAGAATTGGGAGCAGTGCCT |
| NRL sgRNA 1B OT1 F | AGGTCAGCCTCTCAGCGAT |
| NRL sgRNA 1B OT1 R | TAATTCGGTCCAGACCTCGC |
| NRL sgRNA 1B OT2 F | GAATGGTTCATCAGGCCCA |
| NRL sgRNA 1B OT2 R | TCCCAAGTTGCTGACATCCC |
| NRL sgRNA 1B OT3 F | GGAAATCTAAGGGTACTGTAGGG |
| NRL sgRNA 1B OT3 R | CAACCCACGGAAAGACACATC |
| NRL sgRNA 1B OT4 F | GCCTTAGCCAATTTGCTCATAAATC |
| NRL sgRNA 1B OT4 R | AGGATGTTGGCCTTTGCAGC |
| NRL sgRNA 1B OT5 F | TCCGTTCCATCTTTTGCGGA |
| NRL sgRNA 1B OT5 R | AGGGGTCAGTCAGTACGTCA |
| NRL sgRNA 1B OT6 F | CTCTGCTAGCCACCGTTCTC |
| NRL sgRNA 1B OT6 R | GTTTGGAGGATGGGGTCTGG |
| NRL sgRNA 1B OT7 F | GGTGCAGGAGAGCTTGTGG |
| NRL sgRNA 1B OT7 R | GAAGTTGCGACACAGAGGGA |
| NRL sgRNA 1B OT8 F | GAGTTGCCTGGAGGAAGCTAA |
| NRL sgRNA 1B OT8 R | AGTTTGCAATACTCTCTCAAAGCA |
| NRL sgRNA 1B OT9 F | AGCTGAGGAGGGTACTGAGG |
| NRL sgRNA 1B OT9 R | ACACTCTGCTGCTCTGCTTC |
| NRL sgRNA 1B OT10 F | CCTTCAATGCCTCTCCGTGT |

| | |
|---------------------|----------------------|
| NRL sgRNA 1B OT10 R | CTTTTGGCCTTGCTGTGACC |
|---------------------|----------------------|

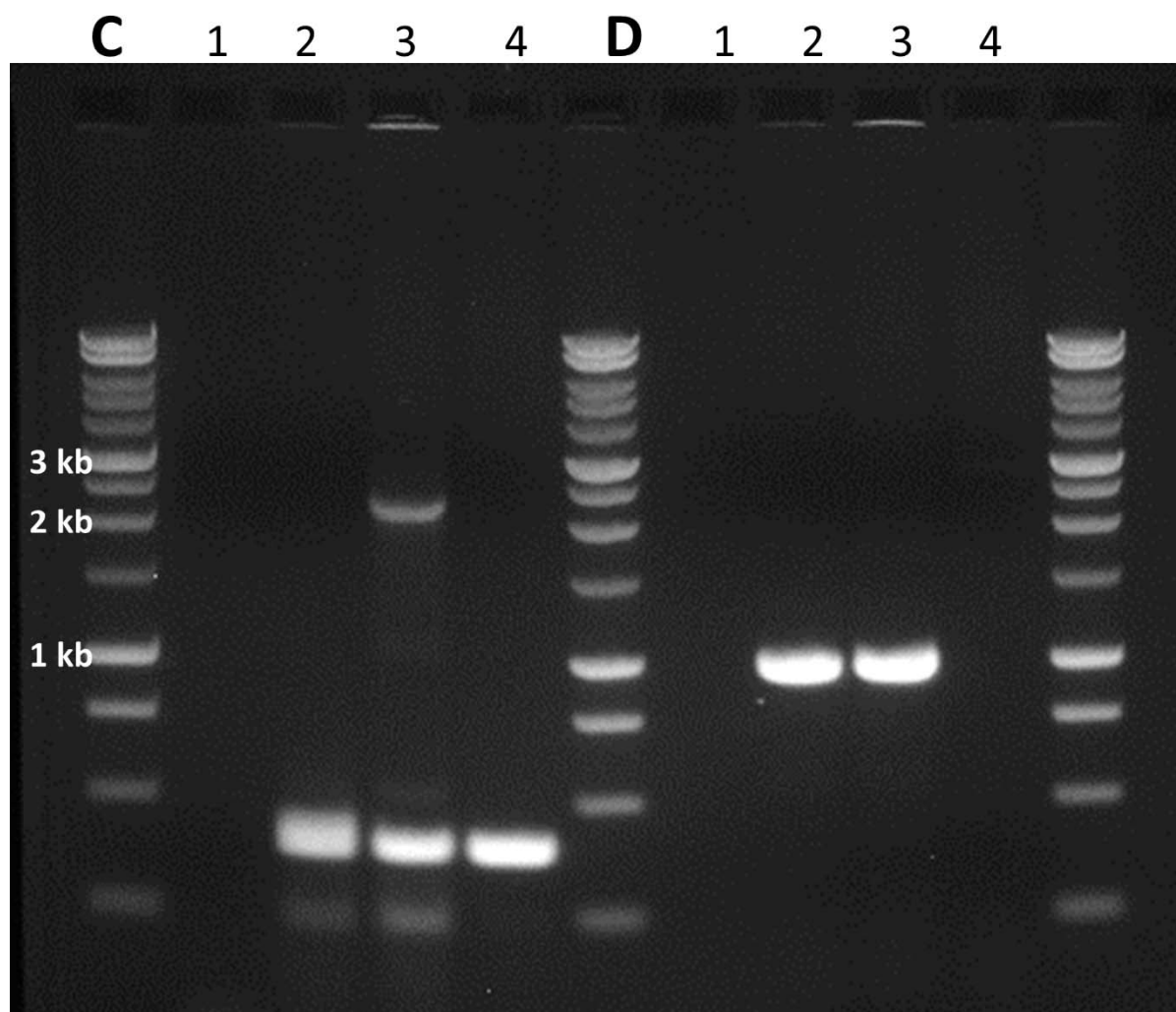
Supplemental Table 2. Off target sequences.

