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In the format provided by the authors and unedited nature biotechnology

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Supplementary Information

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Supplementary sequences

Supplementary Table 1. Synthetic sgRNAs, nicking sgRNAs, and pegRNAs.

Syntenic sgRNA and pegRNA	**sequence (5'-3')**
FANCF sgRNA	mG*mG*mA*rArUrCrCrCrUrUrCrUrGrCrArGrCrArCrCrGrUrUrUrUrArGrArGrCrUrArGrArArArUrArGrCrArArGrUrUrArArArArUrArArG rGrCrUrArGrUrCrCrGrUrUrArUrCrArArCrUrUrGrArArArArArGrUrGrGrGrArCrCrGrArGrUrCrGrGrUrCrCmU*mU*mU*rU
FANCF nicking sgRNA	mG*mG*mG*rGrUrCrCrCrArGrGrUrGrCrUrGrArCrGrUrGrUrUrUrUrArGrArGrCrUrArGrArArArUrArGrCrArArGrUrUrArArArArUrArArG rGrCrUrArGrUrCrCrGrUrUrArUrCrArArCrUrUrGrArArArArArGrUrGrGrCrArCrCrGrArGrUrCrGrGrUrGrCmU*mU*mU*rU
IDS sgRNA	mG*mC*mA*rUrUrUrUrCrGrArUrUrCrCrGrUrGrArCrUrGrUrUrUrUrArGrArGrCrUrArGrArArArUrArGrCrArArGrUrUrArArArArUrArArG rGrCrUrArGrUrCrCrGrUrUrArUrCrArArCrUrUrGrArArArArArGrUrGrGrGrArCrCrGrArGrUrCrGrGrUrCrCmU*mU*mU*rU
IDS nicking sgRNA	mA*mC*mU*rGrArGrGrGrArUrGrUrCrUrGrArArGrGrCrGrUrUrUrUrArGrArGrCrUrArGrArArArUrArGrCrArArGrUrUrArArArArUrArArG rGrCrUrArGrUrCrCrGrUrUrArUrCrArArCrUrUrGrArArArArArGrUrGrGrGrArCrCrGrArGrUrCrGrGrUrCrCmU*mU*mU*rU
PRNP sgRNA	mG*mC*mA*rGrUrGrGrUrGrGrGrGrGrCrCrUrUrGrGrGrUrUrUrUrArGrArGrCrUrArGrArArArUrArGrCrArArGrUrUrArArArArUrArArG rGrCrUrArGrUrCrCrGrUrUrArUrCrArArCrUrUrGrArArArArArGrUrGrGrCrArCrCrGrArGrUrCrGrGrUrGrCmU*mU*mU*rU
PRNP nicking sgRNA	mG*mC*mA*rUrGrUrUrUrUrCrArCrGrArUrArGrUrArArGrUrUrUrUrArGrArGrCrUrArGrArArArUrArGrCrArArGrUrUrArArArArUrArArG rGrCrUrArGrUrCrCrGrUrUrArUrCrArArCrUrUrGrArArArArArGrUrGrGrCrArCrCrGrArGrUrCrGrGrUrGrCmU*mU*mU*rU
HEK3 sgRNA	mG*mG*mC*rCrCrArGrArCrUrGrArGrCrArCrGrUrGrArGrUrUrUrUrArGrArGrCrUrArGrArArArUrArGrCrArArGrUrUrArArArArUrArArG rGrCrUrArGrUrCrCrGrUrUrArUrCrArArCrUrUrGrArArArArArGrUrGrGrCrArCrCrGrArGrUrCrGrGrUrGrCmU*mU*mU*rU
HEK3 nicking sgRNA	mG*mU*mC*rArArCrCrArGrUrArUrCrCrCrGrGrUrGrCrGrUrUrUrUrArGrArGrCrUrArGrArArArUrArGrCrArArGrUrUrArArArArUrArArG rGrCrUrArGrUrCrCrGrUrUrArUrCrArArCrUrUrGrArArArArArGrUrGrGrCrArCrCrGrArGrUrCrGrGrUrGrCmU*mU*mU*rU
AAVS1 sgRNA	mG*mC*mA*rGrCrUrCrArGrGrUrUrCrUrGrGrGrArGrArGrUrUrUrUrArGrArGrCrUrArGrArArArUrArGrCrArArGrUrUrArArArArUrArArG rGrCrUrArGrUrCrCrGrUrUrArUrCrArArCrUrUrGrArArArArArGrUrGrGrGrArCrCrGrArGrUrCrGrGrUrCrC*mU*mU*mUrU
