



AATAGAAACTGGGCTTGTTCGAGACAGAGAAGACTCTTGCCTTTCTGATAGGCACCTATTGGTCTTACTGACATCC
 TTATCTTTGACCCGAACAGCTCTGTCTCTTCTGAGAACGCAAAGACTATCCGTGGATAACCAGAATGACTGTAGG

600

chimeric intron

ACTTTGCCTTTCTCTCCACAGGTGTCCACTCCCAGTTCAATTACAGCTCTTAAGGCTAGAGTACTTAATACGACT
 TGAAACGGAAAGAGAGGTGTCCACAGGTGAGGGTCAAGTTAATGTCGAGAATTCCGATCTCATGAATTATGCTGA

675

chimeric intron

T7 promoter

CACTATAGGCTAGCCACCATGGCTTCCAAGGTGTACGACCCGAGCAAACGCATGATCACTGGGCCTCAG
 GTGATATCCGATCGGTGGTACCGAAGGTTCCACATGCTGGGGCTCGTTGCGTTTGCCTACTAGTGACCCGGAGTC

750

T7 promoter

1 Met Ala Ser Lys Val Tyr Asp Pro Glu Gln Arg Lys Arg Met Ile Thr Gly Pro Gln
 hRluc

TGGTGGGCTCGCTGCAAGCAAATGAACGTGCTGGACTCCTTCATCAACTACTATGATTCCGAGAAGCACGCCGAG
 ACCACCCGAGCGACGTTCTGTTTACTTGCACGACCTGAGGAAGTAGTTGATGATACTAAGGCTCTTCTGTCGGGCTC

825

hRluc

AACGCCGTGATTTTTCTGCATGGTAACGCTGCCTCCAGCTACCTGTGGAGGCACGTCGTGCCTCACATCGAGCCC
 TTGCGGCACTAAAAGACGTACCATTGCGACGGAGGTCGATGGACACCTCCGTGCAGCACGGAGTGATAGCTCGGG

900

hRluc

45 Asn Ala Val Ile Phe Leu His Gly Asn Ala Ala Ser Ser Tyr Leu Trp Arg His Val Val Pro His Ile Glu Pro

GTGGCTAGATGCATCATCCCTGATCTGATCGGAATGGGTAAGTCCGGCAAGAGCGGGAATGGCTCATATCGCCTC
CACCGATCTACGTAGTAGGGACTAGACTAGCCTTACCCATTCAGGCCGTTCTCGCCCTTACCGAGTATAGCGGAG

975

70 75 80 85 90
Val Ala Arg Cys Ile Ile Pro Asp Leu Ile Gly Met Gly Lys Ser Gly Lys Ser Gly Asn Gly Ser Tyr Arg Leu

hRluc

CTGGACTACTACAAGTACCTCACCGCTTGGTTTCGAGCTGCTGAACCTTCAAAGAAAATCATCTTTGTGGGCCAC
GACCTAGTGATGTTTCATGGAGTGGCGAACCAAGCTCGACGACTTGAAGGTTTCTTTTAGTAGAAACACCCGGTG

1050

95 100 105 110 115
Leu Asp His Tyr Lys Tyr Leu Thr Ala Trp Phe Glu Leu Leu Asn Leu Pro Lys Lys Ile Ile Phe Val Gly His

hRluc

GACTGGGGGGCTTGTCTGGCCTTTCCTACTCTCCTACGAGCACCAAGACAAGATCAAGGCCATCGTCCATGCTGAG
CTGACCCCCCGAACAGACCGGAAAGTGATGAGGATGCTCGTGGTTCTGTTCTAGTTCGGGTAGCAGGTACGACTC

1125

120 125 130 135 140
Asp Trp Gly Ala Cys Leu Ala Phe His Tyr Ser Tyr Glu His Gln Asp Lys Ile Lys Ala Ile Val His Ala Glu

hRluc

AGTGTCGTGGACGTGATCGAGTCCTGGGACGAGTGGCCTGACATCGAGGAGGATATCGCCCTGATCAAGAGCGAA
TCACAGCACCTGCACTAGCTCAGGACCCTGCTCACCGGACTGTAGCTCCTCTATAGCGGGACTAGTTCTCGCTT