| sgRNA1A | | | | | | | |
|------------|--------|----------|-------------------------|--------------|----------|----------|--------------|
| chromosome | strand | position | sequence | n_mismatches | score | ontarget | gene |
| chr14 | 1 | 24552017 | TGACATATTCCATGGCCAGGGGG | 0 | 100 | True | NM_006177 |
| chr20 | 1 | 39317426 | TGACATACTCCATGGCCAGCGGG | 2 | 4.214362 | False | NM_005461 |
| chr5 | 1 | 26555853 | TTCATATTCTATGGCCAGGGAG | 3 | 1.500342 | False | None |
| chr15 | 1 | 99428977 | TGAAATATTGTATGGCCAGGTGG | 3 | 1.332228 | False | None |
| chr6 | -1 | 1.36E+08 | AGAGATATTCCAAGGCCAGGCAG | 3 | 1.150704 | False | None |
| chr6 | 1 | 12088422 | TTACATCTCCATGGCCAGTGAG | 3 | 1.019098 | False | None |
| chr15 | -1 | 99563969 | TGACAACCTCCATGGCCAGGTAG | 3 | 0.958618 | False | None |
| chr2 | 1 | 1.4E+08 | TGTCATATTTCAAGGCCAAGGAG | 3 | 0.958556 | False | None |
| chr3 | -1 | 46932745 | TCACCTTCTCCATGGCCAGGAGG | 4 | 0.932256 | False | None |
| chr17 | -1 | 74383417 | TGCCCTTCTCCATGGCCAGGAAG | 4 | 0.905329 | False | NM_001142601 |
| chr16 | -1 | 68573852 | TGGGGTTTTCCATGGCCAGGAGG | 4 | 0.891867 | False | None |
| sgRNA1B | | | | | | | |
| chromosome | strand | position | sequence | n_mismatches | score | ontarget | gene |
| chr14 | -1 | 24551968 | GTAAAGCGGGAACCTCTGAGGG | 0 | 100 | True | NM_006177 |
| chr8 | -1 | 22398127 | CTGAAGCGAGAACCCTCTGATGG | 3 | 1.609912 | False | NM_001243974 |
| chr11 | 1 | 1.13E+08 | CTATTGCTGGAACCTCTGATAG | 4 | 1.386187 | False | None |
| chr3 | 1 | 72786510 | GAGAGGCAGGAACCTCTGAAGG | 4 | 1.345833 | False | None |
| chr10 | 1 | 92490398 | CTAAAGAGGGAACCTCTGGGAG | 3 | 1.054856 | False | None |
| chrX | -1 | 1.5E+08 | GGAAAGTGGGAACCTCTGGAAG | 3 | 1.019098 | False | None |
| chr1 | 1 | 6113546 | GCCGAGGGGGAACCTCTGAGAG | 4 | 0.905329 | False | None |
| chrX | 1 | 55306856 | CGAAAACCTGGAACCTCTGAGAG | 4 | 0.838643 | False | None |
| chr6 | 1 | 62641171 | ATAAATCCGTAACCTCTGAAGG | 4 | 0.797206 | False | None |
| chr10 | 1 | 19062244 | GTCAAGCCTCAACCTCTGACAG | 4 | 0.76913 | False | None |
| chr8 | -1 | 52335592 | ATATAGCTGGAACCTCTGCAGG | 4 | 0.710795 | False | None |

Supplemental Table 3. Primary antibodies used for immunocytochemistry.

| Antibody | Host | Catalog # | Company |
|-----------------|-------------|------------------|--------------------------|
| ARR3 | Goat | NBP1-37003 | Novus |
| CRX | Mouse | h00001406-m02 | Abnova |
| eGFP | Mouse | MB3580 | Millipore |
| eGFP | Rabbit | A11122 | Thermo Fisher Scientific |
| KI67 | Rabbit | sc-15402 | Santa Cruz BioTechnology |
| NR2E3 | Mouse | ab41922 | AbCam |
| NRL | Goat | AF2945 | R&D |
| OPN1MW/LW | Rabbit | AB5405 | Millipore |
| OPN1SW | Rabbit | AB5407 | Millipore |
| PKC α | Rabbit | AB32376 | Abcam |
| RHO | Mouse | MABN5356 | Millipore |
| SNCG | Mouse | H00006623-M01 | Abnova |
| VGLUT1 | Guinea Pig | AB5905 | Millipore |
| VSX2 | Sheep | X1179P | Exalpha |

Full-length gel from Figure 1, panels C and D.



Off target amplicons for sgRNA 1A and sgRNA 1B. 10 off target sites for each sgRNA were sequenced and no indels were detected. The off-target sequence is noted with brackets.

