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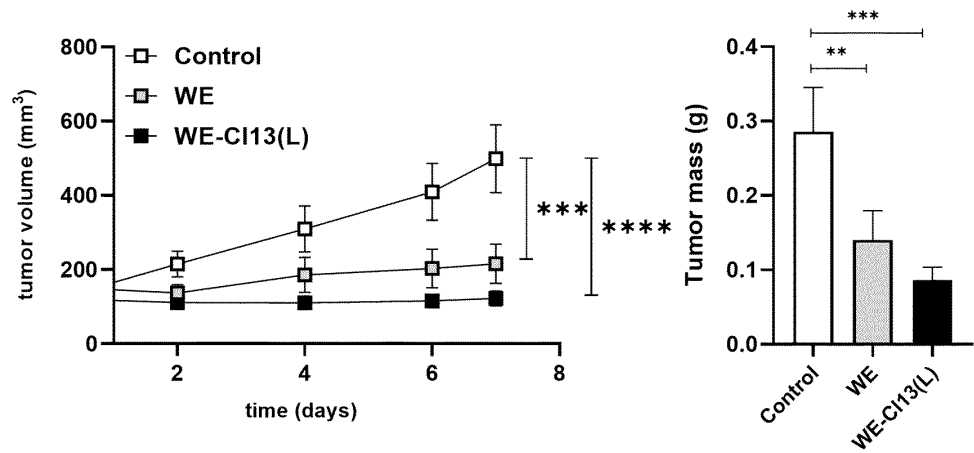


Figure 2

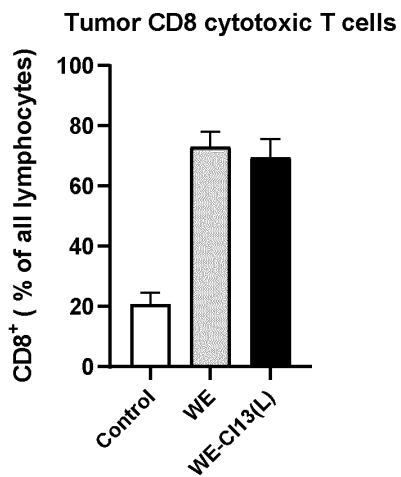


Figure 3

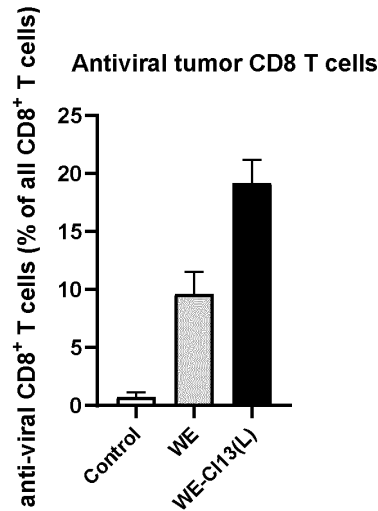


Figure 4

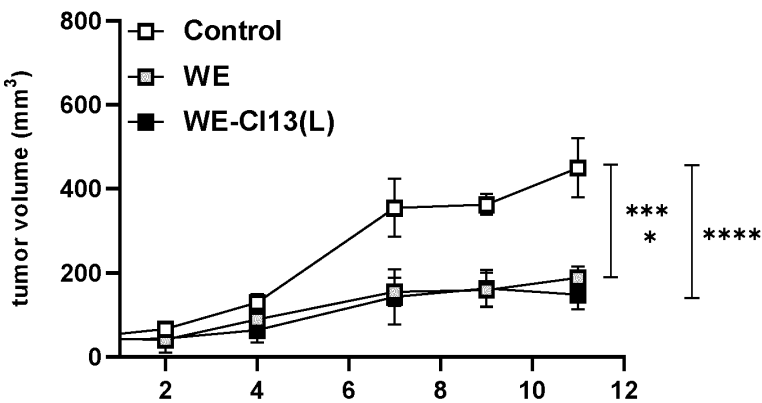


Figure 5

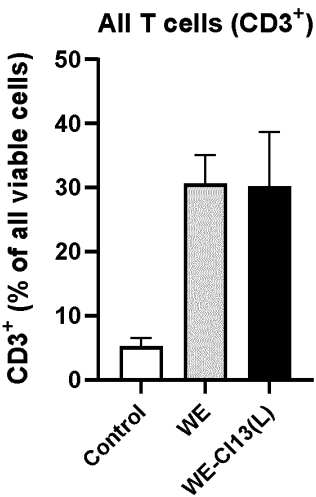


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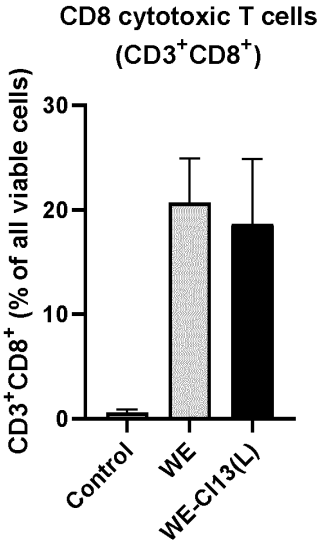


