

UPLC Mass Spectrometry

Mass spectrometry when coupled with UPLC can be a highly selective and sensitive method for quantitatively measuring analytes in complex matrices but is still subject to interferences and suppression. Additionally, by utilizing the Multiple Reaction Monitoring (MRM) feature of the triple quadrupole mass spectrometer, the signal-to-noise ratio can be significantly improved.

For this assay, the mass spectrometer was operated in positive ion mode with a voltage of 4000V. The source was heated to 300°C. Quadrupole 1 (Q1) resolution was set to unit resolution with Quadrupole 3 (Q3) set to unit. Ion Source gas 1 & 2 and Curtain gas were all set to 40 psi. The CAD gas was set to 9. The MRM transitions monitored were for dA: 252.1→136.0 m/z with a Collision Energy (CE) of 28V and Collision Cell Potential (CXP) of 16V; for the IS: 267.1→146.0 m/z with a Collision Energy (CE) of 27V and Collision Cell Potential (CXP) of 7V; for m6A: 266.1→150.0 m/z with a Collision Energy (CE) of 22V and Collision Cell Potential (CXP) of 9V. The resulting chromatograms were integrated using Sciex OS: Autopik software. Concentrations were calculated from a standard curve prepared in water.

Inserts that were cloned into pMCs-Puro Retroviral Backbones

pMCS -AID-mCherry-SV40-Puro Insert

atgaaggagaagagtgtcttaaatccagccaaacctccggccaaggcacaagttgtgggatggccaccgggtgagatcata
ccggaagaacgtgatggttctgccaataatcaagcgggtggcccgaggcggcggttcgtgaaggtatcaatggacggagca
ccgtacttgaggaaatcgatttgaggatgtataaatgttgagcaagggcgaggaggataacatggccatcatcaaggagttcatg
cgcttaaggtgcacatggagggctccgtgaacggccacgagttcgagatcgagggcgagggcgagggcgccctacgaggg
caccagaccgccaagctgaaggtgaccaaggggtggccctcgccctcgctgggacatcctgtccctcagttcatgtacggctcc
aaggcctacgtgaagcaccggcgacatcccgactactgaagctgtcctcccgagggctcaagtgaggagcgcggtgatgaa
cttcgaggacggcggtggtgaccgtgaccaggactcctcctgcaggacggcgagttcatctacaaggtgaagctgcgaggca
ccaactccctccgacggccccgtaatgcagaagaagaccatgggctgggaggcctcctccgagcggtatgacccgaggacgg
cgccctgaagggcgagatcaagcagaggctgaagctgaaggacggcgccactacgacgtgaggtcaagaccactacaag
gccaagaagcccgtagctgcccggcgctacaacgtcaacatcaagttgacatcacctcccacaacgaggactacaccatcg
tgaacagtacgaacgcgcgaggggcgccactccaccggcgcatggacgagctgtacaagtag

pMCS-UNG2-AID-mCherry-SV40-Puro Insert

atgatcgccagaagacgtctactccttttctccccagccccgcccaggaagcgacacgccccagccccgagccggccgtcca
ggggaccggcggtggtggtgggtgctgaggaaagcggagatgcggcgccatcccagccaagaaggccccggctgggcaggag
gagcctgggacgcccctcctcgccgtgagtgccgagcagttggaccgatccagaggaacaaggccgcgccctgctcaga
ctcgcgcccgcaacgtgcccgtgggcttgagagagctggaagaagcacctcagcggggagttcgggaaaccgtatttatcaa
gctaattgggattgtgcagaagaagaagcattacactgtttatccacccccacaccaagtcttcacctggaccagatgtgtgaca
taaaagatgtgaaggtgtcatcctgggacaggatccatcatggaacctaatcaagctcacgggctctgcttagtgttcaaaggcctg

ttccgctccgcccagtttgagaacatttataaagagttgtctacagacatagaggatgttcatcctggccatggagatttatctgggt
gggccaagcaaggtgtctcttctcaacgctgtcctcacgggtcgtgccatcaagccaactctcataaggagcgaggctgggagca
gttactgatgcagttgtctctgctaaatcagaactcgaatggcctgttttctgtctggggctcttatgctcagaagaagggcagtg
cattgataggaagcggcaccatgtactacagacggctcatccctccccttgtcagtgatagagggttcttggatgtagacactttcaa
agaccaatgagctgtgcagaagtctggcaagaagccattgactggaaggagctgaaggagaagagtgctgtcctaaagatcc
agccaaacctccggccaaggcacaagttgtgggatggccaccgggtgagatcataccggaagaacgtgatggttctcgccaaaaat
caagcgggtggccggaggcggcggcgttcgtgaaggtatcaatggacgggacaccgtacttgaggaaaatcgatttgaggatgtat
aaaatggtgagcaagggcgaggaggataacatggccatcatcaaggagttcatgcgttcaagggtgcacatggagggtcctgga
acggccacgagttcgagatcgagggcgagggcgagggcgccctacgagggcacccagaccgccaagctgaagggtgacca
gggtggccccctgcccctgcctgggacatcctgtcccctcagttcatgtacggctccaaggcctacgtgaagcaccgcccgcgacatc
cccgactactgaagctgtccttccccgagggcttcaagtgggagcgcgtgatgaacttcgaggacggcgggcgtggtgaccgtgacc
caggactcctcctgcaggacggcgagttcatctacaagggtgaagctgcgcggcaccaacttcccctccgacggccccgtaatgca
gaagaagacatgggctgggaggcctcctccgagcggatgtaccccgaggacggcgccctgaagggcgagatcaagcagagg
ctgaagctgaaggacggcgccactacgacgctgaggtaagaccacctacaaggccaagaagcccgtgcagctgcccggcgc
ctacaacgtcaacatcaagttgacatcacctcccacaacgaggactacaccatcgtggaacagtacgaacgcgcgaggggccg
ccactccaccggcgccatggacgagctgtacaagtag