sgRNA 1A

Off target site 1: NC_000020.11: 40688583-40689751 Homo sapiens chromosome 20, GRCh38.p7
Primary Assembly

```
TCGCCATCCAGTACAGATCCTCGAGGTGTGTCTTCTGTTCCGGTCGGGCTGAAGCTGGGCGACGAGGGCACGGAGC
TACACGGAGTGCTGAGCGGTGTGGAGGACACCGAGCCGGCTGGCTGCAGGCGTGTGCAGGGCCTGCCCCGACG
CTCCGCGCGCCCCAGTGGCTCCTTCTTACGTCAACTTGAGCAGTCAAGTCGT[TGACATACTCCATGGCCAGC
GGG]CTGGTGGGCAGCTCTGGCCCCATGCTCAGCTCCGCGGCCATCGCTGAAGCGAGGCGCAGCCGCCGCTGCCG
CCCGGGAAACTTTGCGGCCGGCCGGAGCGCGCCGAGCCAAGCGCGGGGGGAAGAGCGGAGAAGAGCTGGGG
AGGCGGGGAGCGAGGGCGCAGCGGGCCGGGGCCGGCCGCAAGCCTTGTCTGGGGACGCGGCGGCGCGCCG
GAGAGTCCCGAGGCTGCCTGCACCGCCCCAGAGCTCTGGGCTGTGCCCGCGCAGGGACCGGGCCGGGTAGAGTC
GGGCGGGGTGGAGAGGCAAGCGGAGCGCGCGGTGGGGCTGAGGGGAGGCGTGGGGCGAGTGCCCGTTGCTCG
CTCTCTAGCTCTTGTCTTACGCTCTCTCGCTCGCAGCCGCTCGCAGCTCGGCGGTGCAGCTGTGCTGGATCCGG
CGGCGCCGAGCCTTTATCGCCTCCTGATGTCACTGGGGTGCGGGGGCCCGGGCGGCCCGGTGCGCGGGCCAA
TAGCTGCACGGCCTCCGCGGCCAGCGGCGCAGGGCGGGGCGCGCCTGACAGCTCCCCCGCCCCCGCGTCAGCT
GACTGGCGGCCCGAGCGGCCCGGAGCGGCGGAGGCCTGGCGGAGCGCTGGAGCGGAGTGGGACGGCCAGCC
TGGGCCACCCCGTACCCTGCAGGTCCCGGCCACGCACGCTCGCCTGGAGTGCGCGCCCCACCTTAGGCCAA
ATCACCGCTTCCCCTCCTCGCGCACTCTCCTCCCTCAGTTCCTTTGCACCCACCCCATCCCGTGTACCCCCAAG
GAGGCTCAGAATGAGCGCCGGGACAACGCCTCCTGGGCCCTTGTCCCAAGCGGCCCGCCAGTGGGCGACG
CTCTGTGTCTCTCGCGGCTTCTGGCCGTGTGTGTCGTGCGTTCCTGTTTCTGG
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sgRNA 1A

Off target site 2: NC_000005.10: 26555045-26556014 Homo sapiens chromosome 5, GRCh38.p7
Primary Assembly

ATTCGTGGTGTCCAGAGGCTAGCAGTTCTGGTAAGAATAAAGTAGTTTCTCCTTATCCATGAAGGATACATTCCAA
GATCACCAGTGGATGCTTGAAGCCATGGGGAGTACAAAACCTATGTACATCATGATTTTTCTATAAATACATACCT
ATAATAATGTTTAAATTGATAAATTAGGAACATTAAGATATTTACAATAACTAATAATAAAATAGAACAATATAACAA
TAGCCTATAATAGTATTTGTGTTTCATATAGTCTCTCTCTCAAAATATCTTGTACTGTGCTGATTTATTTTTGCACCACA
CTTGACCATGGGTAAGTGCAAAACCTGTGGATAAAGGTGGAGTACTGCATTCTTAATTTGAAAATGTATTTTCATATA
AATGCATAGAGTAATTTAAACAACCTAGTATTATTAATAAACTAAGCTAACAATTTTTCTTTCAAAAAAAGCATCAGCAC
AGAAACAACCTGAAATTTTTGAAAACCTAATTCAATTTGTGCTATTATATACAGTATTTACTGGATGTACACACGTGTG
GATGCGCACATGTGCACACACAAACACACACATGGGAAATCTTCCACATTACAAAAAGGAATATCAAGAGCCATT
GGAGCACTTGATCTTTGATGACATCAACCTCTTCGGCTAATAATTTCTCCAGAAAGGTCTTGACTTTCTGATTTCTT
TTTTGTT[TCTCATATTCTATGGCCAGGGAG]TCTCACTCTCTAACTCCATTTTTATTTTCTAATTCTGTTGCATTGAA
TGTCTGTTCAATAAGTGTGTTCTCCGGGTTTCATATCATTGGTTCTTCTCTCAAGCTTCTATGGCTCTGAGATAGAA
TATATTTCTTCCACATCTGTGGTCTCATAGAATAGTAAAAATAACTCTCCTGCAATCCTTACTAAGAATAATGTCCAT
GTTTATTTTCACTTTTAGGCATATCATTGCACTTACGATGCCA

sgRNA 1A

Off target site 3: NC_000015.10: 98885303-98886249 Homo sapiens chromosome 15, GRCh38.p7
Primary Assembly

AGAAGAATGCCACGTCCTGGGTGGACTTCTGTTCCGGCCTGGGGCAGGACGCTGCATGTCAGTTCACCTAGAGCC
CCTCGCTTGCCCTCACCCCTCTCCCTTTCTTCTCCTCCCGTGTTGTCTCATGGTCAGTTCCTCTCCTGGCAAGGCAA
GAGAATCATAAAATCTCTTTGGACCATGTGTCTCTGATGCACTTTGGAGGTTGAAGCTCACTTTCGTGAAGTTAG
GAGCGGTTAATCCTCCTGCACGAGGATGCATGCCTGCTAGGGAAAGCCTCCCTGCGTTTATATGGAACAGTGGTG
TGTACCTTAGGGCAACCCAGAAACAGCTGAGATGGCCCTAAACTCTTCCGTATTTTGATTGAGAAGCTTTACCTTAT
TTGAACATCTGCAGAATAAGTTCTTTCTTTAGAAATGATTGGGGATAAAATTGTTTGCATTA[TGAAATATTGTAT
GGCCAGGTGG]CCCCTCTTTCATGTTTTGTTCCCTGTGAAGAGGTTGAGTCTCCTATTTTTTTTTTTTTTTTGGAGATA
GAGTTTTGTTCTTGTCCCTCAGGCTGGAGTAAATGGTGCAATCTTGGCTCACTGCAACCTCCGCCTCCTGGGTTCA
AACGATTCTCCTGCCTCAGCCTCCAAGTAGCTGGGATCACAGGCACGTGCCACCACACCTGGCTAATTTTTGTATT
TTTAGTAAGAGATGGGGTTTCGCCATGTTGGGCAGGCTGGTCTTGAACCTCCTGACCTCAGTTGATCTGCCCCCTC
GGCCTCCCAAAGTGCTGGGATCACAGGCGTGAGCCACCACGCCAGCCTATGGTATGCTTTTAAAAATGGTTTCTC
TGCACTAATGATTATTTAAAAAAAACCTCTGGCAAGAACAAAAACAAATGGTTTTTTAAAAACTCTAGAAATAAT
TTGATACATTCGAGGACTCTGGAGAGGG

sgRNA 1A

Off target site 4: NC_000006.12: 136010901-136011617 Homo sapiens chromosome 6, GRCh38.p7
Primary Assembly

ACCGGGTGCTCCCAGAATTACTGCAAGGGAGGTTTCATTACCTGGGATTATACTTCATGCCGTGTGGGAAATTACA
TGCTCTCTAGTCAACTGTTGACATTACCAAGACCCTCAGCCTTGGAGATTTACATTTTACTCACACCTCAGACATAG
ACACAAGCTGGGGTTCATTTGTTTGTCTTTACTTTTTTCAGATGTTGGATGAAAAAAGAGATTCTTAATAATGGGTTTT
CACTTCTAACTCCCCCTTTCTCCCCATCAAAAAACAAAACAAAACAAAACAAACCTCAAAAGACTTTATTTTCCTTT
CCCTTTCTTTATAGCAGAGATCAGGGTATCAGGGTATCAAGAGAGCAGGGTATCAGGCTGCTCTCTTATCCAAATG
GCAATACTCAAAGGTTCCCAAGATTTAGTCACCTCCCTTCTCAAGTGAATATAAAACGTGGAGCATCTTTCTTTGCA
GAGTAAGACTGACTTTAGGTCATCTTGAGCCATTTATCATTATTTGAAACATTATAGAATCTATTGGATCATATAG
CCAAAGTTATAGAAAATATAATTTTCATTTTAAACAGATCTCTTATTATGAATGGTACTTGGG[CTGCCTGGCCTT
GGAATATCTCT]TTTGCATGATTGCAATATACTTGTGTCCAAATGTGGATCTTGGCCTCTTAAGTAATGTTCTCACAT
TTACCCAACTTGTCGGTGTGGC

sgRNA 1A

Off target site 5: NC_000006.12: 12087892-12088555 Homo sapiens chromosome 6, GRCh38.p7
Primary Assembly

