

Table EV3. Plasmid sequences

Plasmid	DNA Sequence
pRep2/Cap2	Region between P40 and Intron in pTrans of pRep2/Cap2 packaging plasmid
	gttgcgagccatcgacgtcagacgcggaagcttcgatcaactacgcagacag
pRep2-attR1/Cap2 (pHL280b)	attR insertion in site 1 (attR1) between P40 and Intron (<i>Spacer</i>) Note: Bxb1-Ga mutant attR site was used in this study ²⁸ .
	gtt GTGGTTTGTCTGGTCAACCACCGCGGaCTCCGTCGTCAGGATCAT tcagttgcgagccatcgacgtcagacgcggaagcttcgatcaactacgcagacag
pRep2-attR2/Cap2 (pHL281b)	attR insertion in site 2 (attR2) between P40 and Intron (best performer, used in following experiments) (<i>Spacer</i>)
	gttgcgagccatcgacgtca GTGGTTTGTCTGGTCAACCACCGCGGaCTCCGTCGTCAGGATCAT tcagacgcggaagcttcgatcaactacgcagacag
pRep2-attR3/Cap2 (pHL282b)	attR insertion in site 3 (attR3) between P40 and Intron
	gttgcgagccatcgacgtcagacgcggaagcttcg GTGGTTTGTCTGGTCAACCACCGCGGaCTCCGTCGTCAGGATCAT atcaactacgcagacag
pHelper_DBP-2A-Bxb1 (pHL284)	DBP (20bp) -T2A- Bxb1-DBP 3'UTR (20bp)
	ggcagaacccttgattt GGATCCGGTGAGGGCAGAGGAAGTCTACTAACATGCGGTGACGTGGAGGAGAATCCG GGCCCT atgccaaaaaagaaaagaaagtgtatccctatgatgtccccgattatgccggtcaagagccctggctgtagtagactgagccgagtgaca gacgccaccacaagtcgagagacagctggaatcatgccagcagctctgtgctcagcggggtgggatgtggtcggcgtaggagatctggacgtga gcggggccgctgacccattcgacagaaagaggaggcccaacctggcaagatggctcgcttcgaggaacagcccttgatgtgatcgctgcctacagagtg gaccggctgacccgctcaattcgacatctccagcagctggtgacgtgggctgaggaccacaagaaactggtggtcagcgcaacagaagcccacttcgatac taccacacctttgccgctgtggtcatgcactgatgggactgtggccagatggagctgaagctatcaaggagcgaacaggagcgcagcccatttcaa tattagggccggtaaatacagaggctccctgcccccttggggatatccttaccaggtggatggggagtgagactggtgccagaccccgctccagagag agcggatctggaagtgtaccacagagtggtcgataaccacgaacctccatctggtggcacacgacctgaatagacggcgctgctctctcaaaggatt atthtctcagctgcaggaagagagccacaggaagagaatggagtgctactgcactgaagagatctatgatcagttaggctatgctgggttacgcaacac tcaatggcaaaactgtccgggacgatgacggagccctctggtgagggtgagcctattctaccagagagcagctcgaagctctcggggcagaactggtc aagactagtcgcgcaaacctgcccgtgagcaccacaagcctgctcgtgaggggtgtgttctgcgcgctgtgtagagagccagcatacaagtttgccggcgga ggcgcaaacatccccgctatcgatgcaggagcatgggttccctaaagcactgtgaaacgggacagtgccatggctgagtgaggcgcctttgtagga acaggtgctggatctcctgggtgacgtgacggctggaaaaagtgtgggtggcaggatctgactccgctgtggagctggcagaagtcaatgccgagctcgt ggatctgacttccctatcgatctcctgcataatagctgggtccccacagagagaagctctggacgcacgaattgctgactcgtgtagacaggagga actggaggccctggaggccaggccctctggatgggagtgaggagaaacggacagaggttggggattggtggaggaggagcaggacaccgcagccaag aacacatggctgagatccatgaatgtccggctcacattcgacgtgcgggtggcctgactgaacctcgatttggcgacctgcaggagtagtaacagcac ctgagactgggtccgtggtcgaaagactgcacactgggatgtcctaaaccctgcccgtctgcgcgt