Inserts that were cloned into pLenti-CMV-Insert-SV40-Puro Backbones

pLenti-CMV-Cry2-mCherry-SV40-Puro Insert

atgaagatggacaaaaagactatagtttggtttagaagagacctaaggattgaggataatcctgcattagcagcagctgctcacgaa
ggatctgttttctgtcttcatttggtgtcctgaagaagaaggacagttttatcctggaagagctcaagatgggtgatgaacaatcactt
gctcacttatctcaatccttgaaggctcttgatctgacctcactttaatcaaaaccacacgatttcagcgatcttgattgtatccgc
gttaccggtgtcaciaaaagtcgtctttaaccacctctatgatcctgttctgtagttcgggaccataccgtaaaggagaagctggtggaac
gtgggatctctgtgcaaagctacaatggagatctattgtatgaaccgtgggagatatactgcgaaaagggcaaacttttacgagtttca
attcttactggaagaatgcttagatgtcgattgaatccgttatgcttctccttggcgggtgatgccaataactgcagcggctgaag
cgatttggcgtgttcgattgaagaactagggctggagaatgagccgagaaaccgagcaatgcgttgtaactagagcttggctcc
aggatggagcaatgctgataagttactaaatgagttcatcgagaagcagttgatagattatgcaaagaacagcaagaagttgttg
gaattctacttactacttctcctgatctccatttcggggaaataagcgtcagacacgtttccagtggtgcccggatgaacaaattatag
ggcaagagataagaacagtgaaggagaagaaagtgagatcttttcttaggggaatcggtttaagagagtattctcggatatatgttt
caacttcccgtttactcagcagcaatcgtgttgagtcattctcgggttttcccttgggatgctgatgttgataagttcaaggcctggagacaa
ggcaggacccggtatccgttggtggatgccgaatgagagagcttgggtaccggatggatgcataacagaataagagtgattgttt
caagcttctgtggaagtttcttctcctccatggaaatggggaatgaagtatttctgggatacacttttgatgctgatttggaatgtgacatc
cttggtggtcagctatctctgggagatccccgatggccacgagcttgatcgcttggaacaatcccgcgttacaaggcgccaaatag
cccagaaggtgagtagataaggaatggcttcccgagcttgagattgccaactgaatggatccatcatccatgggacgctccttta
accgtactcaaagcttctgtgtggaactcggaacaaactatgcgaaaccattgtagacatcgacacagctcgtgagctactagcta
aagctatttcaagaaccggtggagcacagatcatgatcgagcagcagcccggtaccacggctgccaccatggtgagcaagg
gagaggaggataacatggccatcatcaaggagttcatgcgttcaagggtgcacatggagggtcctggaacggccacgagttcgag
atcgagggcgagggcgagggcgccctacgagggcacccagaccgccaagctgaagggtgaccaaggggtggccccctgcccctt
cgcttgggacatcctgtcccctcagttcatgtacggctccaaggcctacgtgaagcaccgcccgcgacatccccgactacttgaagctg
tcttccccgaggggttcaagtgggagcgcgtgatgaacttcgaggacggcgcggtggtgaccgtgaccaggactcctcctgcag
gacggcgagttcatctacaagggtgaagctgcgcggcaccaacttcccctccgacggccccgtaatgcagaagaagacatgggct
gggagggcctcctccgagcggatgtaccccgaggacggcgccctgaaggcgagatcaagcagagggtgaagctgaaggacgg
cggccactacgacgctgaggtaagaccacctacaaggccaagaagcccgtgcagctgcccggcgctacaacgtcaacatcaa
gttgacatcacctcccacaacgaggactacaccatcgtggaacagtacgaacgcgcgaggggcgccactccaccggcgccat
ggacgagctgtacaagtaa