Figure 7

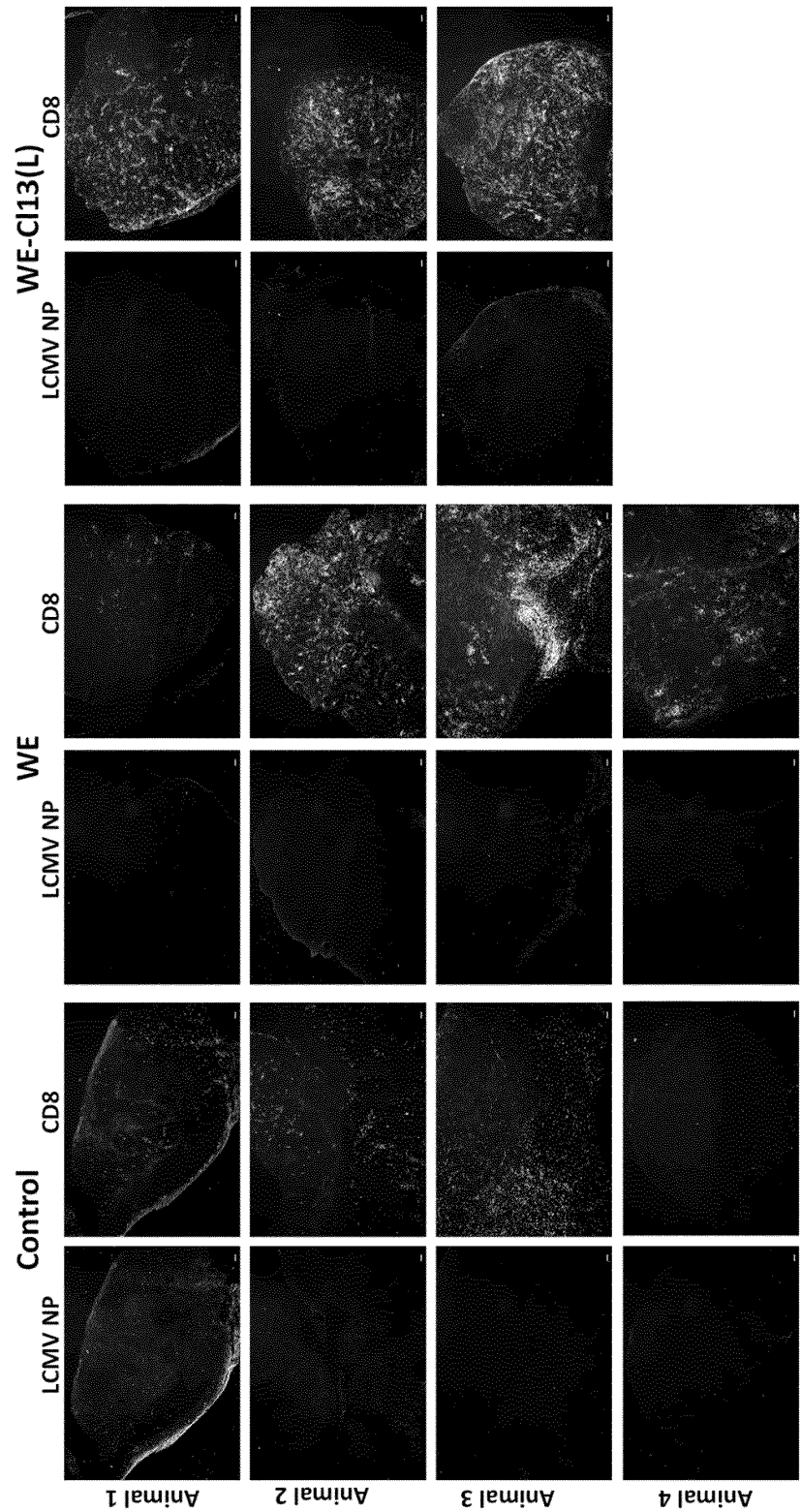


Figure 8

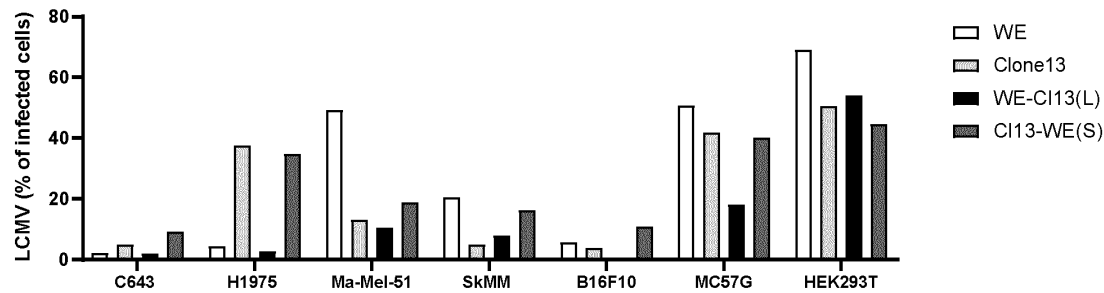


Figure 9

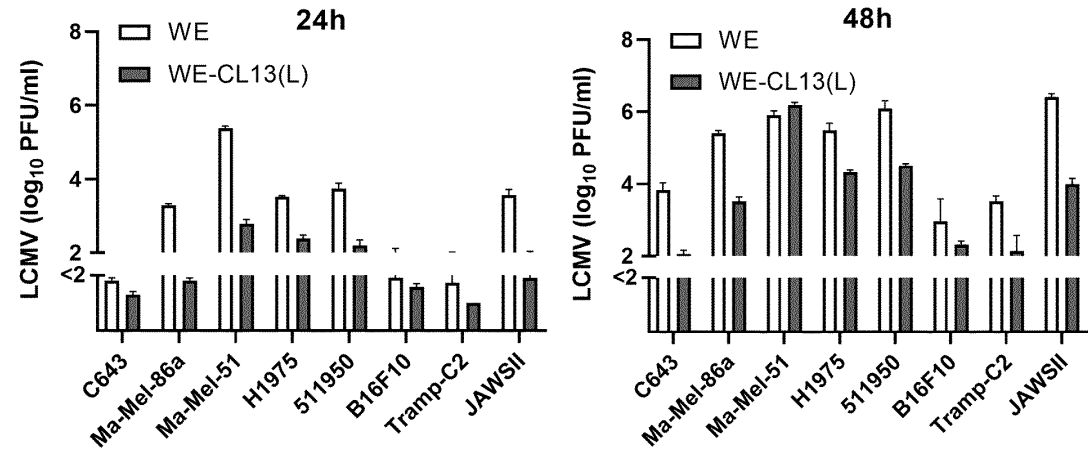


Figure 10

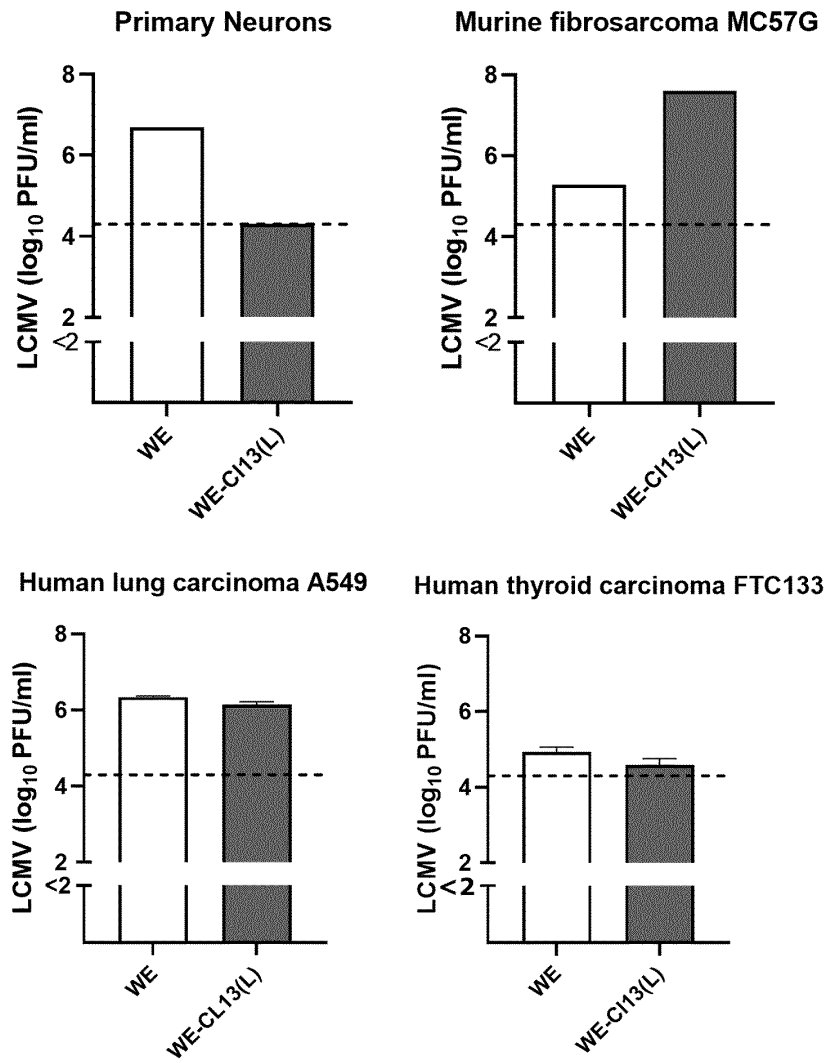


Figure 11

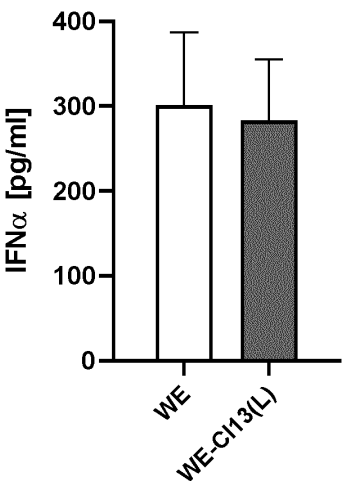


Figure 12

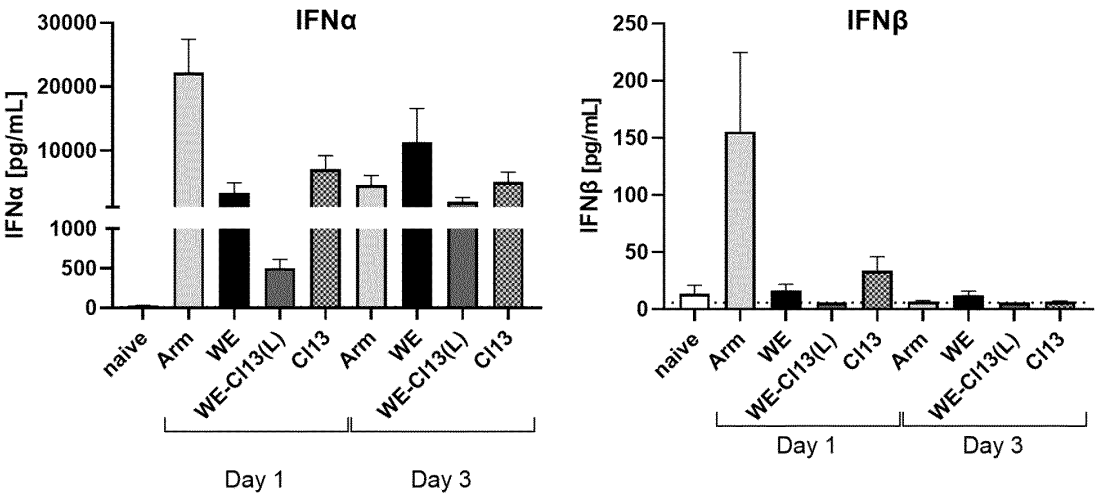
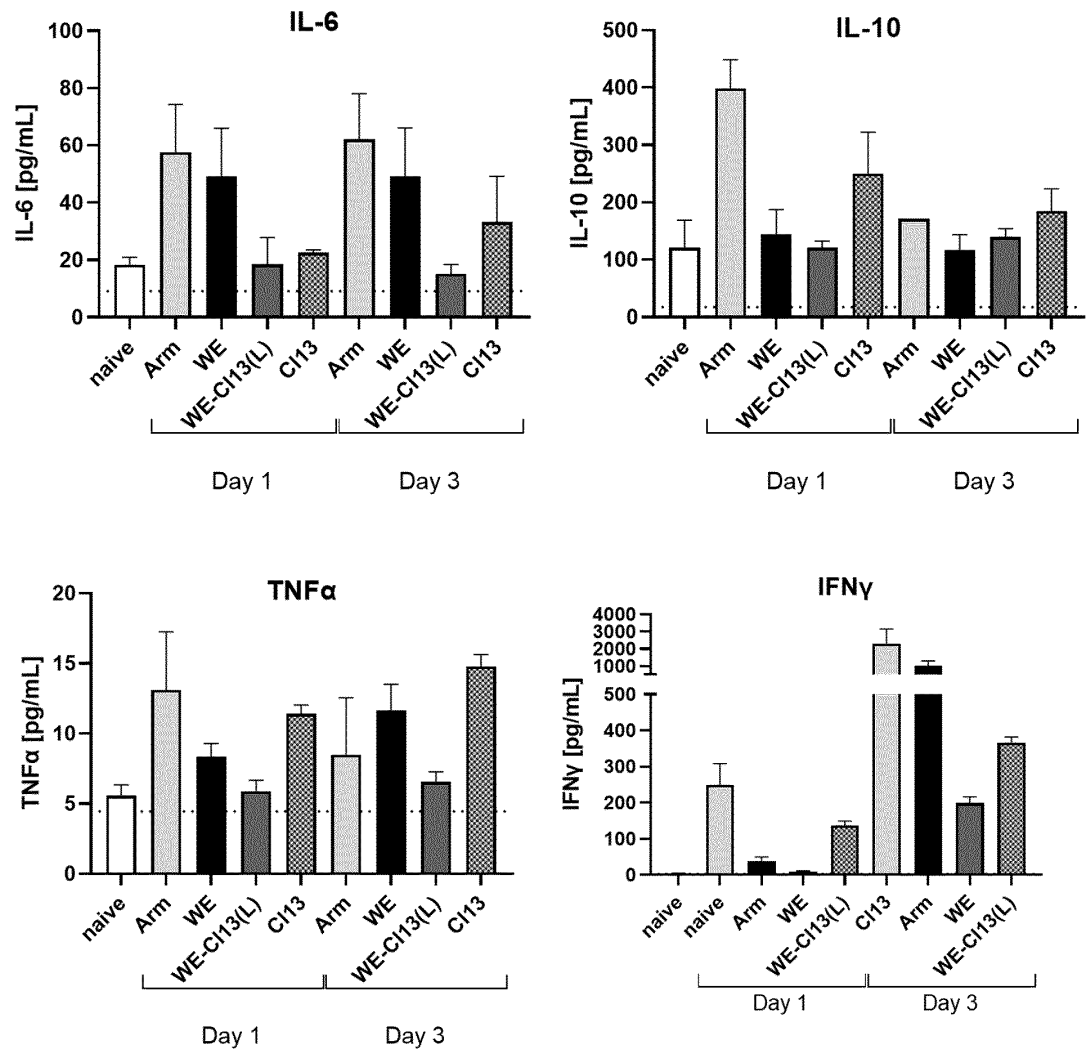