ACATTGCTGTGGGCGATACATTTATCAGGATGAAAATTTAGTTATTTTTGACTATTGTTGAGATGTAATG

TCCTATATTTCAAAGCTAGCTTGCTTCCTTTGTTCTGTTCTCCCACTTTGCCTTGGCAAGTTGGATCAATATGCAATTG
AAAGACGTTTGATCTGTAAATAGAAGGTTCTCTGAATTTCTTGGCCTTTCTGGCAAGATAGGGAGAGAGGCAGGT
AGATCAGAGTTTGAAGGGCCCATGGTGTGCGGTGTCTGCCTTTTATTTATTTGGAGTAGGATACCATATTGGAGG[
TTACATCTCCATGGCCAGTGAG]CAGCGGTAGGGTCAGCATTGGAGACAACCTTCTGAGCTGATGCGTTTATTTAA
ATTGTACTTACACATTTGGGATATGTAGAATGTTATATAATTATCAATATTGTCTTCAGTTCAGTACAAAATAGTACC
CTGGGAATTTGTTCTTTTGCCATTTAATAAGTACCTAGACCAGTGTGTTAAATTTGGAATCGATTACTGCCCATGT
CATGAAGTATGTATATCCTTATAAAGTTTAAATTAATTATTATTGAAATAGAGCATGCACATATTTACAAAATCCAG
TTGTGCCCAGAGCCCCAGGTCAAAGAACAGCAGGAGCAAGGCACTGCTCCCAATTCTC

sgRNA 1A

Off target site 6: NC_000015.10: 99020565..99021246 Homo sapiens chromosome 15, GRCh38.p7
Primary Assembly

GTGTCTGTAGGGGAACGTGGACCCAGCACGTCTGGGATTCAGTTCTTGGGGAGCAGGGTCTCGCTGGGGACCAT
GGGCAGGGACTGGGCTGGATATTTGGACTCATAAACAAGTCCACAGACTATTCCCATTCTTCATCAGTGTGAAAGG
AAAGGATGAGGTGGCCTCTGAAAGT[CTACCTGGCCATGGAGGTTGTCA]GTTACTTCTCACCCAAGCAGATAGTA
TAGTCTATCTGCTGTAGGAAAGTTTGCTAGGAGGGATTTTTTTGTGATTGGGTGTATCGACGAGCTGGCTTGCCAC
CACCTGGCCAGGGCTCTGGGCAGCCCATCCCCTAGAATGTCTTTCCAGGGGTCCTGTTCTTCTGGGAGGGCCGG
GTCCACAGTGAGTCCCCTGATGGCCAAGGCGTCTGTATTTCCATCTTCTGTTGTGATTCTTGCCATGTAGTGGCA
TCTACACTAGAGATGGCTCTTATCACCCCTTTCTACACATCAGGGGCTGTAGGATATCTGTATGAAATGGGATCTC
CACAGCATAAGATGGCTGGTGTCTGTCCCTCTCCACATGGGTCCTGCCATGGCCTGGCAGGACAGAGTGAATGA
CCAGACTTGGATAGGGTGGTGGCAGGGCAGTGGATGCTGAGTGTGCGTTTTGAACTTTGAAGCCCTAGTCTGG
CG

sgRNA 1A

Off target site 7: NC_000002.12: 139531402-139532229 Homo sapiens chromosome 2, GRCh38.p7
Primary Assembly

ACAGAATGACTCAGCACCGTTTATGAATGATTATAATGAGTTGGGGTAAAGAGAGGTAACAGACATGGGGAAAA
AGATGACACACGATGATAAGAAGTGCAAGCAGCATTCTAAAATTCAGTTCACATCTTCAAACCTCTGAGTTCAAGAT
GCTTCCACTGTACCATGTGGTCCCTATCACTGAGTTCTATAGCATGTTTTCTATGTTTTAAAGCAAAAAGTTTCTCT
GGTTTGCCTCCTCAAATTGTCCAACAAAAATATATATTGAAAACCTCTCAGATTTGCTACACATCACTTGTGAAAAA
TTGCTTAAGAAATAATTCCTCAACTCATTCAAGTTTCATTAATTTTGCCTTTGAAGGATGGAAGAATATATCTTTCTA
GCAAAAATCGGATTTGTGCATGACAGCTACTTGAGCTCAGAGGTCAAAGAATGAATTTGGGCTGCCTCCCTGCATT
CCCATCCCTTCAATCTTTTGTGCTTCCACAGCAGGTAGGATTTGAAAGAGATTCTGCCCTTGCTAGAAGAAAAA
AAAATTGTAAGGTAGAAAATAATCAAACCTTGGCTTGAGAGGAGCCAAAATGAATGCCGTTCCAATACTAATGT
AAACCTTCTACCAATACTTAGGATTTACAAAAAATTTCAAAG[TGTCATATTCATGGCCAAGGAG]ACCTAGTAT
GGTGGCGATGTATGCTATGCTTATGCCTGGGAATAGAGTAAGAGGTTAGGAAGATCAGGAGATAAATTTTCAAG
GAAAAAATCTGAAAAAAGATTGGCATTTCACAAATGTGTGAAAGGGAATGCAGACAGATAAACCT

sgRNA 1A

Off target site 8: NC_000003.12: 46891087-46892009 Homo sapiens chromosome 3, GRCh38.p7 Primary Assembly

CTTGTTGCAATGGCTGTGCTAACAGATAAATAGGTCCTAAAGTTCAGGGAGGCCAGAGGTGGGGCCACCACCCT
ATGGATGAATGAAGGAGTGTGGGAGTCATGCGTGCTGGAAGCACATATCTTCCCTCCTGAACATCCCACTCC
AGAAAAAGGGGTGTGCCT[CCTCCTGGCCATGGAGAAGGTGA]AGCCAACAGCTGGAGGTAGAGGCTGAGCCAAT
TCCTTGAGCCAGTGAGGGGTGTGTTGGTCAGCTTTCGGTGGTCAGGCTGCCAATGGCCACTCAGTTTTCAACCA
TGACTGCCTGCCTGCAGTCTAGGCCATCAGGGGTGACCCCCAGTCATATCAGTAGGCTGGTCTGTCTGTTGGGAG
GCCCAGGGAGTCAGCAAGTCTCTAAGGATGTGTGGGAGCCTCCGTCAGTCACTCCAGAGCTCTCCATCAGCTGGA
GAAAATACAGCACAAATGGGTTTGTCTTGAGAGGGGTGGAGGTGGCAGAAGAAGAAGGATAGTGGGGAGGGGG
TAAGACAACAAGATGGCAAAGGCAGTGTAGATGGTAGTTGTTGGGCAGGTGGCAGTATTGCTGATGGTGCTAAT
GTTGCCTTGGTGATGCTGGAGGTGGTGGCAGTGGTGTGGTGTGGTGTGATGTACCAGTTGTGATGGTGCAGATG
GTGGTGATGGTGGTTATATGGATGGTTACAGTAGTGCTCATGGTGGTAACGGTGATGCCAGTGGTGGTGGTGGT
AGTACTGGGAGGGACTGGTGTGCTGGTGTGGTGTAGTGACAGTAATGATGGTTATTGATGGAGGTACTAGCA
GCAACGATGGAAATGGTAGTTAATGGGTGCTGTAAATGGAGTGAGGTGGACAGGGATCAGCCCCCTCACCAGCA
TGGATCCCCCATGTCAGAGGCACAGGGAGA

sgRNA 1A

Off target site 9: NC_000017.11: 76386803-76387585 Homo sapiens chromosome 17, GRCh38.p7
Primary Assembly

CAGCTATGAGCAGGTCACCAATGAAGACCTCCTGACCAACTGCACGCTATTGCTGTGCCCGGGCTGCTGTCACCC
ATGAACCTGCTGTCTCTGCACACGGCTTCGGGGCTGCGCCTCTTCTCTGTGCTCAGCCTGGCCTGGGGCTTCATTGC
TGATGTGGACCTAGAGAGTGAGAAGTATCGGCGTCTGGGGGAGATGCGCTTCACTCTGGGCACCTCCTGCGTCT
GGCAGCCCTGCGCACCTACCGCGCCGACTGGCCTACCTCCCTGTAGGAAGAGTGGGTTCCAAGACACCTGCCTC
CCCCGTTGTGGTCCAGCAGGGCCCGGTAGATGCACACCTTGTGCCACTGGAGGAGCCAGTGCCCTCTCACTGGAC
AGTGGTGCCCGACGAGGACTTTGTGCTAGTCCTGGCACTGCTGCACTCGCACCTGGGCAGTGAGATGTTTGCTGC
ACCCATGGGCCGCTGTGCAGCTGGCGTCATGCATCTGTTCTACGTGCGGGCGGGAGTGTCTCGTGCCATGCTGCT
GCGCCT[CTTCCTGGCCATGGAGAAGGGCA]GGCATATGGAGTATGAATGCCCCTACTTGGTATATGTGCCCGTGG
TCGCCTCCGCTTGGAGCCCAAGGATGGGAAAGGTGTGTTTGCAGTGGATGGGGAATTGATGGTTAGCGAGGCC
GTGCAGGGCCAGGTGCACCCAACTACTTCTGGATGGTCAGCGGTTGCGTGGAGCCCCCGCCAGCTGGAAGCCC
CAGCAGATGCCACCGCCAGAAGAGCCCTTATG

sgRNA 1A

Off target site 10: NC_000016.10: 68539589..68540304 Homo sapiens chromosome 16, GRCh38.p7
Primary Assembly