pTrans-STOP (pHL327)	attP-3XSV40 pA-attB insertion in site 2 between P40 and Intron
	gttgcgagccatcgacgtca GTGGTTTGTCTGGTCAACCACCGCGGaCTCAGTGGTGTACGGTACAAACCA taatta aggcctaattaggtgcgcgaagctgcagatctgcgactctagaggatctgcgactctagaggatcataatcagccataccacattttgtagaggtttactg tttaaaaaacctcccacacctccccctgaacctgaaacataaaatgaatgcaattgtgtgttaactgtttattgcagcttataatggttacaataaagcaatag catcacaaatttcacaaataaagcatttttactgcattctagttgtgtgttgcctaaactcatcaatgtatctatcatgtctggatctgcgactctagaggatcata atcagccataccacattttgtagaggtttactgcttataaaaaacctcccacacctccccctgaacctgaaacataaaatgaatgcaattgtgtgttaactgtttat tgcagcttataatggttacaataaagcaatagcatcacaaatttcacaaataaagcatttttactgcattctagttgtgttgcctaaactcatcaatgtatctta tcatgtctggatctgcgactctagaggatcataatcagccataccacattttgtagaggtttactgcttataaaaaacctcccacacctccccctgaacctgaaaca taaatgaatgcaattgtgtgttaactgtttattgcagcttataatggttacaataaagcaatagcatcacaaatttcacaaataaagcatttttactgcattct agtgtgtgttgcctaaactcatcaatgtatctatcatgtctggatcccgagcgcgcagcctaataa GGCTTGTGACGACGCGCGGaCTCCG TCGTCAGGATCAT tcagacgcggaagcttcgatcaactacgcgagacag

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Plasmid	DNA Sequence
pHelper_DBP-IRES-Bxb1 (pHL285)	DBP (20bp)-IRES-Bxb1-DBP 3'UTR (20bp) (Spacer) agaacccttggatttttaaTGCATccctctccctccccccccctaacgttactggccgaagccgcttgaataaggccggtgtgctgttctatatgttatttccaccatattgccgtctttggcaatgtgagggcccgaaacctggccctgtcttcttgacgagcattcctaggggtctttccctctcgccaaaggaatgcaaggctgttgaatgtcgtgaaggaagcagttcctctggaagcttctgaagacaaacaacgtctgtagcgacccttgcaggcagcggaacccccaccctggcgacagggtcctctcgggccaaaagccacgtgtataagatacacctgcaaaggcggcacaacccacgtgccacgttgtgagttgtagattgttgaaagagtcaaattggctctcctcaagcgtattcaacaaggggtgaaggatgccagaaggtagcccatgtatgggatctgatctggggcctcggtacacatgctttacatgtgttagtcgagggttaaaaaacgttaggccccccgaaccacggggacgtggttttcttggaaaaacacgatgataatatgccacaaccatgccaaaaaaga aaagaaaagtgtatccctatgatgtcccgattatgccgggtcaagagccctggctgtgattagactgagccgagtgacagacgccaccacaagtcccagagagacagctggaatcatgccagcagctctgtgctcagcgggttgggatgtgttcggtggcagaggatctggacgtgagcggggcgtcgatccattcgacagaaagaggaggccaaacctggcaagatggctcgttctgaggaacagccctttagtgtatcgtcgcctacagagtggaccgggtgaccgcgtcaattcga catctccagcagctgtgtcattgggtgaggaccacaagaaactgggtgtcagcgcaacagaagcccacttcgatactaccacaccttttgcgctgtgttca tcgactgtatgggactgtggccagatggagctcgaagctatcaaggagcgaaacaggagcgcagccatttcaatattagggcgggtaaatacagagg ctccctgcccccttgggatctcctaccagggtggatggggagtggagactgggtccagaccccgccagagagagcggattctggaagtgtaccaca gagtggctgataaccacgaaccactccatctgttggcacacgacctgaatagacggcgctgtctctccaaaggattatttctcagctgcagggaagag agccacaggggaagagaatggagtgtactgactgaagagatctatgatcagtgaggctatgctgggttacgcaacactcaatggcaaaactgtccgggac gatgacggagccctctggtgagggctgagcctattctaccagagagcagctcgaagctctcggggcagaactggtaagactagtcgcgcgaacctgc