1200

145 150 155 160 165
Ser Val Val Asp Val Ile Glu Ser Trp Asp Glu Trp Pro Asp Ile Glu Glu Asp Ile Ala Leu Ile Lys Ser Glu

hRluc

GAGGGCGAGAAAATGGTGCTTGAGAATAACTTCTTCGTCGAGACCATGCTCCCAAGCAAGATCATGCGGAAACTG
CTCCCGCTCTTTTACCACGAACTCTTATTGAAGAAGCAGCTCTGGTACGAGGGTTCTGTTCTAGTACGCCTTTGAC

1275

170 175 180 185 190
Glu Gly Glu Lys Met Val Leu Glu Asn Asn Phe Phe Val Glu Thr Met Leu Pro Ser Lys Ile Met Arg Lys Leu

hRluc

GAGCCTGAGGAGTTCGCTGCCTACCTGGAGCCATTCAAGGAGAAGGGCGAGGTTAGACGGCCTACCCTCTCCTGG
CTCGGACTCCTCAAGCGACGGATGGACCTCGGTAAGTTCCTCTTCCCGCTCCAATCTGCCGGATGGGAGAGGACC

1350

195 200 205 210 215
Glu Pro Glu Glu Phe Ala Ala Tyr Leu Glu Pro Phe Lys Glu Lys Gly Glu Val Arg Arg Pro Thr Leu Ser Trp

hRluc

CCTCGCGAGATCCCTCTCGTTAAGGGAGGCAAGCCCGACGTCGTCAGATTGTCCGCAACTACAACGCCTACCTT
GGAGCGCTCTAGGGAGAGCAATTCCCTCCGTTCCGGGCTGCAGCAGGTCTAACAGGCGTTGATGTTGCGGATGGAA

1425

220 225 230 235 240
Pro Arg Glu Ile Pro Leu Val Lys Gly Gly Lys Pro Asp Val Val Gln Ile Val Arg Asn Tyr Asn Ala Tyr Leu

hRluc

CGGGCCAGCGACGATCTGCCTAAGATGTTTCATCGAGTCCGACCCTGGGTTCTTTTCCAACGCTATTGTCGAGGGA
GCCCGGTGCTGCTAGACGGATTCTACAAGTAGCTCAGGCTGGGACCCAAGAAAAGGTTGCGATAACAGCTCCCT

1500

245 250 255 260 265
Arg Ala Ser Asp Asp Leu Pro Lys Met Phe Ile Glu Ser Asp Pro Gly Phe Phe Ser Asn Ala Ile Val Glu Gly

hRluc

GCTAAGAAGTTCCTAACACCGAGTTCGTGAAGGTGAAGGGCCTCCACTTCAGCCAGGAGGACGCTCCAGATGAA
CGATTCTTCAAGGGATTGTGGCTCAAGCACTTCCACTTCCCGGAGGTGAAGTCGGTCTCCTGCGAGGTCTACTT

1575

270 275 280 285 290
Ala Lys Lys Phe Pro Asn Thr Glu Phe Val Lys Val Lys Gly Leu His Phe Ser Gln Glu Asp Ala Pro Asp Glu

hRluc

AsiSI XhoI

ATGGGTAAGTACATCAAGAGCTTCGTGGAGCGCGTGCTGAAGAACGAGCAGTAATTCTAGGCGATCGCTCGAGCC
TACCCATTCATGTAGTTCTCGAAGCACCTCGCGCACGACTTCTTGCTCGTCAATTAAGATCCGCTAGCGAGCTCGG

1650

295 300 305 310
Met Gly Lys Tyr Ile Lys Ser Phe Val Glu Arg Val Leu Lys Asn Glu Gln

hRluc

MCS

PmeI

NotI

CGGGAATTCGTTTAAACCTAGAGCGGCCGCTGGCCGCAATAAAATATCTTTATTTTCATTACATCTGTGTGTTGG
GCCCTTAAGCAAATTTGGATCTCGCCGGCGACCGGCGTTATTTTATAGAAATAAAAGTAATGTAGACACACAACC

1725

MCS

synthetic polyadenylation signal

TTTTTTGTGTGAGGATCTAAATGAGTCTTCGGACCTCGCGGGGGCCGCTTAAGCGGTGGTTAGGGTTTGTCTGAC
AAAAACACACTCCTAGATTTACTCAGAAGCCTGGAGCGCCCCGGCGAATTCGCCACCAATCCCAAACAGACTG

1800

synthetic polyadenylation signal