```
CCGCTGAGCCTTTCATTCGGGGATGGGGAGCGGCAGGCCCGGGCTGGTTCCACGGTCCTCGCCACCATCTCCCCT
GGAGATGTGGTTTAGGGGCGGAGGTGGGGCGGGGCGGGGCGGGGTGGGGTCGGTGTTCAGCGGGGTGAGT
GGGCCCTGTCCTTCTCCCCAGCTCCTGCCCCGAGCCGGGCCCTGGCGAGGCAGGAATGGCCCCGAGGCCTCCG
ACCGCCGCGCCCCAGGTGAGCAACGCGTTCCTAACCTCCTGGGCATCCCATCCATCTATCCATCCCATCTCCAAGG
GTGTTTGGAGCAGTCATTGTTCTCTGCCTGGCGACTCCCTTACTTGCTTGGCTCGATCGGAG[CCTCCTGGCCATGG
AAAACCCCA]GGCTTTGGGGAGCTGGATTCCCAAAGGGGAGGCTGCTCTGTGGGGTAGAGAGGGCCAGTGTGGT
GCGATCTTGTGGGAGGAGTTGAGATTGGATGCGTTGGGAAGTGTGAGTTTTGAGAGTCCTGAATGCCACGCCAGT
TTTTGAACTCTTGTCAATAAGAAATGGAGAGAGTGGGGTACAGGATGGAACACTGTAGAGGAGGAAGTGACT
GTCGGCAAGTGTGGAGAGAGGAGCCCCAGCTTCTGACCCAGGGCCCATAGAGAGTCCGTAAGGGGCCGTAGAA
GCCTGGTTAGAACATGTCTAGGAAGAGGCTGGAGATGGGCTTTCTT
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sgRNA 1B

Off target site 1: NC_000008.11: 22539844-22540683 Homo sapiens chromosome 8, GRCh38.p7
Primary Assembly

AGGTCAGCCTCTTCAGCGATTCTAAAAGATTTCAAGAGCAGAGGCAGAAGTAGACTGGAATTTAGTTCAATTCATT
TCTGAGGTTGCCCTAAGGTAGGCAAGTTAAATTAACCTTTGTTTCTATGAAAACCATTGGAAGCTGATAAACTTGTATT
ATACTTGTAATTGTTTTATTAGGTAAGATGGTTCAAACGCGAATGCCTTAACCTGGTGTATAAAAGTTGAATCGG
AAGGAAAATATGTAGAAGCTATTTTTAAGTTTTTAACCTTATGTACAGCTCCTGGTTGTGCAAGATAGAAAGCTGTC
CTAAACGAAAAGATTAGCTCTTTTGTTACTTTTTTTGTGGTCTATGTGGCCTTTGTGCGAAAAGCAACTACCCTGG
GTTTAACTTGTTCAATTATTCTAGTGTTCCTTTGTTCTAGCATTGAGTATGTTTCTGGTGCATAAGACACTCTTCTT
AAAGGTACTGGGGCCAGTAAGTACTTGTTAGCTTTTTGTTAGGTATATGTCTACCATGATTATGCATATAGAGCTT
TTATGAAAATTACTTTCACAATTCAGCTGCCCTTTGGGCTTTAAGGAAGCAGTAGCTGCAGCCAAGACTGATTCA
GTCAGACATTGCCATGACTTTCACTAGACGTGTGCTCCATAGCCACCTTTCTGTGTGTTTCTCTAGGAGGTTGCTG
TGTGCTAAGAACTTTTTTAAGCCTGTTGCTTGGCTGCCTAATTGAGCTCTCCACCTGCTTCTGTTTTCTGTAG
[CCATCAGAGGGTCTCGCTTCAG]CACAAAGATCCGGAGTTTTGAAGAAGCGCGAGGTCTGGACCGAATTA

sgRNA 1B

Off target site 2: NC_000011.10: 112807711-112808876 Homo sapiens chromosome 11, GRCh38.p7
Primary Assembly