cgtgagcaccccaagcctgtcctgagggtgtgttctgcgcgtctgtggagagccagcatacaagtgttcggcgaggggcgaaacatccccgctatcg atgaggagcatgggttccctaagcactgtgaaacgggacagtggccatggctgagtgggacgccttttgcaggaacagggtgtggatctctgggtga cgctgagcggctgaaaaaagtgtgggtggcaggatctgactccgtgtggagctggcagaagtcaatgccgagctcgtggatctgactccctcatcggtat cctgcataagagctgggtcccccagagagaagcttgacgcacgaattgtcgtcactcgtctgtagacaggaggaactggagggcctggaggccagg ccctctggatgggagtggcgagaaaccggacagaggttgggattgggtggaggagcaggacaccgcagccaagaacacatggctgagatccatgaat gtccggctcacattcgacgtgcggtggcctgactcgaacctcgatttggcgacctgcaggagatgaacagcacctgagactgggtccgtgtgcgaa agactgcacactgggatgtcctaaacctgtccgtctgcgcgt
pTrans/Cis.Rep2-EGFP-Cap2 (pHL300)	attP-5' ITR-CB6-EGFP-pA-3' ITR-attB insertion in site 2 between P40 and Intron (Spacer) Note: Bxb1-Ga mutant attP and attB target sites were used in this study²⁸. gttgcgcagccatcgacgtcaGTGGTTTGTCTGGTCAACCACCGCGGactCAGTGGTGTACGGTACAAACCCAattaatta aggcctaattaggctgcgcgtcgtcgtcactgaggccgcccgggcaaagcccgggctcgggcgaccttgggtcggcgccctcagtgagcagcga gcgcgcagagagggagtggccaactccatcactaggggttctttagttaatgattaaccgcgatgtacttatctaccagggtaatggggatcctctaga ctatagctagtgcacattgatttactagttattaatagtaataacacgggtcattagtcatagccatataatggagtcccggttacataacttacggtaaat ggcccgcctgggtgacgcaccaacgacccccgccattgacgtcaataatgacgtatgttcccatagtaacgccaatagggactttccattgacgtcaatggg tggagtatttacggtaaactgccacttggcagtagacatcaagtgtatcatatgccaaagtagcggccctattgacgtcaatgacggttaaattggcccgcctggcatt atgccagtagacattatgggacttctacttggcagtagacatctactgtatttagtcacgtctattaccatgtcaggccacgttctgttctactctcccctccc ccccctccccaccccccaatttgtatttatttattttaaatttatttggcagcgatggggcgggggggggggcgcgcgccaggcgggcgggcgggcgga ggggcgggcgggcgaggcggaaggtgcggcggcagccaatcagagcggcgcgtccgaaagtcttcttatggcgaggcgggcgggcgggcgga ccctataaaaagcgaagcgcgcgggcgggcgggagcaagcttattgcgtagtttatcacagttaaattgctaacgcagtcagtgcttctgacacaacagtctc gaacttaagctgcagaagtggctgtgaggcactgggcaggttaaggtatcaaggttacaagacaggttaaggagaccaatagaaactgggctgtcgagac agagaagactcttgcttctgataggcacctattggtcttactgacatccatttgccttctctccacaggtgtccactcccagttcaattacgtcttaagggtag agtacttaatacgaactcactataggctagtaatacgaactcactatagatggtagcaagggcgaggagctgttcaccggggtgggtcccattcctgtcagct ggacggcgacgtaaacggccacaagttcagcgtgtccggcgaggggcgaggcgatgccacctacggcaagctgacctgaagttcatctgcaccaccgg caagctgcccgtgccctggcccaccctcgtgaccacctgacctacggcgtgacgtgttcagccgtaccccgaccacatgaagcagcagcacttctcaa gtccgcatgcccgaaggctacgtccaggagcgcaccatcttctcaaggacgacggcaactacaagacccgcgcccaggtgaagttcgagggcgacac cctggtgaaccgcatcgactgaagggcatcgactcaaggaggacggcaacatcctgggcacaaagctggagtacaactacaacagccacaacgtcta