pLenti-CMV-Cry2-mCherry-UNG2-SV40-Puro Insert

atgaagatggacaaaaagactatagtttggtttagaagagacctaaggattgaggataatcctgcattagcagcagctgctcacgaa
ggatctgttttctgtcttcatttggtgtcctgaagaagaaggacagttttatcctggaagagctcaagatgggtgatgaacaatcactt
gctcacttatctcaatccttgaaggctcttgatctgacctcactttaatcaaaaccacacacgatttcagcgatcttgattgtatccgc

gttacccggtgctacaaaagtcgtctttaaccacctctatgatcctgtttcgtagttcgggaccataaccgtaaaggagaagctggtggaac
 gtggatctctgtgcaaagctacaatggagatctattgtatgaaccgtgggagatatactgcgaaaagggcaaaccctttacgagtttca
 attcttactggaagaaatgcttagatatgtcgattgaatccgttatgcttctcctccttggcggtgatgccaataactgcagcggtgaag
 cgatttggcggtgttcgattgaagaactagggctggagaatgaggccgagaaaccgagcaatgctgtttaactagagcttggctcc
 aggatggagcaatgctgataagttactaaatgagttcatcgagaagcagttgatagattatgcaaagaacagcaagaaagttgttg
 gaattctacttactacttctcctgatatctcatttcggggaaataagcgtcagacacggtttccagtggtcccggatgaaacaaattatg
 ggcaagagataagaacagtggaaggagaagaaagtcagatcttttctaggggaatcggtttaagagagtattctcggatatatgttt
 caacttccggttactcacgagcaatcgttgttgagtcattcgttttcccttgggatgctgatgttgataagttcaaggcctggagacaa
 ggcaggaccggttatccgttgggtgatgccgaatgagagagcttgggtaccggatggatgcataacagaataagagtgattgttt
 caagcttctgtgtaagtttcttctccttccatggaaatggggaatgaagtatttctgggatacacttttggatgctgatttgaatgtgacatc
 ctggctggcagtatatcttgggagtatccccgatggccacgagcttgatcgcttggacaatcccgcgttacaaggcgccaaatatga
 cccagaaggtagtacataaggcaatggcttcccgagcttgcgagattgccaactgaatggatccatcatccatgggacgctccttta
 accgtactcaaagcttctggtgtggaactcggaaacaaactatgcgaaaccattgtagacatcgacacagctcgtgagctactagcta
 aagctatttcaagaacccgtggagcacagatcatgatcggagcagcagcccggatccaccggtcgccaccatggtgagcaagg
 gcgaggaggataacatggccatcatcaaggagttcatgcgttcaagggtgcacatggagggtcctgtgaacggccacgagttcgag
 atcgagggcgagggcgagggcgccctacgagggcaccagaccgccaagctgaaggtgaccaaggggtggccccctgccctt
 cgcttgggacatctgtccccctcagttcatgtacggctccaaggcctacgtgaagcaccgcccgcacatccccgactacttgaagctg
 tcttccccgagggcttcaagtgggagcgctgatgaacttcgaggacggcggtgtgaccgtgaccaggactcctccttgcag
 gacggcgagttcatctacaaggtgaagctgcgcgccaccaacttccccctcgacggccccgtaatgcagaagaagaccatgggct
 gggaggcctcctcgagcggatgtaccccgaggacggcgccctgaagggcgagatcaagcagaggctgaagctgaaggacgg
 cggccactacgacgtgaggtaagaccacctaagaaggccaagaagcccgtgcagctgcccggcgctacaacgtcaacatcaa
 gttggacatcacctcccacaacgaggactacaccatcggtgaacagtacgaacgcgcccggaggggccgactccaccggcggtcat
 ggacgagctgtacaagatgatcgccagaagacgctctactccttttctccccagccccgaggaagcgacacgccccagcc
 ccgagccggccgtccaggggaccggcggtggtgggtgctgaggaaagcggagatgcggcgccatcccagccaagaaggc
 cccggttggcaggaggagcctgggacgcccctcctcgccgctgagtgccgagcagttggaccggatccagaggaacaagg
 ccgcgccctgtcagactcgcgcccgcaacgtgcccgtgggcttggagagagctggaagaagcacctcagcggggagttcgg
 gaaaccgtattttatcaagctaattgggatttgtgcagaagaagaagcattacactgtttatccacccccacaccaagtcttcacctg
 gaccagatgtgtgacataaaagatgtgaaggtgtcatcctgggacaggatccatatcatggacctaataagctcacgggctctgct
 ttagtgttcaaaggcctgttccgctcctcgcccagtttgagaacattataaagagttgtctacagacatagaggatttgttcatcctggc
 atggagatttatctgggtgggccaagcaaggtgttctccttcaacgctgtcctcacggttctgtgccatcaagccaactctcataagga
 gcgaggctgggagcagttactgatgcagttgttctgggttaaatacagaactcgaatggccttgtttctgtctggggtcttatgtc
 gaagaagggcagtgccattgataggaagcggcaccatgtactacagacggctcatccctccccttgtcagtgtagaggggtcttgg
 gatgtagacacttttcaaagaccaatgagctgctgcagaagtctggcaagaagcccattgactggaaggagctgtaa