Figure 13



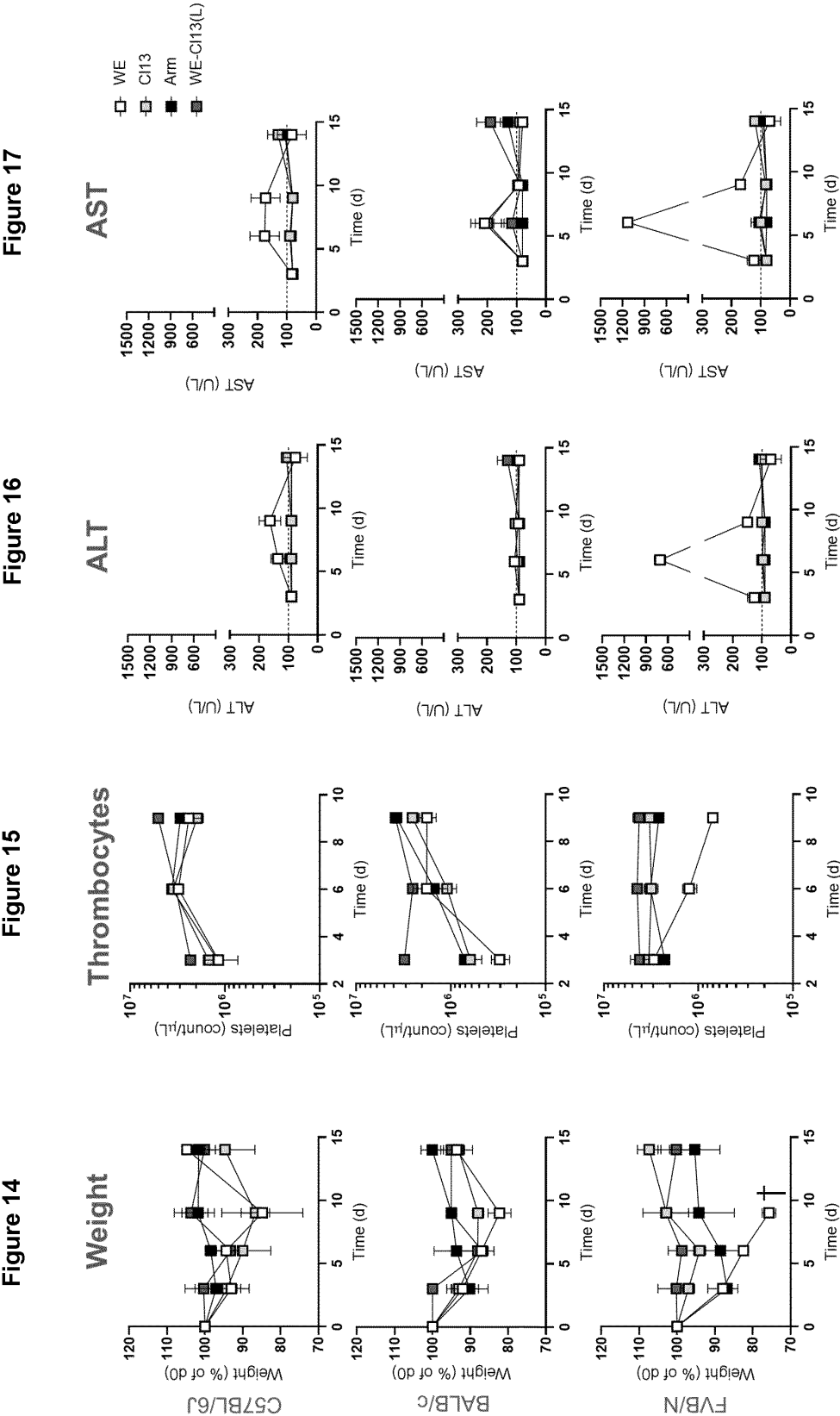


Figure 18

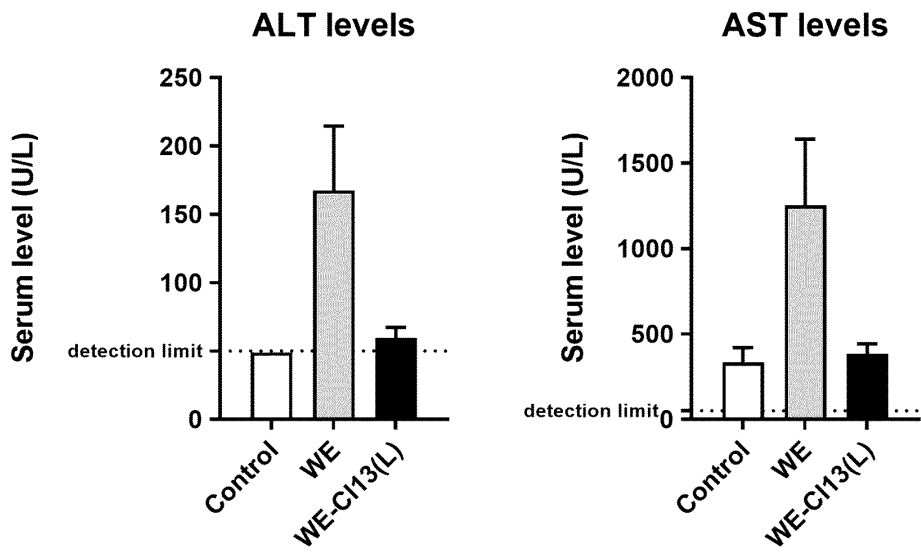


Figure 19

B16-Ova (melanoma) tumor model

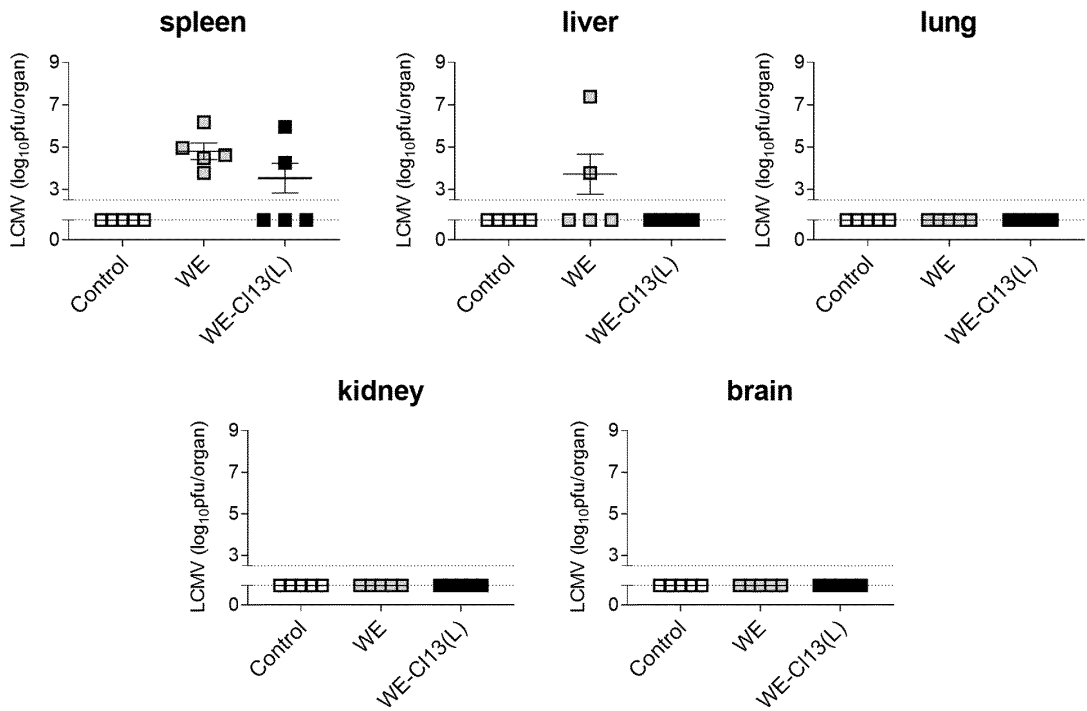


Figure 20

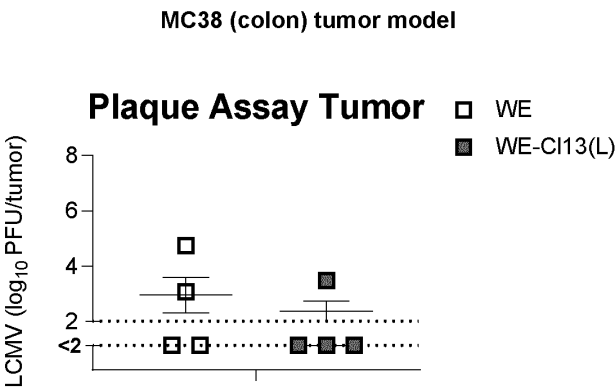


Figure 21

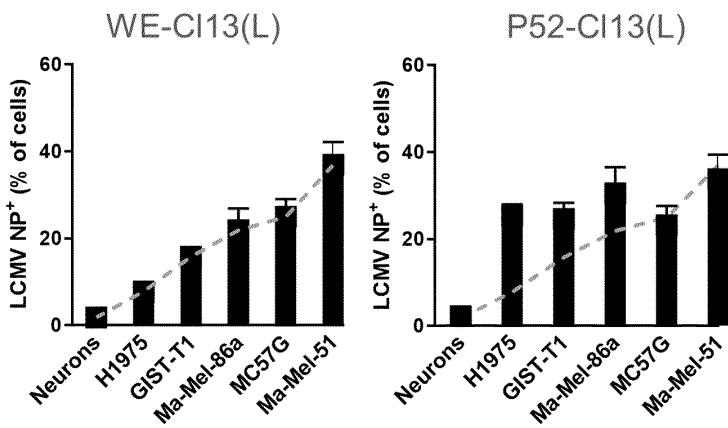


Figure 22