GAATGGTTCCATCAGGCCAGATGGGGCCTCAAAGAGCTGGTCAGCTGGACACCCTCTGACTCCTCCCTCCCCA
TCCCTGTGCTTCCCTGGACCTGGGATCAAACCTATTTTCAGGGCAAACCTTGCAAGGGCTCCAACTGGGAGAGAG
CGGGTGGGAGGGAGGTGCAAGAAGAGAGGGCACTTTGCTGTTTACAGCTAAGCCCTGGTGTCTGAAAGCCTCAA
ACTGAAGACATCAATAATTCATACATTCATATGCTGTAGAGTATTTCCCTTTTGTACATATCTGGCCAATTGATTT
CCCTTGGCCACAAACCTGCTGCTTTTAGAACATCATTAAATAACAAGTCAACTGGTAAAATCTTCCCTGGGAGAGGG
GGCTTTGGTTGGGAGAGGTTCTGACCTTGTTTCCCCAAGAAAAGGGGCTGTGAGCAGCCCTGGCAGCAGAATG
TATGCACATGGGCTGGGAGCCTTCCCTCCTCTGTTTTAGTGGAAGAAGGGACTGGGGGCCAGAGAGATGAGATG
CCCACCCTATGGCCTCCCCAGG[CTATTGCTGGAACCCTCTGATAG]GGTTACAGGGAGAGAAGGAAAGAGAGAG
AGAGAGAGAACTTGGGAGCCTCAGAATAAGAATACAGGTTCTAATGGAACCCTCTCTAGCAGCCTCCTCCTCCCC
TCCTCACCCAGGTTCTGTCTCTGGGGGTTCCGTGTCTGATCCTCAAGTACCACGGGATGAAACTAATCAGGGGC
TCTGGAATTAACAAGAGCTGGGAGCCCATGGTGCAACCTGGAGCTTCTACCAAAGCCTCCCTGCACCTCGTCAG
GGAAACCAGGAGGCCACCCAGCTGAGGCCCTTTGGAGTGGCAAATGGGGCAAGGGCATCTTTCCTGCTGGCT
CCATTCCCTGAGCCCTTCCATGGCATCCGGAGCCCAGATTGTCCTCCTTCTGCTTCTGTGAGTCCCTGGACAGC
ACCTGGCTCGTAGGGAATGACCCTTCATGGATACTACAAGAGACTTGTTGAAAGAGTAAATGAAAGCGGAAAGG
AACTGACAACTCATTACAGTAAGTAAAGTGCTGCCACTTCTCAGGACTCTGGGTTTACAGAGACTCAAAGGAAT
GAGTCTCTACTGGTGGGATGTCAGCAACTTGGGA

sgRNA 1B

Off target site 4: NC_000010.11: 90729730-90730789 Homo sapiens chromosome 10, GRCh38.p7
Primary Assembly

GCCTTAGCCAATTTGCTCATAAATCAAGGATTACCTGTATTTCAAATAATCACTGAATACCTCAAGAGGGAAGCTTC
TTTCTAAATAATTCAGGTTTAAAAGAATCAGTTCAACCATTGTGGAAGTCAGTGTGGCGATTCCCTCAGGGATCTA
GAACTAGAAATACCATTTGACCCAGCCATTCCATTACTGGGTATATACCCAAAGGACTATAAATCATGCTGCTATAA
AGACACATGCACACATATGTTTATTGCGGCACTATTCACAATAGCAAAGACTTGAACCAACCCAAATGTCCAACA
ATGATAGACTGGATTAAGAAAATGTGGCACATATACCCATGGAATACTATGCAGCCATAAAAAAGGATGAGTTC
ATGTCCTTTGTAGGGACATGGATGAAATTGGAATAGTCATTCTCAGTAACTATCACAAGGACAAAAACCAAACA
CTGCATGTTCTCACTTATAGGTGGGAATTGAACAATGAGAACACATGGACACAGGAAGGGGAACATCACACTCTG
GGGACTGTTGTGGGGTGGGGGGAGGGGGGAGGGATAGCATTAGGAGATATACCTGATGCTAAATGACGAGTTA
ATGGGTGCAGCACACCAGCATGGCACATGTATACATATGTAACCTGCACATTGTGCACATGTACCCTAAAC
TTAAAGTATAATAATAATAAAATAAAAAAAGAATCAGATCTTATTAACCAATCAACATGACCCTAGGTTTTAGT
AAAGTGATCAATTGCTTTTATTTTATATTTTTTATTCCTTTGTATCAAGTCACCTATAAATCTAGGCATGTAAAAATAT
GTAGTTCTCTTCATGTTGTCAGAAGTGTCCAGATGGTTTGACGCCTTACATGGAAAGAAAATCAGCAGTTAACTT[C
TAAAGAGGGAACCCTCTGGGAG]CAGATCAAAAATAAGAATGTTGTGTTAAGGGGAATTTTTTGGCTAAGGACT
AGATTGAGAATTAGAAGAGTAAAAGAAATTTAAAGGTGTTTTCCCAAATAAGCTGCAAAGGCCAACATCCT

sgRNA 1B

Off target site 5: NC_000023.11: 151153829-151155455 Homo sapiens chromosome X, GRCh38.p7
Primary Assembly