pLenti-CMV-Cry2-mCherry-IDR-SV40-Puro Insert

atgaagatggacaaaaagactatagtttggtttagaagagacctaaggattgaggataatcctgcattagcagcagctgctcacgaa
 ggatctgttttctgtcttatttgggtcctgaagaagaaggacagttttatcctggaagagcttcaagatggtggatgaacaatcactt
 gctcacttatctcaatccttgaaggcttctggatcgacctcactttaatcaaaaccacacagatttcagcagcttggattgtatccgc
 gttaccggtgctacaaaagtcgtctttaaccacctctatgatcctgtttcgtagttcgggaccataaccgtaaaggagaagctggtggaac
 gtggatctctgtgcaaagctacaatggagatctattgtatgaaccgtgggagatatactgcgaaaagggcaaaccctttacgagtttca
 attcttactggaagaaatgcttagatatgtcgattgaatccgttatgcttctcctccttggcggtgatgccaataactgcagcggtgaag
 cgatttggcggtgttcgattgaagaactagggctggagaatgaggccgagaaaccgagcaatgctgtttaactagagcttggctcc
 aggatggagcaatgctgataagttactaaatgagttcatcgagaagcagttgatagattatgcaaagaacagcaagaaagttgttg
 gaattctacttactacttctcctgatatctcatttcggggaaataagcgtcagacacggtttccagtggtcccggatgaaacaaattatg
 ggcaagagataagaacagtggaaggagaagaaagtcagatcttttctaggggaatcggtttaagagagtattctcggatatatgttt
 caacttccggttactcacgagcaatcgttgttgagtcattcgttttcccttgggatgctgatgttgataagttcaaggcctggagacaa
 ggcaggaccggttatccgttgggtgatgccgaatgagagagcttgggtaccggatggatgcataacagaataagagtgattgttt
 caagcttctgtgtaagtttcttctccttccatggaaatggggaatgaagtatttctgggatacacttttggatgctgatttgaatgtgacatc
 ctggctggcagtatatcttgggagtatccccgatggccacgagcttgatcgcttggacaatcccgcgttacaaggcgccaaatatga
 cccagaaggtagtacataaggcaatggcttcccgagcttgcgagattgccaactgaatggatccatcatccatgggacgctccttta
 accgtactcaaagcttctggtgtggaactcggaaacaaactatgcgaaaccattgtagacatcgacacagctcgtgagctactagcta

aagctatttcaagaacccggtggagcacagatcatgatcggagcagcagcccggtaccacggtcgccaccatggtgagcaagg
gcgaggaggataacatggccatcatcaaggagttcatgcgttcaagggtcacatggagggtccgtgaacggccacgagttcgag
atcgagggcgagggcgagggcgccctacgagggcaccagaccgccaagctgaaggtagaccaaggggtggcccttgcctt
cgctgggacatcctgtccctcagttcatgtacggctccaaggcctacgtgaagcaccggccgacatcccgactactgaagctg
tcctcccgaggggttcaagtgggagcgcgtgatgaacttcgaggacggcggtggtgaccgtgaccaggactcctcctgcag
gacggcgagttcatctacaaggtgaagctgcgcggcaccaacttccctccgacggccccgtaatgcagaagaagaccatgggt
gggagggcctcctccgagcggatgtacccgaggacggcgccctgaaggcgagatcaagcagagggtgaagctgaaggacgg
cggccactacgacgctgaggtaagaccacctacaaggccaagaagcccgtgcagctgcccggcgctacaacgtcaacatcaa
gttgacatcacctcccacaacgaggactacaccatcgtggaacagtacgaacgcgcggaggggcgccactccaccggcggtcat
ggacgagctgtacaagatgatcgccagaagacgctctactccttttctccccagccccgaggaagcgacacgccccagcc
ccgagccggccgtccaggggacggcggtgggtgctgaggaaagcgagatgcggcgccatccagccaagaaggc
cccggtgggacaggaggagcctgggacggcctcctcgcgctgagtgccgagcagttggaccggtccagaggaacaagg
ccggcgccctgctcagactcgcgggccgcaacgtgtaa