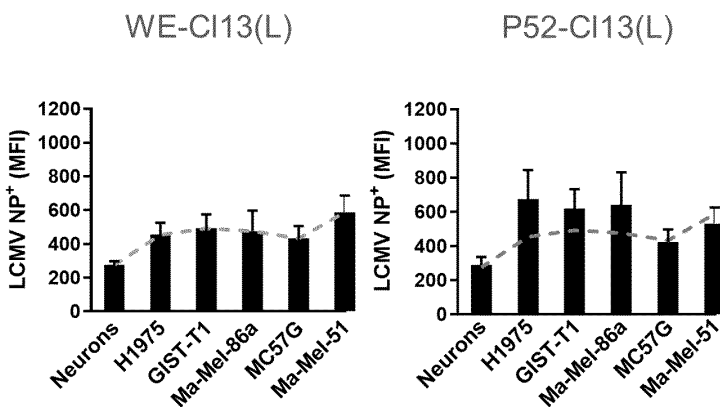


Figure 23

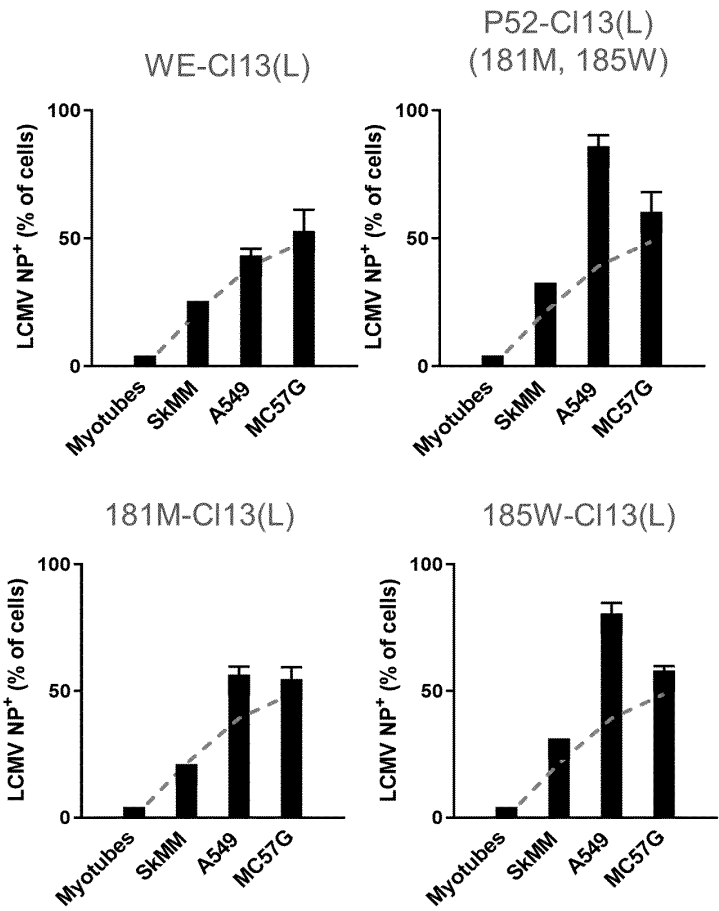


Figure 24

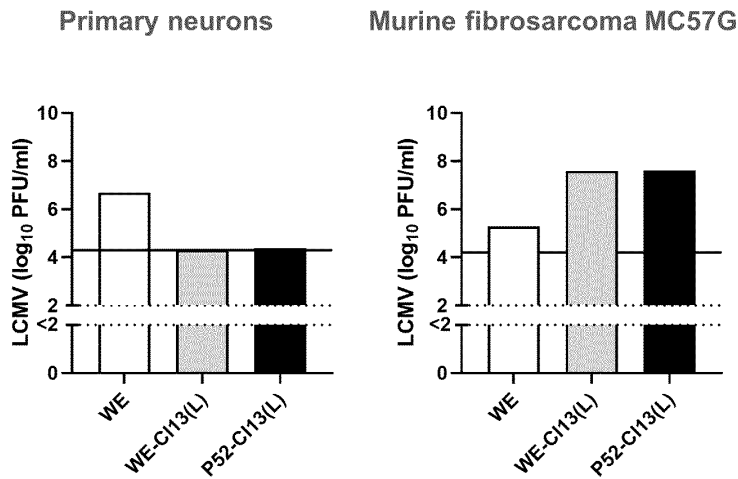
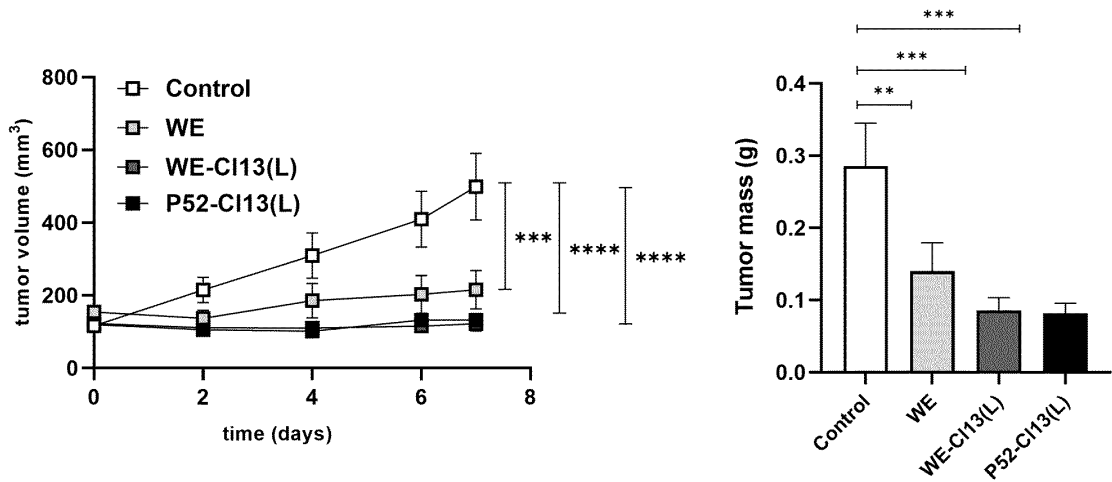


Figure 25



Tumor draining lymph node

Figure 26

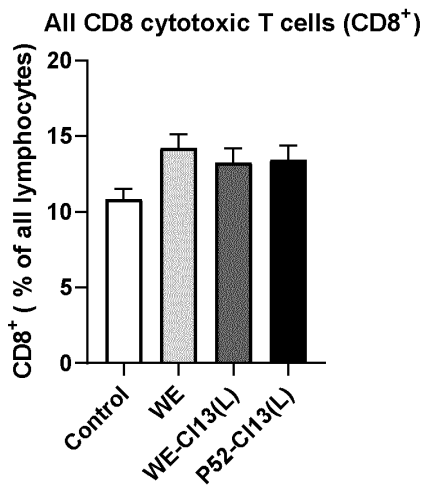
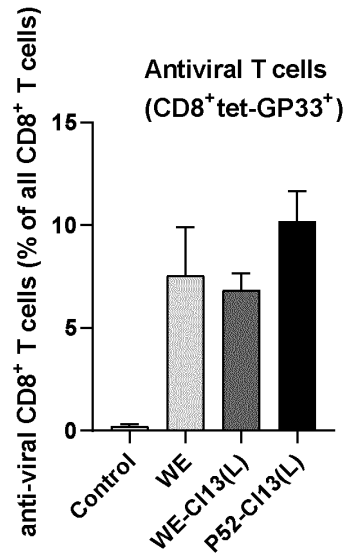