AAVS1 nicking sgRNA	mG*mA*mU*rGrGrArGrCrCrArGrArGrArGrGrArUrCrCrGrUrUrUrUrArGrArGrCrUrArGrArArArUrArGrCrArArGrUrUrArArArArUrArArG rGrCrUrArGrUrCrCrGrUrUrArUrCrArArCrUrUrGrArArArArArGrUrGrGrGrArCrCrGrArGrUrCrGrGrUrCrC*mU*mU*mUrU
HBB sgRNA	mC*mA*mU*rGrGrUrGrCrArCrCrUrGrArCrUrCrCrUrGrGrUrUrUrUrArGrArGrCrUrArGrArArArUrArGrCrArArGrUrUrArArArArUrArArG rGrCrUrArGrUrCrCrGrUrUrArUrCrArArCrUrUrGrArArArArArGrUrGrGrCrArCrCrGrArGrUrCrGrG*mU*mG*mC
HBB nicking sgRNA	mC*mC*mU*rUrGrArUrArCrCrArArCrCrUrGrCrCrCrArGrUrUrUrUrArGrArGrCrUrArGrArArArUrArGrCrArArGrUrUrArArArArUrArArG rGrCrUrArGrUrCrCrGrUrUrArUrCrArArCrUrUrGrArArArArArGrUrGrGrCrArCrCrGrArGrUrCrGrG*mU*mG*mC
RUNX1 sgRNA	mG*mC*mA*rUrUrUrUrCrArGrGrArGrGrArArGrCrGrArGrUrUrUrUrArGrArGrCrUrArGrArArArUrArGrCrArArGrUrUrArArArArUrArArG rGrCrUrArGrUrCrCrGrUrUrArUrCrArArCrUrUrGrArArArArArGrUrGrGrCrArCrCrGrArGrUrCrGrG*mU*mG*mC
RUNX1 nicking sgRNA	mA*mU*mG*rArArGrCrArCrUrGrUrGrGrGrUrArCrGrArGrUrUrUrUrArGrArGrCrUrArGrArArArUrArGrCrArArGrUrUrArArArArUrArArG rGrCrUrArGrUrCrCrGrUrUrArUrCrArArCrUrUrGrArArArArArGrUrGrGrCrArCrCrGrArGrUrCrGrGrUrGrCmU*mU*mU*rU
FANCF pegRNA	mG*mG*mA*rArUrCrCrCrUrUrCrUrGrCrArGrCrArCrCrGrUrUrUrUrArGrArGrCrUrArGrArArArUrArGrCrArArGrUrUrArArArArUrArArG rGrCrUrArGrUrCrCrGrUrUrArUrCrArArCrUrUrGrArArArArArGrUrGrGrGrArCrCrGrArGrUrCrGrGrUrCrCrGrGrArArArArGrCrGrArUr CrGrUrGrArUrGrCrUrGrCrArGrArArGrG*mG*mA*mU
PRNP pegRNA	mG*mC*mA*rGrUrGrGrUrGrGrGrGrGrCrCrUrUrGrGrGrUrUrUrUrArGrArGrCrUrArGrArArArUrArGrCrArArGrUrUrArArArArUrArArG rGrCrUrArGrUrCrCrGrUrUrArUrCrArArCrUrUrGrArArArArArGrUrGrGrGrArCrCrGrArGrUrCrGrGrUrCrCrArUrGrUrArGrArCrGrCrCr ArArGrGrCrCrCrCrCrCrArCrCmU*mU*mU*rU
RUNX1 pegRNA	mG*mC*mA*rUrUrUrUrCrArGrGrArGrGrArArGrCrGrArGrUrUrUrUrArGrArGrCrUrArGrArArArUrArGrCrArArGrUrUrArArArArUrArArG rGrCrUrArGrUrCrCrGrUrUrArUrCrArArCrUrUrGrArArArArArGrUrGrGrGrArCrCrGrArGrUrCrGrGrUrCrCrUrGrUrCrUrGrArArGrCrCr ArUrCrCrArUrGrCrUrUrCrCrUrCrCrUrGrArArArArUmU*mU*mU*rU
mCherry sgRNA	mA*mA*mG*rUrUrCrArGrCrGrUrGrUrCrCrGrGrCrUrUrGrUrUrUrUrArGrArGrCrUrArGrArArArUrArGrCrArArGrUrUrArArArArUrArArG rGrCrUrArGrUrCrCrGrUrUrArUrCrArArCrUrUrGrArArArArArGrUrGrGrGrArCrCrGrArGrUrCrGrG*mU*mC*mC
mCherry nicking sgRNA	mG*mU*mA*rGrGrUrCrArGrGrGrUrGrGrUrCrArCrGrArGrUrUrUrUrArGrArGrCrUrArGrArArArUrArGrCrArArGrUrUrArArArArUrArArG rGrCrUrArGrUrCrCrGrUrUrArUrCrArArCrUrUrGrArArArArArGrUrGrGrGrArCrCrGrArGrUrCrGrG*mU*mC*mC