pLenti-CMV-Cry2-mCherry-ΔIDR -SV40-Puro Insert

atgaagatggacaaaaagactatagtttggttagaagagacctaaggattgaggataatcctgcattagcagcagctgctcacgaa
ggatctgttttctgtcttatttggttctgaagaagaaggacagttttatcctggaagagcttcaagatggtgatgaacaatcactt
gctcacttatcctgaaggtcgtgacatcacttcaaaaacccacaacacgatttcagcagatcttgattgatccgc
gttacgggtgctacaaaagtcgtcttaaccacctctatgatcctgttctgtagttcgggaccataaccgtaaaggagaagctggtggaac
gtggatctctgtcaaaagctacaatggagatctattgtatgaaccgtgggagatatactgcgaaaagggcaaacctttacgagtttca
attctactggaagaaatgcttagatgtcgattgaatccgttatgcttctcctccttggtggtgatgccaataactgcagcggtgaag
cgatttggcggtgttgattgaagaactagggtggaagaatgaggccgagaacccgagcaatgcgttgaactagagcttggtctcc
aggatggagcaatgctgataagttactaaatgagttcatcgagaagcagttgatagattatgcaagaacagcaagaagttgttg
gaattctacttactacttctcctgatctccatttcggggaataagcgtcagacacggtttccagtgtgcccggatgaacaaaattatg
ggcaagagataagaacagtggaaggagaagaagtgatcgttttctaggggaatcggttgaagagagtattctcggtatatatgtt
caacttccgttactcagagcaatcgttgttgagtcattcgttttcccttggtgctgatgttgataagttcaaggcctggagacaa
ggcaggaccggttatccgttggtgatgccgaatgagagagcttgggtaccggatggatgcataacagaataagagtgattgtt
caagcttctgtgaagtttcttctcctccatggaaatggggaatgaagtatttctgggatacacttttggtgctgatttgaatgtgacatc
cttggtggcagtatatcttgggagtatccccgatggccacgagcttgatcgttggacaatcccgcttacaaggcgccaaatatga
cccagaaggtagtacataaggcaatggcttccgagcttgcgagattgccaactgaatggatccatcatccatgggacgctccttta
accgactcaaagcttctggtgtggaactcggaacaaactatgcgaacccattgtagacatcgacacagctcgtgagctactagcta
aagctatttcaagaacccggtggagcacagatcatgatcggagcagcagcccggtaccacggtcgccaccatggtgagcaagg
gcgaggaggataacatggccatcatcaaggagttcatgcgttcaagggtcacatggagggtccgtgaacggccacgagttcgag
atcgagggcgagggcgagggcgccctacgagggcaccagaccgccaagctgaaggtagaccaaggggtggcccttgcctt
cgctgggacatcctgtccctcagttcatgtacggctccaaggcctacgtgaagcaccggccgacatcccgactacttgaagctg
tcctcccgaggggttcaagtgggagcgcgtgatgaacttcgaggacggcggtggtgaccgtgaccaggactcctcctgcag
gacggcgagttcatctacaaggtgaagctgcgcggcaccaacttccctccgacggccccgtaatgcagaagaagaccatgggt
gggagggcctcctccgagcggatgtacccgaggacggcgccctgaaggcgagatcaagcagagggtgaagctgaaggacgg
cggccactacgacgctgaggtaagaccacctacaaggccaagaagcccgtgcagctgcccggcgctacaacgtcaacatcaa
gttgacatcacctcccacaacgaggactacaccatcgtggaacagtacgaacgcgcggaggggcgccactccaccggcggtcat
ggacgagctgtacaagcccgtgggttggagagagctggaagaagcacctcagcggggagttcgggaaaccgtattttatcaagc
taatgggatttgtgcagaagaagaagcattacactgtttatccacccccaccaaagttcacttgagccagatgtgtgacata
aaagatgtgaaggtgtcacttgggacaggatccatatcatggacctaataagctcacgggctctgtcttagtttcaaggcctgttc
cgctccgcccagtttggagaacatttataaagagttgtctacagacatagaggatttgttcatcctggccatggagatttatcgggtg
gccaagcaaggtgttcttctcaacgctgtcctacgggtcgtgccatcaagccaactctcataaggagcgagggtgggagcagtt
cactgatgcagttgttcttggttaaatcagaactgaatggcctgttttctgtctgggctcttatgctcagaagaagggcagtgcca
ttgataggaagcggcaccatgtactacagacggctcatcctcccccttctgagtgatagagggttcttggatgtagacacttttcaag
accaatgagctgctgcagaagcttggaagaagccattgactggaaggagctgtaa

pLenti-CMV-Cry2-mCherry-IDR-C-SV40-Puro Insert

atgaagatggacaaaaagactatagtttggttagaagagacctaaggattgaggataatcctgcattagcagcagctgctcacgaa