Figure 27



Tumor

Figure 28

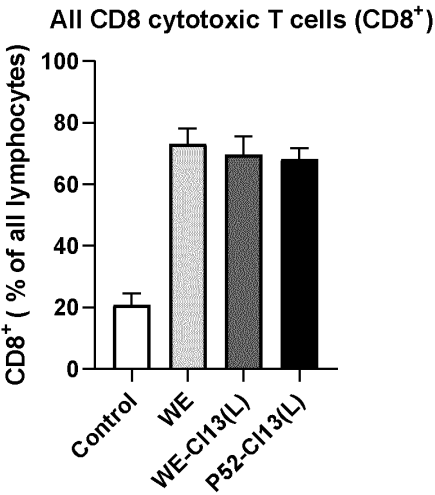


Figure 29

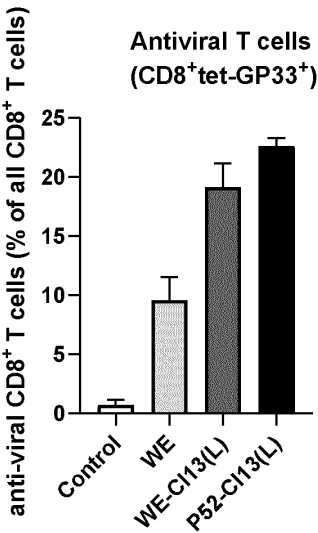
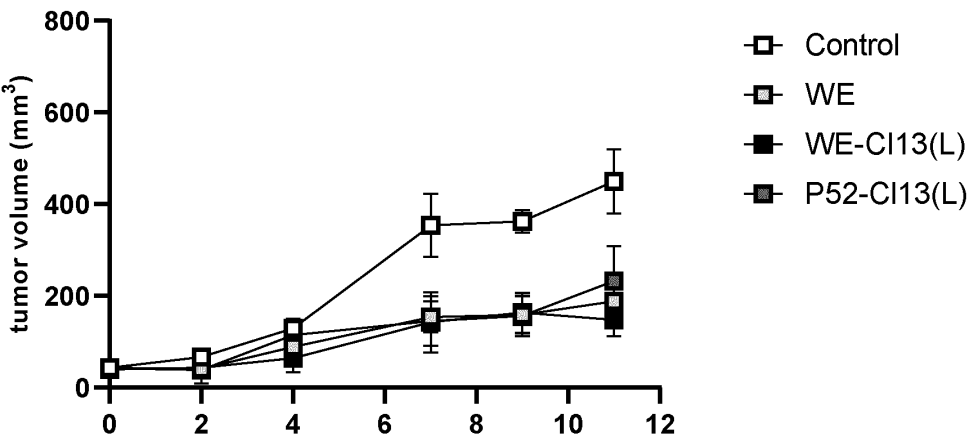


Figure 30



Ctrl. vs.	Day 7	Day 9	Day 11
WE	*	**	**
WE-CI13(L)	ns	**	**
P52-CI13(L)	ns	**	ns

Figure 31

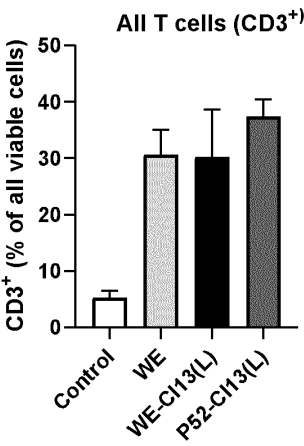


Figure 32

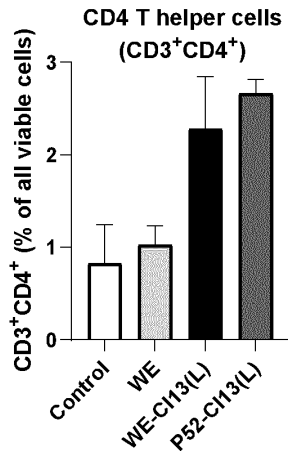


Figure 33

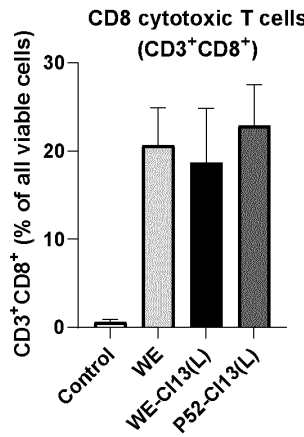


Figure 34

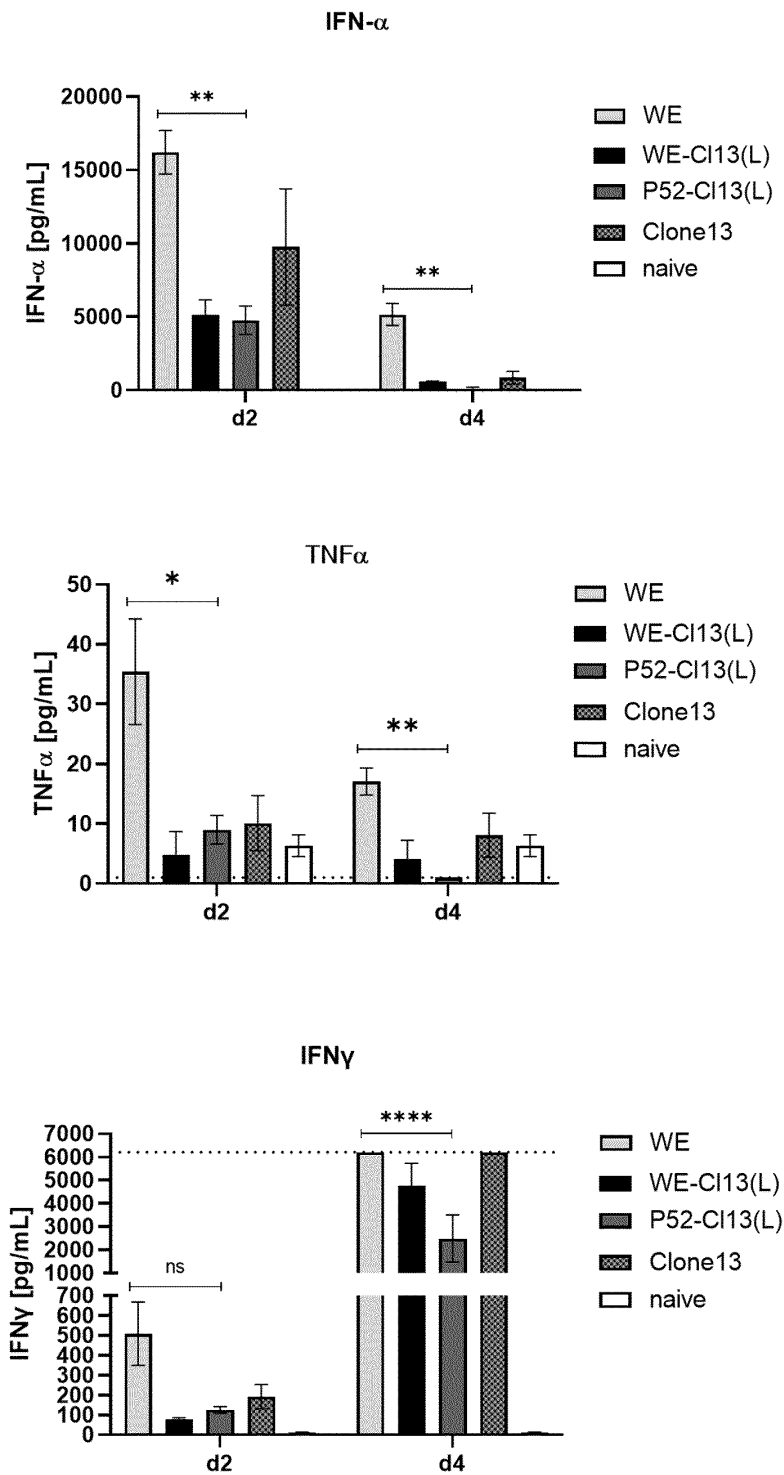


Figure 35

B16-Ova (melanoma) tumor model (day 7)