TCCGTTCCATCTTTTGGGAGAGTGCCAGAGGCACACATCTCAGAGAGTCGTGACTGTGTGCATTATGTTCTCGTCA
GCACAGATGATTCAGTCAATGTATAAGCAAGCACAGTTGCATTTTATACGACTTCAAATCAGTTCATTTCCAAGTC
AGAAAAATCTCCAGCAAGTCTGATCACCACACACAGGGCAGCAACCAGTTCTAGGGGCTTACCTGTTAAGAT
GATTTGGCTTGTTTGAAGTCATTTTCAGAGAACAAGAGAGACAATCTCCCACTACTCTATAATTAGAGTGCTGG
GGGCAGGCTGGGGGAAGACAGCATGAACATGGAGCTCTCATTCTTATTAGGAGCGTCTCTAATTCACACGGCC
CTGGGGACTGCTTCAGATGTAATATTCTCTCCACAAAGGATGGAAATCTTTTCTTTAAAACGTCTCATCGCTGCAA
CTTTGCTGTAAGGCTTCATCGGATAAGTGTATAAAAAATCCAAAACCTCACCTGTTTTCTTATTTTCATCCAACCTTTTT
GTGTTTATATAATTAAGCACACCCTGCTTGATTGGTGTGTGTGGGATGTGTGTGTTTGTGTGTGTAATCTTAAA
GGACTCAGAAGTTGGAGTGTCGTGCGCTTATCACAGCTCCACGGACTCTATGTAATCATTTAGCTTCTTGAGGCTT
TTGCTGCCCTGTGATTTTCAGAAGTGAGTGTCTTCATCACTCTTGAACCCCAATGCCTGAGGCAGGGAGGC
AAACTACTGGACTTTTGGTAAATGACAATTTTATTCTGCAACAATTGGGTGGGAATATTCCAG[CTTCCAGAGGGTT
CCCACTTTCC]TGGTCTGTAAATGGAACCAAGCCTACCTGCGTATCTTGTGTTGGGAGCTTCAGACTCTGCAGCAG
TTAAAGCCTTCATTTTTGGTCTTTACTTAACCACCCATAAGCTTCTTGTCTGTTCCCTGCTCTTCTCCAGTCCTTGC
CTTGATCATTATTCTCTATACCTCAGACCTCTGCCAACCTAAAGAGAAGCCTGTCTGGGGCCTTGCTTTGTTTT
TCCCTGTGTTTCTAACCCCAAGATAGGGCCCCGGAGCACGCAAGAGACTTGGGGCTGAATGAACGTAATTGACTT
GCTTGGATTCCCTGCACAGGTGACTGGGATCAGATCATTTTCCTTCTCAGAGACCTAGTTGTCTCACTTGTACAAGA
AGGGACTAACCTGGATGACTTCTGAAATCTTTATTTTTGAGAAGAGGATTTTATAATTCTATGAATATTTTGTATTT
TTCTATATTTATTCACTTATCACTTTCTTCTTTCCATTCTTTCTAGCACAGAGGAAGGGGAACAGCGAGAAACAACCC
CCAAACAAGTGAACCCAAACACTAGTTCCTCTCTACCTTCTAAAATCATATTTTCTCTGTTGTACAATGGTTGTTT
TTTTCTATCTTATCAAGAGTCATCCGTTCAAGTGATTTCAAGATGACTAATGGCCAAGTTGGTTGTTTCATGCTGTA
CGCTCCTGCTGCTGGAAGTGAAGTGAATAATACTCTCCACGTCACCAATCTCATTTTTTTCTGACGTAC
TGACTGACCCCT

sgRNA 1B

Off target site 6: NC_000001.11: 6052625-6053681 Homo sapiens chromosome 1, GRCh38.p7 Primary Assembly

CTCTGCTAGCCACCGTTCTCTGGCTGGTGTAAATCCCTCTCAATTGCAAATTGACAGCTTTATCTTCTGGCCTCTCAG
GAACATGCCCTTGTGAGAGCCATTAGCCAAAGAGGACCCTCCCCACCCAGTCCTTGTAGAGTTGCCAGTTAAATT
TGAAGTTCAGATAAACGCGTAACTTTTTAGCATAAATACGTTCCATGCAATATTTGGGTCATACTTATACTAAAAAG
TTCCTCATTGTTTATCTGAACTTCAAATTTAACTGGGCGTCCTGTGTTTTATCTGGCAACTAAATATCTGGCTTCC
GTCTGAGACAGACCCTAGGGATCATCTGCGTGCTCTGTGCAGAGTGGAGTGCAGGCCAGGACCGCTCCTTTAACG
TTTTCTCCTGTGGACGGCGTGTGGTTCCTCAGCCATTGTTTGAATATGTGGTTGTAATTTAGAAACAAAACACT
TCTCCTGTGAGTCCATTAGATGGCAGTGTTCCTCAGGCTTTGTATCCTAAATCCAGCTGTAAAGGAAGGACAAAGG
GTCCGCTAGTTTGGCCACAGCTGACCTCCTTGTCTGCTGGAAATTTCTCAAGAAGGAGACGCTGGGCATTCATGA
GGGGCTGGTCATTGATTCCTTTTGTTCATTAGTAAATGTTTATTGAGAGTCTGCTTGGCACCAGGCGCTGAGCCA
GATCCTGGAGCTGCTGCATGAACAAGAGCAACCAGGTCCCCAACCTCACGGCAGCCATGGCCTGGGGGTGTGGG
GGGCAGAGAAGCAGCGAGCTTGCACGGAGACAAGTTCCAACAGCGACCACTGGCCGAGGCAGCAAAGCAGGAC
AATGCAATGAAGAAAGACCAGGGAG[GCCGAGGGGGAACCCTCTGAGAG]AGGGATCATCTGAAGATGTGGAGA
ACATTCCAGCCCAAGAGGAGAGGGGTCTGGAATGGATGCCTCTCTCAGCTGGAGGAGCGAAGAGAAGGCCCAGG
CGGCTAGGCTGGAGGGAGGAAGGTGGAGGACACAAGGCGATGATGCAGGAGGGGCCAGACCCCATCCTCCAAA
C

sgRNA 1B

Off target site 7: NC_000023.11: 55279910-55280619 Homo sapiens chromosome X, GRCh38.p7
Primary Assembly

GGTGT CAGGAGAGCTTGTGGTCTAGGTTCTCCACAGAGGCAGGAAAACCTTCAGTCACGTGGTGAATGCCCCACTC
AGTGCGCATGCTGCACAGATCTGTTACTGCAGATTTCTGTTGCTACGCATGTCTGTTACGCATGCGCCTTGTGCCT
ACCTTCTGTCCATGCAGAGCTTTGTGAGAAGAGGTAGTATCTTCATTCTTTCCACCATCTTGATTCTTCTCTGAC
TGAGGCTCAGCCGGTAGGTCCGCAGAGCGGTCTTCTGGAATTTAGTTGTGAGTGAATGTGAGGAGGAGCCAG
CGGGCTTTGGACAGGTCTGCGGCACAGTCTTTGGCTTCTGAGGGAAAGGGGCCTCGCAGTCGTCTCGGCTCC
TCCCAGGTCGCAATGCTGCTATGGGCCTTGACGTAGTGGCTAGGCTGGAAGTGGGAGGAAAAGTGGGCCGAGA
GGGGAGGGATCACGTGAAGATGGGGCGAGTGTGGAGGTGCTGTTAGAGGTATCTGAGTCC[CGAAAACCTGGAA
CCCTCTGAGAG]AGGACAGTTTCCAGACTCCTCAGTAGGGACGCGGGAAGGGATGGTGAGGTCGGCAAGGAAGG
GGCCTGGGAACTAGGAACGCTGTGGGCTGGTGACTGCGGCCCTGAGGTCTGTAGAGTGCCTGGCAGAGGTGTCC
CGTGAGGAACATAAACTCCCTCTGTGTCGCAACTTC

sgRNA 1B

Off target site 8: NC_000006.12: 61930823-61931624 Homo sapiens chromosome 6, GRCh38.p7
Primary Assembly