Supplementary Table 2. Synthetic LPETs and DPETs.

L-pet	sequence (5'-3') (DNA/RNA)
FANCF L-petRNA	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCrGrGrArArArAGrCrGrArUrCrGrUrGrArUrGrCrUrGrCrArGrArArGrG*mG*mA*mU
FANCF chimera -6	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGGAAAAGCGATrCrGrUrGrArUrGrCrUrGrCrArGrArArGrG*mG*mA*mU
FANCF chimera -5	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGGAAAAGCGATCrGrUrGrArUrGrCrUrGrCrArGrArArGrG*mG*mA*mU
FANCF chimera -4	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGGAAAAGCGATCGrUrGrArUrGrCrUrGrCrArGrArArGrG*mG*mA*mU
FANCF chimera -3	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGGAAAAGCGATCGTrGrArUrGrCrUrGrCrArGrArArGrG*mG*mA*mU
FANCF chimera -2	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGGAAAAGCGATCGTGrArUrGrCrUrGrCrArGrArArGrG*mG*mA*mU
FANCF chimera -1	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGGAAAAGCGATCGTGArUrGrCrUrGrCrArGrArArGrG*mG*mA*mU
FANCF chimera +0	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGGAAAAGCGATCGTGATrGrCrUrGrCrArGrArArGrG*mG*mA*mU
FANCF chimera +1	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGGAAAAGCGATCGTGATGrCrUrGrCrArGrArArGrG*mG*mA*mU
FANCF chimera +2	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGGAAAAGCGATCGTGATGCrUrGrCrArGrArArGrG*mG*mA*mU
FANCF chimera +3	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGGAAAAGCGATCGTGATGCTrGrCrArGrArArGrG*mG*mA*mU
FANCF chimera +4	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGGAAAAGCGATCGTGATGCTGrCrArGrArArGrG*mG*mA*mU
FANCF chimera +5	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGGAAAAGCGATCGTGATGCTGCrArGrArArGrG*mG*mA*mU
FANCF chimera +6	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGGAAAAGCGATCGTGATGCTGCArGrArArGrG*mG*mA*mU
FANCF chimera +7	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGGAAAAGCGATCGTGATGCTGCAGrArArGrG*mG*mA*mU
FANCF chimera +8	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGGAAAAGCGATCGTGATGCTGCAGArArGrG*mG*mA*mU
FANCF chimera +9	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGGAAAAGCGATCGTGATGCTGCAGAArGrG*mG*mA*mU
FANCF MS2-less LPET(+2)	GGAAAAGCGATCGTGATGCrUrGrCrArGrArArGrG*mG*mA*mU
FANCF MS2-less ssDNA	GGAAAAGCGATCGTGATGCTGCAGAAGGGAT
FANCF unmod petRNA	rGrCrArCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrGrCrGrGrArArArArGrCrGrArUrCrGrUrGrArUrGrCrUrGrCrArGrArArGrGrGrArU
FANCF chimera +10	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGGAAAAGCGATCGTGATGCTGCAGAAGrG*mG*mA*mU
FANCF chimera +11	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGGAAAAGCGATCGTGATGCTGCAGAAGG*mG*mA*mU
FANCF fully OMe PBS + 0	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGGAAAAGCGATCGTGATmGmCmUmGmCmAmGmAmAmGmG*mG*mA*mU
FANCF fully OMe PBS +1	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGGAAAAGCGATCGTGATGmCmUmGmCmAmGmAmAmGmG*mG*mA*mU
FANCF fully OMe PBS +2	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGGAAAAGCGATCGTGATGCmUmGmCmAmGmAmAmGmG*mG*mA*mU
FANCF fully OMe PBS +3	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGGAAAAGCGATCGTGATGCTmGmCmAmGmAmAmGmG*mG*mA*mU
FANCF fully OMe PBS +4	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGGAAAAGCGATCGTGATGCTGmCmAmGmAmAmGmG*mG*mA*mU
FANCF OMe/DNA alt 1	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGmGAmAAmAGmCGmATmCGmUGmATmGCmUGmCAmGAmAGmG*mG*mA*mU
FANCF F/DNA alt 1	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCfGGfAAfAAfGCfGAfUCfGTfGAfUGfCUfGCfAGfAAfGG*mG*mA*mU
FANCF chimera +3 OMe/RNA alt 1	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGGAAAAGCGATCGTGATGCTmGrCmArGmArAmGrG*mG*mA*mU
FANCF chimera +3 RNA 3'PS alt 1	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGGAAAAGCGATCGTGATGCTrGrC*rArG*rArA*rGrG*mG*mA*mU
FANCF chimera with LNA	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGGAAAAGCGATCGTGATrGrClUrGrClArGrAlArGrG*mG*mA*mU
FANCF 3' no modification	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGGAAAAGCGATCGTGATGCTGCAGAAGGGAT
FANCF 3' mU	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGGAAAAGCGATCGTGATGCTGCAGAAGG*mG*mA*mU
FANCF 3' *T	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrUrGrCGGAAAAGCGATCGTGATGCTGCAGAAGG*mG*mA*T