tatcatggcgacaagcagaagaacggcatcaaggtgaactcaagatccgccacaacatcgaggacggcagcgtgcagctgcggaccactaccagc agaacacccccatcggcagcgcccgctgctgctgccgacaaccactacctgagcaccagctccgcccagcaaagaccccaacgagaagcgcat cacatggtcctgctggagtctgacgcggcgggatcactctcggcatggacgagctgtacaagtaaagcgccctagcgtttaaaccgggccccttagact cgaggacggggtgaactacgcctgaggatccgatcttttccctctgcaaaaaattatggggacatcatgaagcccttgagcatctgacttctgctaataaag gaaatttatttcatgtcaatagtgtgtgaatttttgtgtctcactcgaagcaattcgtgtatctgaatttcgaccaccataataccattaccctggtagataa gtagcatggcggttaataactacaaggaaccctagtgtgaggtggccactccctctctgcgcgtcgtcgtcactgaggccggggcgaccaaaag gtcggccgacgcccgggcttggccggggcgccctcagtgagcagcagcgcgcagcctaattaaGGCTTGTCTGACGACGGCGGactC CGTCGTCAAGGATCATtcagacgcggaagcttcgatcaactacgcagacag

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Plasmid	DNA Sequence
pAAVS1 LHA-SA-P2A-BxB1-T2A-PuroR-bGH pA-RHA (pHL380)	AAVS1 LHA-SA-P2A-BxB1-T2A-PuroR-bGH pA-RHA (Spacer) CTCTCTCCTGAGTCCGGACCACTTTGAGCTCTACTGGCTTCTGCGCCGCTCTGGCCCACTGTTTCCCCT CCCAGGCAGGTCCTGCTTTCTCTGACCTGCATTCTCTCCCCTGGGCCTGTGCCGCTTTCTGTCTGCAGCTT GTGGCCTGGGTACCTCTACGGCTGGCCCAGATCCTTCCCTGCCGCTCCTTCAGGTTCCGTCTTCCTCC ACTCCCTCTTCCCCTTGCTCTCTGCTGTGTTGCTGCCAAGGATGCTCTTTCGGGAGCACTTCTTCTCGG CGCTGCACCACGTGATGTCCTCTGAGCGGATCCTCCCCGTGTCTGGGTCTCTCCGGGCATCTCTCTCC CTCACCAACCCCATGCCGTCTTCACTCGCTGGGTTCCTTTTCTTCTCTTCTGGGGCCTGTGCCATCT CTCGTTTCTTAGGATGGCCTTCTCCGACGGATGTCTCCCTTGCCTCCCGCTCCCTTCTTGTAGGCCTGC ATCATCACCGTTTTTCTGGACAACCCCAAAGTACCCCGTCTCCCTGGCTTTAGCCACCTCTCCATCCTCTT GCTTTCTTTGCCTGGACACCCCGTTCTCCTGTGGATTGCGGTACCTCTCACTCCTTTTCAATTGGGCAGCT CCCCACCCCTTACCTCTCTAGTCTGTGCTAGCTCTTCCAGCCCCCTGTATGGCATCTTCCAGGGGTC CGAGAGCTCAGCTAGTCTTCTTCTCCAACCCGGGCCCTATGTCCACTTCAGGACAGCATGTTTGCTGC CTCCAGGGATCCTGTGTCCCCGAGCTGGGACCACCTTATATCCAGGGCCGGTTAATGTGGCTCTGGTT CTGGGTACTTTTATCTGTCCCCTCCACCCACAATCaagcttctgaccttcttcttctccacaggcctcgagagatctggcagcg gagcaacaaacttctactactcaacaagcaggtgacgtggaggagaatccgggctaggctcgagatgcaaaaaaagaaaagaaaagtgtatccct atgatgtccccgattatgccggttcaagagccctggctgtagtagactgagccgagtgacagcgcaccacaagtcccagagacagctggaatcatgc cagcagctctgtgctcagcggggtgggatgtggtcggcggtggcagaggatctggacgtgagcggggcgctgatccattcgacagaaagaggaggccca acctggcaagatggctcgtcttcgaggaacagcccttgaatgtgatcgtcgcctacagagtggaccgggtgaccgctcaattcgacatctccagcagctggtg cattgggctgaggaccacaagaaactggtggtcagcgcaacagaagccacttcgatactaccacaccttttgcgctgtgtgcatcgactgatgggcactg tggccagatggagctcgaagctatcaaggagcgaacaggagcgcagccattcaatattaggggcggtaaatacagaggctccctgcccccttgggg atatctccctaccagggtgagtgaggagtggtgagactggtgccagaccctgagagagagcggattctggaagtgtaccacagagtgtcgataaccag aaccactccatctggtggcacacgacctgaatagacgcggcggtgctctctcaaggattatttgcctcagctgcagggaagagagccacaggggaagagaa