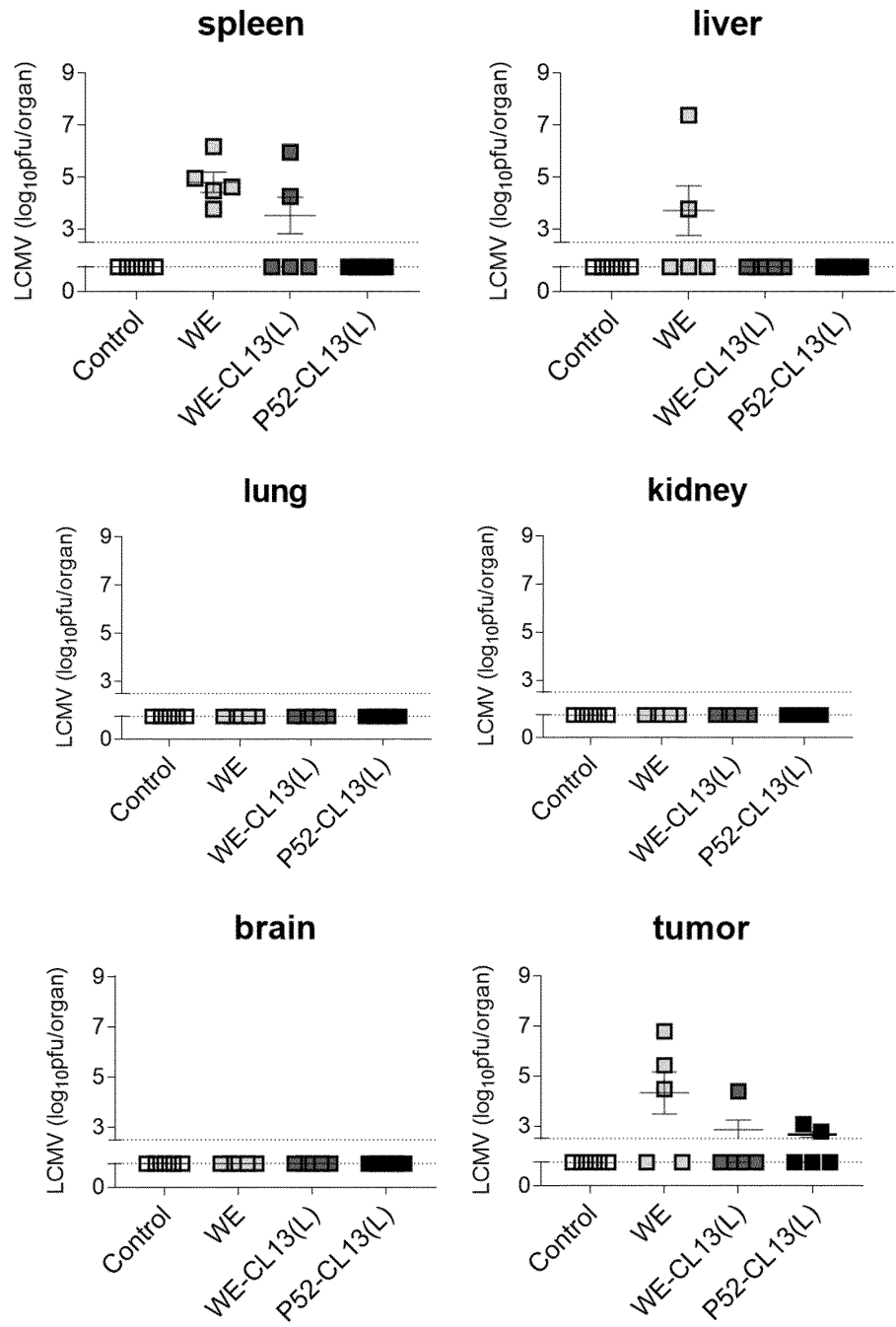


Figure 36

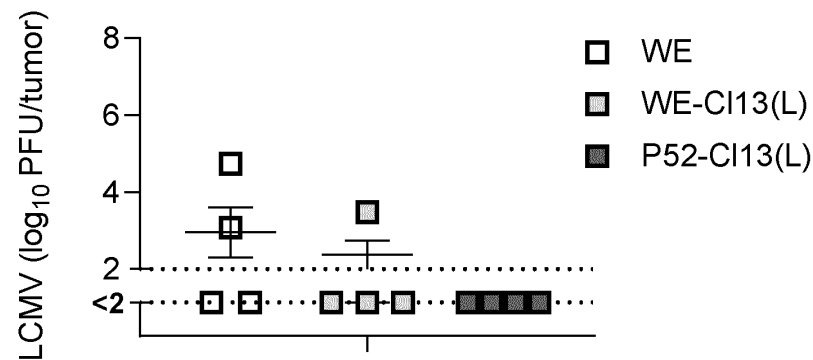


Figure 37

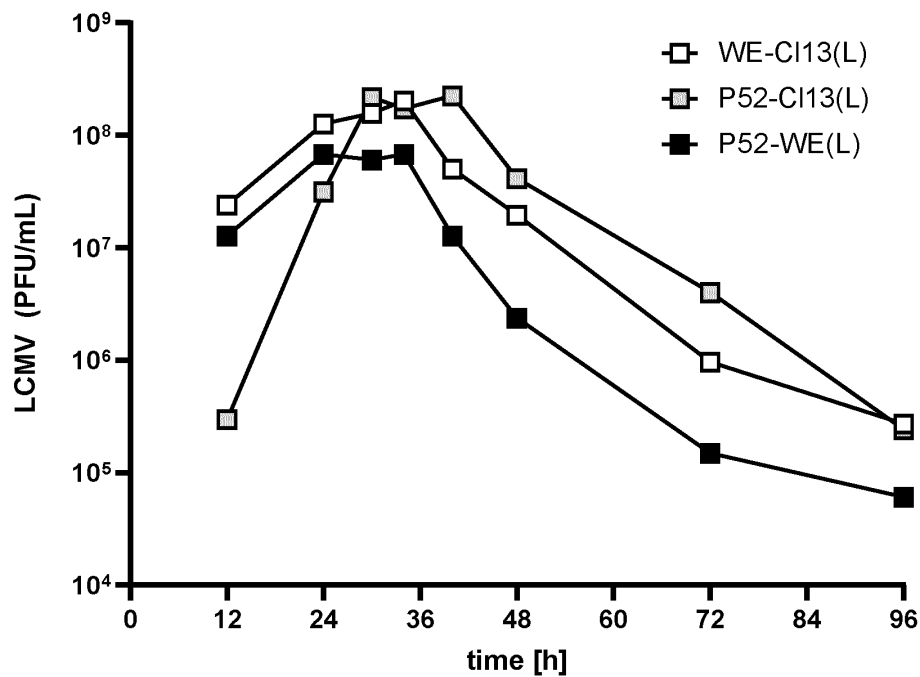


Figure 38

A. Lymphocytic choriomeningitis virus (LCMV) strain WE**Lymphocytic choriomeningitis virus (LCMV) strain WE-DUE****Source: 1-3376 Segment = S****LCMV WE S-Segment**

GCGCACCGGGGATCCTAGGCTTTTGGATTGCGCTTTCTTTAGGACAATTGGGTGCTGGATTCTATCCAATAAAAGGATGGGTCA
GATTGTGACAAATGTTTGAGGCTTTGCTTCACATCATTGATGAGGTCATCAACATTGTCTATTGTGCTCATTATAATCACGAGCA
TCAAAGCTGTGTACAATTTGCGCACCTGTGGGATATTAGCACTGGTCAGCTTCTTTTGGCTGGTAGGTCCTGTGGCATGTAC
GGCCTTAATGTTCCCGACATCTATAAAGGGTTTACCAGTTCAAATCAGTGGAGTTTGATATGTCTCACTTAAATCTGACGATGCC
CAATGCGTGTCTCAGCCAACAACCTCTCATCACTACATCAGTATGGGAAGCTCTGGACTGGAGCTAACTTTCCTAACGACTCCATCC
TTAATCACAAATTTTTCGAACTTAACCTCCGCTTTCAACAAAAAGACTTTTGACCATACACTCATGAGTATAGTCTCGAGTCTGCAC
CTCAGTATTAGAGGGAATTCACACCAAGCAGTGTCTTGTGATTTTAAACAATGGCATCACCATTCAATACAACCTTGTCTTTTTC
GGACCCACAGAGCGCTATAAGCCAGTGTAGGACTTTAGAGGTAGAGTCTTGACATGTTTAGAACTGCCTTTGGAGGAAAATACA
TGAGAAGTGGCTGGGGCTGGGCAGGTTAGATGGCAAGACCCTTGGTGCAGCCAAACAAGCTATCAGTACCTAATCATACAAAA
AGGACTTGGGAAAACCACTGTAGATATGCAGGCCCTTTTGGGATGCTAGAATCCTCTTGTCTAGGAAAAGACAAGTTCTCAC
TAGGAGACTTGCAGGCACATTACCTGGACCCTGTGAGTCTCAGGAGTAGAAAATCCAGGTGGTTATTGCCTGACCAATGGA
TGATCCTTGTGTCAGAGCTCAAATGTTTGGGAATACAGTGTTCAGAAATGTAATGTCAATCATGATGAAGAGTTCTGTGACATG
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GGTATCTGGAACATGCTAAGACTGGTGAGACTAGTGTACCCAAGTGTGGCTTGTCTAATGGCTCCTACTTGAATGAGACCCAC
TTTAGTGATCAAATCGAACAGAAGCAGATAACATGATCAGAGATGTTGAGGAAGGACTACATAAAAAGACAGGGGAGTACTCC
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GACACATAAAGGGCGGTTTCATGTCCAAAGCCACACCGCTTGACCAACAAGGGGATCTGTAGTTGTGGTGCAATCAAGGTGCCTGGT
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TGCCTTGGAAAGCACTCTCAAAAATGATGCAGTCCATGAGTGCACAGTGTGGGGTATCTCTTTCTCTTTTGTCTCTCACTACCC
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ATGAGTTTATGTCCCTCTATTTTGTGAGTCCAGAAGCTTTCTGATGTCATCAGAACCCTGACAGCTCAAAACCATCCCTTGTGG
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AATGCTAGGATCCACTGTGCG

(SEQ ID NO: 1)

Figure 38 (cont'd)