FANCF bio-L-petDNA	/5BiosG/GGAAAAGCGATCGTGATGCTGCAGAAGGGAT
FANCF bio-L-petDNA +0	/5BiosG/GGAAAAGCGATCGTGATrGrCrUrGrCrArGrArArGrG*mG*mA*mU
FANCF bio-L-petDNA +8	/5BiosG/GGAAAAGCGATCGTGATGCTGCAGArArGrG*mG*mA*mU
FANCF L-petDNA-bio-3'PS4	/5BiosG/GGAAAAGCGATCGTGATGCTGCAGAAG*G*G*A*T
FANCF L-petDNA-bio-3'PS6	/5BiosG/GGAAAAGCGATCGTGATGCTGCAGA*A*G*G*G*A*T
FANCF L-petDNA-bio-3'PS8	/5BiosG/GGAAAAGCGATCGTGATGCTGCA*G*A*A*G*G*G*A*T
FANCF L-petDNA-bio-3'PS10	/5BiosG/GGAAAAGCGATCGTGATGCTG*C*A*G*A*A*G*G*G*A*T
PRNP L-petRNA	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrGrCrArUrGrUrArGrArCrGrCrCrArArGrGrCrCrCrCrC*mA*mC*mC
PRNP L-pet-chimera -6	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrGrCATGTAGrArCrGrCrCrArArGrGrCrCrCrCrCrC*mA*mC*mC
PRNP L-pet-chimera -3	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrGrCATGTAGACGrCrCrArArGrGrCrCrCrCrC*mA*mC*mC
PRNP L-pet-chimera+0	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrGrCATGTAGACGCCArArGrGrCrCrCrCrC*mA*mC*mC
PRNP L-pet-chimera +2	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrGrCATGTAGACGCCAAGrGrCrCrCrCrC*mA*mC*mC
PRNP L-pet-chimera +4	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrGrCATGTAGACGCCAAGGCrCrCrCrC*mA*mC*mC
PRNP L-pet-chimera +6	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrGrCATGTAGACGCCAAGGCCCrCrCrC*mA*mC*mC
PRNP L-pet-chimera +8	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrGrCATGTAGACGCCAAGGCCCCCrC*mA*mC*mC
IDS L-petRNA	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrGrCrGrCrCrArGrUrArUrCrCrCrUrGrGrCrCrUrUrCrArGrArCrArUrC*mC*mC*mU
IDS L-pet-Chimera +0	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrGrCGCCAGTATCCCTGGCCrUrUrCrArGrArCrArUrC*mC*mC*mU
HBB L-pet+2	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrGrCAGACTTCTCTACAGGArGrUrCrArGrGrUrG*mC*mA*mC
RUNX1 L-pet+2	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrGrCTGTCTGAAGCCATCCATGCTrUrCrCrUrCrCrUrGrArA*mA*mA*mU
PRNP L-pet	/5BiosG/ATGTAGACGCCAAGGCCCCCCACC
HBB bio-L-pet	/5BiosG/GCCAGTATCCCTGGCCTTCAGACATCCCT
AAVS1-loxP-1615	G*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrGrCGATGGAGCCAGAGAGGAATTGTTATAACTTCGTATAGCATACATTATACGAAGTTATCCCrArGrArArCrCrUrGrArG*mU*mU*mU
AAVS1-loxP-1705	G*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrGrCGCAGCTCAGGTTCTGGGATAACTTCGTATAATGTATGCTATACGAAGTTATAACAATTCCrUrCrUrCrUrGrGrCrUrC*mU*mU*mU
HEK3-twin-LPET-1	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrGrCGCTGAACTTGTGGCCGTTTACGTCGCCGTCCAGCTCGACCAGGATGGGCACCACCCCGGTGAACAGCTCCTCGCCCTTGCTCACrCrGrUrGrCrUrCrArGrU*mC*mU*mG
HEK3-twin-LPET-2	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrGrCAGCTGGACGGCGACGTAAACGGCCACAAGTTCAGCGTGTCCGGCGAGGGCGAGGGCGATGCCACCTACGGCAAGCTGACCCTGrCrCrGrGrGrArUrArCrUrG*mG*mU*mU
mCherry L-pet	mG*mC*mA*rCrArUrGrArGrGrArUrCrArCrCrCrArUrGrUrGrCTTTGTCTCGCCAAAGGTCTCCrGrGrArCrArC*mG*mC*mU
mCherry bio-L-pet	/5BiosG/TTTGTCTCGCCAAAGGTCTCCGGACACGCT