ggatctgttttctgtcttcatttggtgtcctgaagaagaaggacagttttatcctggaagagcttcaagatggtggatgaaacaatcactt
gctcacttatctcaatccttgaaggctcttgatctgacctcactttaatcaaaaccacacagatttcagcgatcttgattgatccgc
gttaccgggtgctacaaaagtcgtctttaaccacctctatgatcctgttctgtagttcgggaccataaccgtaaaggagaagctggtggaac
gtggatctctgtgcaaagctacaatggagatctattgtatgaaccgtgggagatatactgcgaaaagggcaaaccctttacgagttca
attcttactggaagaaatgcttagatatgtcgattgaatccgttatgcttctcctccttggcggttgatgccaataactgcagcggtgaag
cgatttggcggttctgattgaagaactagggctggagaatgagccgagaaaccgagcaatgcgttgtaactagagcttggtctcc
aggatggagcaatgctgataagttactaaatgagttcatcgagaagcagttgatagattatgcaaagaacagcaagaaagttgttg
gaattctacttactacttctcctgatatccatttcgggaaataagcgtcagacacgtttccagtggtgcccggatgaaacaaattatag
ggcaagagataagaacagtggaaggagaagaaagtcagatcttttcttaggggaatcggttaagagagtattctcggatatatgttt
caacttcccgtttactcacgagcaatcggttgtagtcatctcggttttcccttgggatgctgatgttgataagttcaaggcctggagaca
ggcaggaccggttatccgttggtggatgccgaatgagagagctttgggtaccggatggatgcataacagaataagagtgattgttt
caagcttctgtgtaagtttcttctccttccatggaaatggggaatgaagtattctgggatacacttttgatgctgatttggatgtgacatc
cttggtggtgagctatatctctgggagtatccccgatggccacgagcttgatcgcttggaacaatcccgcgttacaaggcgccaaatatga
cccagaaggtagtacataaggcaatggcttcccagagcttgagagattgccaactgaatggatccatcatccatgggacgctccttta
accgtactcaaagcttctggtgtggaactcggaaacaaactatgcgaaaccattgtagacatcgacacagctcgtgagctactagcta
aagctatttcaagaacccgtggagcacagatcatgatcggagcagcagcccggtaccgggtcgccaccatggtgagcaagg
gagaggagataacatggccatcatcaaggagttcatgcttcaaggtgcacatggagggtcctgtaacggccacgagttcgag
atcgaggcgaggcgaggcgagggcgccctacgaggcgacccagaccgcaagctgaaggtgaccaaggggtgccccctgcccctt
cgcttgggacatctgtccccctagttcatgtacggctccaaggcctacgtgaagcaccggcgccacatccccgactacttgaagctg
tcttccccgagggcttcaagtgggagcgctgtatgaacttcgaggacggcggtggtgaccgtgaccaggactcctcctgacg
gacggcgagttcatctacaaggtgaagctgctggcgacccaacttcccctccgacggccccgtaatgcagaagaagaccatgggct
gggaggcctcctcgagcggtgtaccccgaggacggcgccctgaagggcgagatcaagcagagggtgaagctgaaggacgg
cgccactacgacgctgaggtcaagaccacctacaaggccaagaagcccgtgcagctgcccggcgctacaacgtcaacatcaa
gttgacatcacctcccacaacgaggactacaccatcgtggaacagtacgaacgcgcgagggcgccactccaccggcgcat
ggacgagctgtacaagcccgtgggcttggagagagctggaagaagcacctcagcgggagttcgggaaaccgtattttatcaagc
taatgggatttgtcagaagaagaagcattacactgtttatccacccccacaccaagcttccactggaccagatgtgtgacata
aaagatgtaaggtgtcatcctgggacaggatccatatcatggacctaataagctcacgggctctgctttagtttcaaaggcctgttc
cgctccgcccagtttgagaacatttataaagagttgtctacagacatagaggattttgttcatcctggccatggagatttatctgggtg
gccaagcaaggtgttcttctcaacgctgtcctcaggttctgcccataagccaactctcataaggagcgaggctgggagcagtt
cactgatgcagttgttcttggttaaatacagaactcgaatggcctgttttctgtctggtgcttctatgctcagaagaagggcagtgcca
ttgataggaagcggcaccatgtactacagacggctcatccctccccttgtcagtgatagagggttcttggatgtagacacttttcaaag
accaatgagctgtgcagaagctgtggaagaagcccattgactggaaggagctgatcgccagaagacgctctactccttttctccc
ccagccccgcaggaagcgacacgccccagccccgagccggcgctcaggggaccggcggtgggtgctgaggaag
cggagatgcggcgccatcccagccaagaaggccccggtgggagaggagcctgggacgcccctcctcgccgctgagtg
ccgagcagttggaccgatccagaggaacaaggccggccctgctcagactcgcgcccgaacgtgtaa