GAGTTGCCTGGAGGAAGCTAAGTATCAGGCTTTAGTAGAGCTCTGTTTCATTTAAATGTTAAACCTAATACCACATT
TTTTACTCAAAGAAAGATTATTCAAATTTAACAACTGCAATTTTTCTACTCAGGTGGATAGAAATATTCTGGTGACA
ATTTTTGTTTCAAATAAGCAACTCTTCTGCATATGTAATAAAATACCACCTAATTTTACATAATAATGTGAATCAACA
AAAAATTCAATCATATTACACATATACAATAAAATATTTTTATATTCATCCTTATAATGAAAAAAATACTTATATTTT
GTTAAAAATATAAGAAGTTTCATCCAAAATACTACTTACGCATCTTCACTGAAAATCACTATAAGAAAATAGGGCTT
GATTCCTTACATACTACATGAAAGGAGCTAAATAAAATTGATTTAGAGTATATGTTT[ATAAATCCGTAACCCCTCTG
AAGG]TCATTTACTGAACTTTCAGGTAACCTAACTTTTTATAAAGTTGGAAGTTTTATAAAGATGAAAGTATAG
TATTACCCAAAAGAAAATAAAGAACTGAAATGTTGGACTTAAAACTATATAAAATATTAAGATGTTAAGAAT
ATATACATACACACATATATATGTGCTAAAGATATATATACATAATCCTTAACACTTGATAACATATTACTTA
TATAAAAATATACAATATTCAAAGAAGAATTTAAGTGGTTTTATATGCTCATTATTAGTAATAAAGCTTTAAATAT
AATTTTATGCTTTTGAGAGAGTATTGCAAAT

sgRNA 1B

Off target site 9: NC_000010.11: 18772978-18774019 Homo sapiens chromosome 10, GRCh38.p7
Primary Assembly

AGCTGAGGAGGGTACTGAGGTGGGAAGACAATGGAGAGAGGCTTTCAGAAGGGAGGGGAAGTGTTCGCTCTCCA
TCCTTGAGGCTGCAGATGATAGAGAATACCTGCCTTCTGGGACAGTGGAGGGGCCGGAGTGATTGGGGTGGAA
CTTCCCCTGCCATTCCAAGGGCCTGAGGTGAGGGCATGGGCAGAACTCCAAGGTGCCACCTCCACAACAATAA
AGTGATTCCTTCCTTCAATCAAACAGACCCAATTACTGGGAGGAAAAAACCAAGACATTCTAAACCAAGCCGTTT
GACAGGAGAAAGTTAAAATAGTCACCATGTCACTGCTGGA[GTCAAGCCTCAACCCTCTGACAG]GTTTTTAACAG
GTGAAATCTATTCCATTAGTAATCCCTATAGGACACCATGACAGCTGCCTGAGCTCCCAGTCCCAGTGTTCGCT
ATTATTTTCCTGAGGCCCGTTGTTTTCTTAGGCCCCAGATACAACTGGGATAATCAACAACTAATTTGTCCC
CTTTTCGTGAACTCCCCAGCAGAGAATTACTCCACTTTTTTCAGCTCCAAGACTGCCTTATCTGAAAGATGCTAA
TAGGATGGCATCTGCGTAGACAGGGATCATAAATATTAGATCAATCCATGTAGTACTTGTTATGTGCTTAGCTG
TGGCTCTGACAAAAGATGAGTAAACATAGTTGTAATCCTCAGAGAAACAGGGTAATTGTTTGTGGGGGAAATG
AGGAGATGCTAAAAATTAAGCATGAAGGACTCTTATGTTTACAGGAGAATTCTACACCAAACGCTAAAATTCAG
GGAGATACATAGCAAAGGACCCAAATGGGCCCACTAGAGAAGGAATTTTAGTATATATGTGTGGGGTAAGTCAG
ATCGGTGTGGGTTTGTGGTAATACAGGAAGGCTTATGAATGAATTGGGACTTGGTCTTAGGAATGAATAGGAG
TTGGGTCGACAGAGTGGTTGGTGAGAGGACATTCCAGAAGGAGAAGCAGGACAGCGAGTGT

sgRNA 1B

Off target site 10: NC_000008.11: 51422814-51423616 Homo sapiens chromosome 8, GRCh38.p7
Primary Assembly

CCTTCAATGCCTCTCCGTGTAGAGAACACACCAGGCAATCTTAACAGCCTGTGTCCACTTGTAATAACCTCAGCTG
AGTTTCAGTACAGTCTACTCAAGTCTGCCTACAAATGGACTCTCCCATGTCCCTTGGAAGTGAATAATCAAAAAA
GAAAAATATATTTTTATAAGACTACAGTAAACAGTATTTTAAACAGTCATTATATATAATCAA[CCTGCAGAGGG
TTCCAGCTATAT]AACCAGATTGGTGATAGAATGTAAAAAGCTATGTCAATTATGTTGGCCAATTATAAATGCCTGG
AAACACTGAGATATTTGTTCTAGTGGTTGTAAAGTTTACTTGGGAGTTTGATGGATTGATTTCTAATTTTAAACTGG
GATTAATATACTAGGCTAGAGTATGTAGTACATGTTGAATTCCATATTATGCTTCCACCTCCGGCTCCACATTTTG
GCTATAAATACATCTTGCACTTCTATTATTTTTGGTTTGTAAGAAAACATGATATATATTTGCAAATCTTTGCTATTTAT
GTTCTTTTTTTAATTTGTTATTTTCACTTTATATCCTTTAAGATTGTTTATTTTAAATTTTTTTATTTTAAAAAGAATA
AAACAGCTTTGACTATAAACACACTTGACCAGAAAGAAAGTATAAGAGAGCATGATTAGTGAGATCAGTCAAATA
GGATTGGGGTAGAAGCTGTTCAAAGACAGTTATTTGGATGTTGTAATGGAGCTATAGACACCTACCCGTGACTG
TAAGAAACATGTTGGTCACAGCAAGGCCAAAAG