Supplementary Table 3. Primers used for high-throughput sequencing.

Gene locus	F (5'-3')	R (5'-3')
FANCF-1	CTACACGACGCTCTTCCGATCTGATGGATGTGGCGCAGGTAG	AGACGTGTGCTCTTCCGATCTAGGCGTATCATTTCG CGGAT
FANCF-2	CTACACGACGCTCTTCCGATCTGACCAAAGCGCCGATGGAT	AGACGTGTGCTCTTCCGATCTGGTGAAAGCGGAAG TAGGGC
IDS	CTACACGACGCTCTTCCGATCTGTGCGTATGGAATAGCCCATGA TC	AGACGTGTGCTCTTCCGATCTACGTTGAGCTGTGCA GAGAAG
PRNP	CTACACGACGCTCTTCCGATCTAGTAAGCCAAAAACCAACATGA AGC	AGACGTGTGCTCTTCCGATCTCTGTACTCATCCATG GGCCTG
RUNX1	ACATGAAGCCTACACGACGCTCTTCCGATCTTCGCTCCGAAGG TAAAAGAAATC	AGACGTGTGCTCTTCCGATCTCAGGCAAAGCTGAG CAAAAGTAG
HBB	CTACACGACGCTCTTCCGATCTTTGCTTACATTTGCTTCTGACA CAAC	AGACGTGTGCTCTTCCGATCTTCTGTCTCCACATGC CCAG
AAVS1	CTACACGACGCTCTTCCGATCTCCAGGATCAGTGAAACGCAC	AGACGTGTGCTCTTCCGATCTCTTGCCAGAACCTCT AAGGT

Supplementary Table 4. Primers used for droplet digital PCR (ddPCR).

Gene locus	5'---------------------------------------3'
HEK3	Wt probe cctggcctgggtcaatccttgg
HEK3	ins probe cggcgacgtaaacggccac
HEK3	caccaccccggtgaacagctc
HEK3	f gcatgcatttgtaggcttgatg
HEK3	r cagccaaacttgtcaaccag

Supplementary Table 5. Primers used for qPCR.

	5'--3'
epegRNA	RT specific primer: TTTCTAGTTGGTTTAACGCGTAAC
LPET	RT specific primer: CTCAGGTTCTGGGATAACTT
epegRNA	qPCR primer F1: CTGGGAGAGTTTTAGAGCTA
LPET	qPCR primer F2: GCACATGAGGATCACCCAT
epegRNA/ LPET	qPCR primer R: GGGATAACTTCGTATAATGT
GAPDH	GTCAAGGCTGAGAACGGGAA
GAPDH	AAATGAGCCCCAGCCTTCTC