pLenti-CMV-Cry2-mCherry-ΔPIP-SV40-Puro Insert

atgaagatggacaaaaagactatagtttggttagaagagacctaaggattgaggataatcctgcattagcagcagctgctcacgaa
ggatctgttttctgtcttcatttggtgtcctgaagaagaaggacagttttatcctggaagagcttcaagatggtggatgaaacaatcactt
gctcacttatctcaatccttgaaggctcttgatctgacctcactttaatcaaaaccacacagatttcagcgatcttgattgatccgc
gttaccgggtgctacaaaagtcgtctttaaccacctctatgatcctgttctgtagttcgggaccataaccgtaaaggagaagctggtggaac
gtggatctctgtgcaaagctacaatggagatctattgtatgaaccgtgggagatatactgcgaaaagggcaaaccctttacgagttca
attcttactggaagaaatgcttagatatgtcgattgaatccgttatgcttctcctccttggcggttgatgccaataactgcagcggtgaag
cgatttggcggttctgattgaagaactagggctggagaatgagccgagaaaccgagcaatgcgttgtaactagagcttggtctcc
aggatggagcaatgctgataagttactaaatgagttcatcgagaagcagttgatagattatgcaaagaacagcaagaaagttgttg
gaattctacttactacttctcctgatatccatttcgggaaataagcgtcagacacgtttccagtggtgcccggatgaaacaaattatag
ggcaagagataagaacagtggaaggagaagaaagtcagatcttttcttaggggaatcggttaagagagtattctcggatatatgttt
caacttcccgtttactcacgagcaatcggttgtagtcatctcggttttcccttgggatgctgatgttgataagttcaaggcctggagaca
ggcaggaccggttatccgttggtggatgccgaatgagagagctttgggtaccggatggatgcataacagaataagagtgattgttt
caagcttctgtgtaagtttcttctccttccatggaaatggggaatgaagtattctgggatacacttttgatgctgatttggatgtgacatc
cttggtggtgagctatatctctgggagtatccccgatggccacgagcttgatcgcttggaacaatcccgcgttacaaggcgccaaatatga

cccagaaggtgagtagacataaggcaatggcttcccgagcttgcgagattgccaactgaatggatccatcatccatgggacgctccttta
accgtactcaaagcttctggtgtggaactcggaacaaactatgcgaaacccattgtagacatcgacacagctcgtgagctactagcta
aagctatttcaagaacccgtggagcacagatcatgatcggagcagcagcccggtaccacgggtcgccaccatggtgagcaagg
gcgaggaggataacatggccatcatcaaggagttcatgcgctcaagggtgcacatggagggtccgtgaacgggccacgagttcgag
atcgagggcgagggcgagggcgccctacgagggcaccagaccgccaagctgaagggtgaccaaggggtgccccctgccctt
cgcttgggacatcctgtcccctcagttcatgtacggctccaaggcctacgtgaagcaccgcccgcacatccccgactacttgaagctg
tcctccccgagggcttcaagtgggagcgctgatgaacttcgaggacggcggtggtgaccgtgaccaggactcctccctgcag
gacggcgagttcatctacaaggtgaagctgcgcgccaccaacttcccctcgacggccccgtaatgcagaagaagaccatgggct
gggagggcctcctcgagcggatgtaccccgaggacggcgccctgaaggcgagatcaagcagagggtgaagctgaaggacgg
cggccactacgacgctgaggtaagaccacctaagggccaagaagcccgtgcagctgcccggcgctacaacgtcaacatcaa
gttgacatcacctcccacaacgaggactacaccatcgtggaacagtagaacgcgcccaggggcccactccacggcgggcat
ggacgagctgtacaagAtgatcggccagaagacgctctactccgcagcatccccagccccgcccaggaagcgacacgccccca
gccccgagccggcgtccaggggaccggcgtggctgggggtcctgaggaaagcggagatgcggcgggccatcccagccaagaa
ggccccggctgggagaggaggacgtgggacggcgccctcctcgccgctgagtgccgagcagttggaccggatccagaggaaca
aggccgcgccctgctcagactcgcgcccgcaacgtgcccgtgggcttggagagagctggaagaagcacctcagcggggagtt
cggaagaccgtattttatcaagctaaggtggttgcagaagaagaagcattacactgtttaccacccccacaccaagtcttcac
ctggaccagatgtgtgacataaaagatgtgaaggttgcacctgggacaggatccatatcatggacctaataagctcacgggctct
gcttagtgttcaaaggcctgttccgctccgcccagtttggaacattataaagagttgtctacagacatagaggattttgtcatcctg
gccatggagatttatctgggtgggccaagcaggttctccttcaacgctgtcctcacggttcgtgccatcaagccaacttcataa
ggagcgaggctgggagcagttcactgatgcagttgtcctggctaaatcagaactcgaatggcctgttttctgtctggtggtcttatg
ctcagaagaagggcagtgccattgataggaagcggcaccatgtactacagacggctcatccctcccttgtcagtgatagaggggt
cttggatgtagacatttcaaagaccaatgagctgctgcagaagctggcaagaagcccattgactggaaggagctgtaa