Lymphocytic choriomeningitis virus (LCMV) strain WE-DUE

Source: 1-7236 Segment = L

LCMV WE L-Segment

GCGCACCGGGGATCCTAGGCGTTTGTGTCGCTGCTTTATGTCACAGCTTCACTCTGCTAAACCATCAGGAAGTACCGGATCATCA
GTCATGGGCCAAGGCAAGTCCAAAGAAAGAGGGACACCAGCAATACAGGCAGAGCAGAGCTTTTGCCAGACACCACCTATCTTGG
TCCTCTAAATTTGTAATCATGTTGGCAGAAATTTGACAGCTTGGTTAGATGCCATGACCCTATCTTTGACAGACTGTCTGAATC
TCCTGCTGTGAGTTTCCGACAGATGTCCTCTCTGTAAGTATCCACTGCCAACCAAAGTGTCAACAGTCCCAAGCTCCCCA
CCTCCCTATGAGGAGTGACGCCCGACACCTCGACACAACAGGCCACCCAACACAGAAAAACCACACAAAACGGGCACACACAGAC
ACAGCAACCCAGCAGAAAGCGACGAAAACACACACACACACACACACACACACCTCACCCACGCGCCCCCGGACCGCGGGGGG
CGCCCCCCCCGGGGGCGAGCCCCCGGGGGCCCGGGCAGGGCCCCGCGGAGATGCCGGCTAGTCGATCTCCTCGGCCACCCGCTCCG
CCAGCCAATCGTCACAGGATTTCCCTTGAGTCTGAACCTGCCCCAGTTGTCTCATACATTACAGTGTCTTTGACCTGCTGAAG
CAGAGCCTACAATCTCTGAAGGTGAACCAATCTGGCACAAGAGATAATGGTGTGAGCATGACGGATCTGTCCATGCAGAGCTCCTG
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TTCCACAGCCCTCGAGCTCTGCCAGAAAGACCTCATGTCTTTGTCTCCAATTTACAGAGATATTCTGAACAAAGTTCTCCCC
TCAAAGAGGGCACCTTCTTATGCTCAGAGGCACAGGTTCCCACTCAGGCCCTATCCTCTCAAAGTCAGTAGATTTGATCTCATT
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ACCTAATGTCAAGATTTCTGACTCCATCAAGTGTCCAGGATCGGGTCTGCTCAACAGATTGAGACACTCATCTAATTAATCTCTGTCA
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GTGCTGACAACAAATTCATCAACTAACTTGAGTCTGACCGTTGGTGAGAGTTGACGAGATCAGAAAAACGACAGTGTAAATGTT
GTCCCTCTTCCATTTGACAAACATGAGAAATGAGTGACAAAGACTCTGAGTTGATGTCAATCAGCACACAAAGGTCAAGGAATTTAA
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CTCAGAGATTGAATTACATGATTCAAACCTCACTTATCCTCTAGTAGTCTCGAATCTCAGGTTTCTTGTCTACATAATCACATGG
ATTTAAGTGCCTAACAGCCGAATTACTCTCGTCTCTTCTTTTACAGGTTCTGCTAAACCCAAACACCAGCTCAAAAGAGTTGC
TCAATGAGATGCAAAATGATGCCAGAGAGGGGCTCAAAGGTTGATGTGGTCAAGGAGGCTCTGGGTGCTCTGCTTGTCTG
CAAATGTACAACATCACACCATCTTGTGTTGTGAACCTTGTGACATGTTCCATGGTCAGATCTTCAAGCACCTTTCTGATATA
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GATCATCTTATACATGAGAACCAATCACCTCTGAGAAGAACTTTCTACAGAGGTTTCTTGCCATCTCATCCAGACCAATGTT
CTTTGACAGCTGATGAAAAATACAATGGTGACAGTTCTGTTGAACCTTCAACAGCCTCACAAATAAACCTCATGTGCTATTGGTG
AGACAGGATGGATCAAAGTCTCTACTAGATGAAATGAAATTTCTGATAAAATGACTTTCTCAGATAAGCTCTTTTACCTGACAA
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Figure 38 (cont'd)

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TGACCTAATCCATGAAATCATTGTGCTATCATGTTGTGCAACACCTCATCTGAAAAAATGGTAAAAAGAACCCTTTTGGATCTG
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TCTTCGGAATCCAGTTTTATTATCTGGCAAAACACCTCTTTGCACTCCACCACCTTGATATCTCACAGACCCAGTTGGTTCTGTCT
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ATTGCTCTATGTTAGGCTGGAAAGTGAATCTTCAAATTTTGTGTAATGCATTACAGGATGAGTCCCGGCTCTCATAAAGTTCTCA
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CACAATCCCAGAGTCTATTAGGATTGTTTCAACAGATTGTGCATCGTGGTGTGTATGCAACCACTTTTGTCTGCACTGTCTATCT
CTATACAGCGTGATAACAATTTGAGTCCCTCAATTAGCACCATTCTGGGTCTCTTTGTCCCAGGAAGTTGAGTTTTGCCTTGAC
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TCCTCGGTGCGC
(SEQ ID NO: 2)

Figure 38 (cont'd)**Lymphocytic choriomeningitis virus (LCMV) strain WE-DUE****Source: 1-3376 Segment = S****Protein: Pre-glycoprotein polyprotein GP complex****Gene: GPC****LCMV WE GPC**

ATGGGTCAGATTGTGACAAATGTTTGAGGCTTTGCCTCACATCATTGATGAGGTCATCAACATTGTCATTATTGTGCTCATTATAAT
CACGAGCATCAAAGCTGTGTACAATTTCCGCCACCTGTGGGATATTAGCACTGGTCAGCTTCCTTTTTTTGGCTGGTAGGTCCTGTG
GCATGTACGGCCTTAATGGTCCCGACATCTATAAAGGGGTTTACCAGTTCAAATCAGTGGAGTTTGATATGTCTCACTTAAATCTG
ACGATGCCCAATGCGTGCTCAGCCACAACCTCTCATCACTACATCAGTATGGGAAGCTCTGGACTGGAGCTAACTTTCACATAACGA
CTCCATCCTTAATCACAAATTTTGCACCTTAACCTCCGCTTTCAACAAAAAGACTTTTGACCATACACTCATGAGTATAGTCTCGA
GTCTGCACCTCAGTATTAGAGGGAATTCCAACCACAAAGCAGTGTCTTGTGATTTTAAACAATGGCATCACCATTCATAACAACCTG
TCATTTTCGGACCCACAGAGCGCTATAAGCCAGTGTAGGACTTTTCAAGAGGTAGAGTCTTGACATGTTTGAAGTGCCTTTGGAGG
AAAAATACATGAGAAGTGGCTGGGGCTGGGCAGGTTTCAGATGGCAAGACCCTTGGTGCAGCCAAACAAGCTATCAGTACCTAATCA
TACAAAACAGGACTTGGGAAAACCACTGTAGATATGCAGGCCCTTTTGGGATGTCTAGAATCCTCTTTGCTCAGGAAAAGACAAAG
TTTCTCACTAGGAGACTTGCAGGCACATTACCTGGACCTGTGCAGACTCCTCAGGAGTAGAAAAATCCAGGTGGTTATTGCCTGAC
CAAATGGATGATCCTTGCTGCAGAGCTCAAATGTTTGGGAATACAGCTGTTGCAAAATGTAATGTCAATCATGATGAAGAGTTCT
GTGACATGCTACGACTAATTGATTACAACAAGGCCGCCCTGAGTAAGTTCAAGCAAGATGTAGAGTCTGCCTTGCATGTATTCAAA
ACAACAGTAAATTCTCTGATTTCCGATCAGCTGTTGATGAGGAATCATCTAAGAGATCTAATGGGGGTACCATACTGTAATTACTC
AAAGTTCTGGTATCTGGAACATGCTAAGACTGGTGAGACTAGTGTAACCAAGTGCTGGCTTGTCACTAATGGCTCCTACTTGAATG
AGACCACTTTAGTGATCAAATCGAACAAGAAGCAGATAACATGATCACAGAGATGTTGAGGAAGGACTACATAAAAAGACAAGGG
AGTACTCCTTTAGCTTAATGGATCTTTTGTGATGTTTCAACATCAGCATATCTAATCAGCATCTTCTGCATCTTGTGAAGATACC
AACACATAGACATAAAGGGCGGTTTCATGTCCAAAGCCACACCGCTTGACCAACAAGGGGATCTGTAGTTGTGGTGCATTCAAGG
TGCCTGGTGTAAAACTATCTGAAAAGACGCTGA
(SEQ ID NO: 3)

Translation =**LCMV WE GPC**

MGQIVTMFEALPHIIDEVINIVIIIVLIIITSIKAVYNFATCGILALVSFLFLAGRSCGMYGLNGPDIYKGVYQFSVEFDMSHLNL
TMPNACSAANSHHYISMGSSGLELFTNDSILNHNFCNLTSFNNKTFDHTLMSIVSSLHLSIRGNSNHKAVSCDFNNGITIQYNL
SFSDPQSAISQCRTRFRGRVLDMFRTAFGGKYMRSWGWSGSDGKTTWCSQTSYQYLIQNRTWENHCRYAGPFGMSRILFAQEKTK
FLTRRLAGTFTWTLSDSSGVENPGGYCLTKWMILAAELKCFGNTAVAKCNVNHDEEFCMLRLIDYNKAALSFKQDVESALHVF
TTVNSLISDQLLMRNHLRDLMGVPCYNYSKFWYLEHAKTGETSVPKCWLVTNGSYLNETHFSDQIEQADNMITMLRKDYIKRQG
STPLALMDLLMFSTAYLISIFLHLVKIPTHRHIKGGSCP KPHRLTNKGICSCGAFKVPGVKTIWKRR
(SEQ ID NO: 4)