tggagtgctactgactgaagagatctatgatcagtgaggtatgctgggttacgaacactcaatggcaaaactgtccgggacgatgacggagcccctctgg tgagggctgagcatttctaccagagagcagctcgaagctctgcgggcagaactggtcaagactagtcgcgcaaacctgcggtgagcccccaagcct gtcctgaggggtgctgttctgcgcgtctgtggagagccagcatacaagtttgcggcgaggggcgcaaacatccccgctatcgatgcaggagcatggggtt ccctaagcactgtggaacgggacagtgccatggctgagtgaggacgcttttgcgaggaacagggtgctggatctcctgggtgacgtgagcggctgga aagtgtgggtggcaggatctgactccgctgtggagctggcagaagtcaatgccgagctggtgactgactccctcatcgatctcctgcatatagactgggt ccccacagagagaagctctggacgcacgaattgctgactcgtctagacaggaggaactggaggcctggaggccaggcccttggatgggagtggtg gagaaaccggacagagggttggggtggtggaggagcaggacaccgcagccaagaacacatggctgagatcatgaatgtccggctcacattcgacg tgcgcggtggcctgactcgaaccatcgatttggcgacctgcaggagtagtaaacagcacctgagactggggtccgtggtgaaagactgcacactgggatgt ccGGATCCGGTGAGGGCAGAGGAAGTCTACTAACATGCGGTGACGTGGAGGAGAATCCGGGCCCT GAATTCGCCACCATGACAGAATACAAGCCCACAGTCAGGCTTGCAACTAGAGATGACGTTCCAGAGCAG TGAGAACCTGGCAGCTGCTTTTGCAGACTATCCGGCCACGAGGCACACTGTGCATCCCGATCGGCACAT CGAGCGCGTTACAGAATTGCAGGAAGTGTTCCTGACAAGAGTTGGGCTCGACATTGGTAAAGTGTGGGTC GCTGACGACGGGGCAGCTGTTGCGGTGTGGACCACACCGGAGAGTGTGGAGGCCGGTGCTGTGTTTGCC GAAATTGGTCCACGCATGGCCGAAGTCTCCGGATCTCGGTTGGCCGCACAGCAGCAGATGGAAGGCCTG CTGGCGCCTCACCGACCTAAAGAGCCTGCATGTTTCTGGCCACCGTCGCGTATCCCCCGATCATCAGG GTAAGGGCCTCGGCAGCGCCGTCGTGCTGCCGGGTGTTGAGGCAGCTGAAAGAGCAGGCGTGCCGGCG TTTTTGAAACAAGTGACCCGAGGAATCTCCCATTTTACGAGAGACTGGGGTTACCGTGACAGCCGATGT CGAAGTGCCCGAAGGCCCCAGGACCTGGTGTATGACCCGCAAGGCCGGTGCTAGgatccgatcttttccctctgcc aaaaattatggggacatcatgaagccccttgagcatctgacttctggctaataaaggaaatttttatttcattgcaatagtgtgttggaattttgtgtctctactcgT cccgatcccctatggtcactctcagtaaatctgctctgatgccgatagtaagccagtagtctgctccctgctgtgtgttgaggctcgtgagtagtgcgcgag caaaatttaagctacaacaaggcaaggcttgaccgacaattgcatgaagaatctgcttagggtaggcgttttgcgctgcttcgcatgtacgggcccagatata cgcgtGCCACTAGGGACAGGATTGGTGACAGAAAAGCCCCATCCTTAGGCCTCCTCCTTCTAGTCTCCTGA TATTGGGTCTAACCCCCACCTCCTGTTAGGCAGATTCTTATCTGGTGACACACCCCCATTTCTGGAGCC ATCTCTCTCCTTGCCAGAACCTCTAAGGTTTGCTTACGATGGAGCCAGAGAGGATCCTGGGAGGGAGAGC TTGGCAgggggtgggaggggaagggggggaTGCGTGACCTGCCCGGTTCTCAGTGGCCACCCTGCGCTACCCTCTC CCAGAACCTGAGCTGCTCTGACGCGGCCGTCTGGTGCGTTTCACTGATCCTGGTGCTGCAGCTTCTTAC ACTTCCCAAGAGGAGAAgcagtttggaaaaacaaaatcagaataagtgtgctcgtagtttaacttggctcttcaccttctagtcccccaattatattg ttctccgtgctcagttttacctgtgagataaggccagtagccagccccgtctggaagggctgtggtgaggaGGGGGGGTGTCGTGTGGAAA ACTCCCTTTGTGAGAATGGTGCGTCTAGGTGTTACCAAGGTCGTGGCCGCTCTACTCCCTTTCTCTTTC TCCATCCTTCTTCTTAAAGAGTCCCCAGTGCTATCTGGGACATATTCTCCGCCAGAGCAGGGTCCCCG CTTCCCTAAGGCCCTGCTCTGGGCTTCTGGGTTTGTGCTTGGCAAGCCCAGGAGAGGCGCTCAGGCTT CCCTGTCCCCCTTCTCTGCTCCACCATCTCATGCCCTGGCTCTCCTGCCCTTCCCTACAGGGGTTCTGT GCTCTGCTCTTCAGAC