pLenti-CMV-Cry2-mCherry-DRPA-SV40-Puro Insert

atgaagatggacaaaaagactatagtttgggttagaagagacctaaggattgaggataatcctgcattagcagcagctgctcacgaa
ggatctgttttctgtcttcatgttgggtcctgaagaagaaggacagtttctcgtgaagagcttcaagatggtgatgaacaatcactt
gctcacttatcfaatccttgaaggcttggatcgtacctaacttatacaaaacccacaacacgatttcagcagatcttgatttatccgc
gttaccggtgctacaaaagtcgtctttaaccacctaataatcctgttctgtagttcgggaccataaccgtaaaggagaagctggtggaac
gtggatctctgtgcaaagctacaatggagatctattgtatgaaccgtgggagataatactgcgaaaagggcaaacttttacgagtttca
attcttactggaagaaatgcttagatagtcgattgaatccgttatgcttctcctccttggcggtgatgccataactgcagcggctgaag
cgatttggcggtgttcgattgaagaactagggctggagaatgaggccgagaaacggagcaatgctgttgaactagagcttggctcc
aggatggagcaatgctgataagttactaaatgagttcatcgagaagcagttgatagattatgcaaagaacagcaagaaagtgttgg
gaattctacttactacttctcctgtatctcatttcggggaaataagcgtcagacacgtttccagtggtgcccggatgaacaaattatag
ggcaagagataagaacagtggaaggagaagaagtgagatcttttctaggggaatcggttaagagagatttctcggtatatagttt
caacttccgttactcacgagcaatcgttgtgagtcattcgttttcccttgggatgctgatgttgataagttcaaggcctggagacaa
ggcaggaccggttatccgttgggtgatccggaatgagagagcttgggtaccggatggatgcataacagaataagagtgattgttt
caagcttctgtgaaagtttcttctcctccatggaaatggggaatgaagtatttctgggatacatttggatgctgatttgaatgtgacatc
cttggctggcagtatatctctgggagtatccccgatggccacgagcttgatcgcttggacaatcccgcttacaaggcgccaaatatga
cccagaaggtgagtagacataaggcaatggcttcccgagcttgcgagattgccaactgaatggatccatcatccatgggacgctccttta
accgtactcaaagcttctggtgtggaactcggaacaaactatgcgaaacccattgtagacatcgacacagctcgtgagctactagcta
aagctatttcaagaacccgtggagcacagatcatgatcggagcagcagcccggtaccacgggtcgccaccatggtgagcaagg
gcgaggaggataacatggccatcatcaaggagttcatgcgctcaagggtgcacatggagggtccgtgaacgggccacgagttcgag
atcgagggcgagggcgagggcgccctacgagggcaccagaccgccaagctgaagggtgaccaaggggtgccccctgccctt
cgcttgggacatcctgtcccctcagttcatgtacggctccaaggcctacgtgaagcaccgcccgcacatccccgactacttgaagctg
tcctccccgagggcttcaagtgggagcgctgatgaacttcgaggacggcggtggtgaccgtgaccaggactcctccctgcag
gacggcgagttcatctacaaggtgaagctgcgcgccaccaacttcccctcgacggccccgtaatgcagaagaagaccatgggct
gggagggcctcctcgagcggatgtaccccgaggacggcgccctgaaggcgagatcaagcagagggtgaagctgaaggacgg
cggccactacgacgctgaggtaagaccacctaagggccaagaagcccgtgcagctgcccggcgctacaacgtcaacatcaa
gttgacatcacctcccacaacgaggactacaccatcgtggaacagtagaacgcgcccaggggcccactccacggcgggcat
ggacgagctgtacaagAtgatcggccagaagacgctctactccttttctccccagccccgcccaggaagcgacacgccccagcc
ccgagccggcgtccaggggaccggcgtggctgggggtcctgaggaaagcggagatgcggcgggccatcccagccaagaaggc

cccggtgggcaggaggagcctgggacgccgcccctcctcgccgctgagtgccgagcagttggaccggatccagaggaacaagg
ccgcgggccctgctcagactcgcggcctgtaacgtgccggtgggctttggagagagctggaagaagcacctcagcggggagttcggg
aaaccgtattttatcaagctaattgggattgtgcagaagaaagaaagcattacactgtttatccacccccacaccaagtcttcacctgg
accagatgtgtgacataaaagatgtgaagggtgtcatcctgggacaggatccatatcatggacctaatcaagctcacgggctctgctt
agtgtcaaaggcctgttccgcctccgcccagtttgagagaacattataaagagttgtctacagacatagaggattttgtcatcctggcca
tgagatttatctgggtgggccaagcaagggtgtctccttctcaacgctgtcctcacggttcgtgccatcaagccaactctcataaggag
cgaggctgggagcagttcactgatgcagttgtcctggctaaatcagaactcgaatggccttgtttcttgcctctggggctcttatgctcag
aagaagggcagtgccattgataggaagcggcaccatgtactacagacggctcatccctccccttgcagtgtagaggggtctttgg
atgtagacacttttcaaagaccaatgagctgctgcagaagtctggcaagaagcccattgactggaaggagctgtaa