Supplementary sequences

MCP-M_MLV RT

MS2-N55K
Flexible linker
M_MLV RT
SV40 NLS

GCTTCAAACTTTACTCAGTTCGTGCTCGTGGACAATGGTGGGACAGGGGATGTGACAGTGGCTCCTTCTAATTTCGCTAATGGGGTGGC
AGAGTGGATCAGCTCCAACTCACGGAGCCAGGCCTACAAGGTGACATGCAGCGTCAGGCAGTCTAGTGCCCAGAAGAGAAAGTATACCA
TCAAGGTGGAGGTCCCCAAAGTGGCTACCCAGACAGTGGGCGGAGTCGAACTGCCTGTCGCCGCTTGGAGGTCCTACCTGAACATGGAG
CTCACTATCCCAATTTTCGCTACCAATTCTGACTGTGAACTCATCGTGAAGGCAATGCAGGGGCTCCTCAAAGACGGTAATCCTATCCC
TTCCGCCATCGCCGCTAACTCAGGTATCTACTCTGGAGGATCTAGCGGAGGATCCTCTGGCAGCGAGACACCAGGAACAAGCGAGTCAG
CAACACCAGAGAGCAGTGGCGGCAGCAGCGGCGGCAGCAGCACCCTAAATATAGAAGATGAGTATCGGCTACATGAGACCTCAAAAGAG
CCAGATGTTTCTCTAGGGTCCACATGGCTGTCTGATTTTCCTCAGGCCTGGGCGGAAACCGGGGGCATGGGACTGGCAGTTCGCCAAGC
TCCTCTGATCATACCTCTGAAAGCAACCTCTACCCCCGTGTCCATAAAACAATACCCCATGTCACAAGAAGCCAGACTGGGGATCAAGC
CCCACATACAGAGACTGTTGGACCAGGGAATACTGGTACCCTGCCAGTCCCCCTGGAACACGCCCCTGCTACCCGTTAAGAAACCAGGG
ACTAATGATTATAGGCCTGTCCAGGATCTGAGAGAAGTCAACAAGCGGGTGGAAGACATCCACCCCACCGTGCCCAACCCTTACAACCT
CTTGAGCGGGCTCCCACCGTCCCACCAGTGGTACACTGTGCTTGATTTAAAGGATGCCTTTTTCTGCCTGAGACTCCACCCCACCAGTC
AGCCTCTCTTCGCCTTTGAGTGGAGAGATCCAGAGATGGGAATCTCAGGACAATTGACCTGGACCAGACTCCCACAGGGTTTCAAAAAC
AGTCCCACCCTGTTTAATGAGGCACTGCACAGAGACCTAGCAGACTTCCGGATCCAGCACCCAGACTTGATCCTGCTACAGTACGTGGA
TGACTTACTGCTGGCCGCCACTTCTGAGCTAGACTGCCAACAAGGTACTCGGGCCCTGTTACAAACCCTAGGGAACCTCGGGTATCGGG
CCTCGGCCAAGAAAGCCCAAATTTGCCAGAAACAGGTCAAGTATCTGGGGTATCTTCTAAAAGAGGGTCAGAGATGGCTGACTGAGGCC
AGAAAAGAGACTGTGATGGGGCAGCCTACTCCGAAGACCCCTCGACAACTAAGGGAGTTCCTAGGGAAGGCAGGCTTCTGTCGCCTCTT
CATCCCTGGGTTTGCAGAAATGGCAGCCCCCCTGTACCCTCTCACCAAACCGGGGACTCTGTTTAATTGGGGCCCAGACCAACAAAAGG
CCTATCAAGAAATCAAGCAAGCTCTTCTAACTGCCCCAGCCCTGGGGTTGCCAGATTTGACTAAGCCCTTTGAACTCTTTGTCGACGAG
AAGCAGGGCTACGCCAAAGGTGTCCTAACGCAAAAACTGGGACCTTGGCGTCGGCCGGTGGCCTACCTGTCCAAAAAGCTAGACCCAGT
AGCAGCTGGGTGGCCCCCTTGCCTACGGATGGTAGCAGCCATTGCCGTACTGACAAAGGATGCAGGCAAGCTAACCATGGGACAGCCAC
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mSA-RT

SV40 NLS
mSA
Flexible linker
M_MLV RT

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MCP-Phi29
MS2-N55K
Flexible linker
Phi29 polymerase
SV40 NLS

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AGTC

MCP-PolI5M

MS2-N55K

Flexible linker

PolI5M polymerase

SV40 NLS

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mSA-Phi29

SV40 NLS

mSA

Flexible linker

Phi29 polymerase

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