Figure 38 (cont'd)**Lymphocytic choriomeningitis virus (LCMV) strain WE-DUE****Source: 1-3376 Segment = S****Protein: Nucleoprotein****Gene: NP****LCMV WE NP**

ATGTCTTTGTCCAAAGAAGTCAAAAGCTTTTCAGTGGACACAGGCGTTGAGGAGGGAGTTGCAGAGTTTTACATCAGATGTAAAGGC
TGCCGTCATCAAGGACGCAACCAGTCTTCTAAATGGGTTGGACTTTTCTGAAGTCAGCAACGTTCAGAGGATCATGAGAAAGGAAA
GGAGGGATGATAAAGACTTGCAGAGACTCAGGAGTCTTAACCAGACTGTGCATTCTCTTGTGATCTGAAGTCTACATCAAAGAAA
AATGTTCTGAAAGTGGAAGACTTAGTGCAGAGGAATTGATGACCTTGCAGCTGATCTTGAGAAGCTGAAGGCCAAAATTATGAG
AACTGAGAGGCCCTCAAGCTTCTGGAGTCTACATGGGAAATTTGACAGCACAACTTGTATCAAAGATCCCAAACTGCAAATGG
TTGGGATGAGAAGACCTCAGCAGGGTGCAAGTGGTGTAGTAAGGGTTTGGGATGTGAAGGACTCATCACTTCTGAACAATCAGTTC
GGCACAATGCCAAGCCTGACAATGGCTTGCATGGCAAAACAGTCACAGACCCCACTCAATGATGTTGTGCAGGCACTCACAGACCT
TGGCTTACTTTACACAGTCAAATACCCGAATCTCAGTGATCTTGAAAGGCTAAAGGATAAACACCCAGTCTGGGGGTCATTACTG
AACAGCAATCTAGTATCAATATCTCTGGTTATAATTTTCAGTCTTGGTGCAGCTGTGAAAGCGGGGCGAGCTCTGCTAGATGGAGGG
AACATGCTGGAATCTATCTTGATCAAACCGAGCAACAGTGAGGATCTCCTAAAAGCAGTCTCGGGGCCAAGAAGAACTCAACAT
GTTTGTCTCAGATCAAGTTGGAGATAGAAATCCCTATGAAAACATCCTTTATAAAGTCTGTCTTTTCAGGTGAAGGATGGCCATACA
TAGCCTGTAGAAGCTCAGTTGTGGGGAGAGCATGGGAGAACACAACAATTGATCTCACAAATGAAAACTTGTGGCCAACTCATCT
AGGCCAGTGCTGGAGCAGCAGGCCACCTCAGGTGGGCTTGAGTTACAGTCAGACAATGCTGTTGAAAGACTTGATGGGAGGGAT
TGATCCCAATGCTCCACATGGATTGACATTGAGGGCAGGTTCAATGATCCAGTGGAGATAGCAATATTTCAACCACAAAATGGGC
AATTCATACATTTTTACAGGGAACCTACGGACCAGAAGCAATTCAGCAGGACTCAAAGTATTCACACGGCATGGATCTTGCTGAT
CTCTTCAATGCACAGCCTGGGCTGACCTCATCAGTTATAGGTGCTCTCCCAAGGGATGGTTTTGAGCTGTCAAGGTTCTGATGA
CATCAGAAAGCTTCTGGACTCACAAAATAGAAGGGACATAAACTCATTGATGTTGAGATGACCAAGGAGGCCTCAAGAGAATATG
AAGATAAAGTGTGGGACAAATATGGCTGGCTATGCAAAATGCACACTGGGGTAGTGAGAGACAAAAGAAGAAAGAGATACCCCA
CACTGTGCACTCATGGACTGCATCATTTTTGAGAGTGCTTCCAAGGCAAGACTCCCTGATCTAAAAACCGTTCAACATCCTGCC
ACATGATTTAATCTTCAGAGGACCAATGTTGTGACACTCTAA
(SEQ ID NO: 5)

Translation =**LCMV WE NP**

MSLSKEVKSFWQTQALRRELQSFTSDVKAIVIKDATSLNLGLDFSEVSNVQIRIMRKERRDDKDLQRLRLSNQTVHSLVDLKSTSKK
NVLVKVGRLSAEELMTLAADLEKLKAKIMRTERPQASGVYMGNLTAQQLDQRSQILQMVGMRRPQQGASGVVRVWDVKDSLLNNQF
GTMPSLTMACMAKQSQTPLNDVVQALTDLGLLYTVKYPNLSDLERLKDHPVLGVITEQQSSINISGYNFSLGAAVKAGAAALLDGG
NMLESILIKPSNSEDLLKAVLGAKKLNMFVSDQVGDRNPYENILYKVLCSGEGWPYIACRTSVVGRAWENTTIDLNEKLVANS
RPVPGAAGPPQVGLSYSQTMMLKDLMGGIDPNAPTWIDIEGRFNDPVEIAIFQPQNGQFIHFYREPTDQKQFKQDSKYSHGMDLAD
LFNAQPGLTSSVIGALPQGMVLSQGSDDIRKLLDSQNRDILKIDVEMTKEASREYEDKVDKYGWLCKRMHTGVVRDKKKKEITP
HCAIMDCIIFESASKARLPDLKTVHNLPHDLIFRGNPVVTL
(SEQ ID NO: 6)

Lymphocytic choriomeningitis virus (LCMV) strain WE-DUE**Source: 1-7235 Segment = L****Protein: RING finger protein Z****Gene: ZP****LCMV WE ZP**

ATGGGCCAAGGCAAGTCCAAAGAAGAAAGGGACACCAGCAATACAGGCAGAGCAGAGCTTTTGCCAGACACCACCTATCTTGGTCC
TCTAAATTGTAAATCATGTTGGCAGAAATTTGACAGCTTGGTTAGATGCCATGACCACTATCTTTGCAGACACTGTCTGAATCTCC
TGCTGTCAGTTTCCGACAGATGTCTCTCTGTAAGTATCCACTGCCAACCAAACTGAAGGTGTCAACAGTCCCAGCTCCCCACCT
CCCTATGAGGAGTGA
(SEQ ID NO: 7)

Translation =**LCMV WE ZP**

MGQGSKEERDTSNTGRAELLPDTTYLGPLNCKSCWQKFDLSVRCHDHYLCRHCLNLLLSVSDRCPLCKYPLPTKLKVSTVPSSPP
PYEE
(SEQ ID NO: 8)

Figure 38 (cont'd)

Lymphocytic choriomeningitis virus (LCMV) strain WE-DUE

Source: 1-7235 Segment = L

Protein: RNA-directed RNA polymerase L

Gene: LCMV WE LP

ATGGATGAAACTATTGCAGATTTGAGAGAGTTGTGTCTAAATTACATAGAACAGGACGAGAGGCTGTCAAGGCCAAAACTCAACTT
CCTGGGACAAAGAGAACCAGAAATGGTGCTAATTGAGGGACTCAAATTGTTATCACGCTGTATAGAGATAGACAGTGCAGACAAAA
GTGGTTGCATACACAAACCAGATGACAAATCTGTTGAAACAATCCTAATAGACTCTGGGATTGTGTGTCAGGACTGCCACTCATC
ATCCCTGATGGTTATAAGTTGATTGACAATTCCTTATTCTTCTGAATGTTTTGTTAGAAAGCACACCAGCTAGTTTTGAAAAGAA
GTTCCATTGAGGACCAACAACTAGCATGCATCAAGAAGACTTGTCTGTTGCAGGCATCACACTGGTTCCAAATAGTGGATGGTC
GTTGTGATTATGATAACAGTTTCATGCCAGAATGGGTGAATTTTAAAGTTCAGAGACCTCCTATTTAAACTCCTGGAGTATTCTAGT
CAAGATGAGAAAGTTTTTGAGGAGTCTGAATACTTCAGGCTCTGTGAGTCTCTTAAGACCACTGTTGACAAACGTTCCGGCATGGA
CTCAATGAAAATTTTGAAAGACGCAAGATCATTTACATACGATGAGATTATGAAAATGTGCCACGATGGTGTCAACCCCAACATGA
GTTGCGATGATGTGCTCTTTGGCATAAATTCCTTTTGGCAGGTTTAGGAGGGACCTGTAAATGGGAACTCAAAAGGAATTTG
CAAAAGGTCAGCCCTGGGGGCTTAATCAAGGAATTCCTGAACTTTATGAAACCTTACTGATAATGATGACATATTAATGTTGAG
CAAAGAGGCAGTTGAATCCTGCCCCCTTAATGAGGTTCAATACAGCAGAGACCATGGGCATGAGAGAGGAAGCGATGCTAACACTG
AGTATGAAAGGCTACTCTCTATGTTGAACAAGGTGAAAAGTTTAAATATTAAACACTAGAAGGAGACAGCTGCTGAACCTTAGAT
GTCTTATGCTCTTCTTCTTATTAAGCAGTCAATTTCCAAAGGTTTGGAAATGATAAATGTTGGTGGTGGTCTGCTACAGTAG
TGTGAATGATAGGCTTGTGAGCCTTCAAAGTACCAAGAAGAATTCATGAGACTTTTGAAGAACAAGAAAATCAAGAGTGCACA
AAAAGGCATCTCTTATGAGCTTTTAGGGTATCCATAAATGAGTTCATAGCAAAAATCCAGAAATGCCATCAACAGTGGGACTT
AGTTTTGAGCATTACGGACTATCAGAATGCCCTCGTGCAAGAATGCCATATACCATTGCTGAATTTGAGAATTTTATGAGAGCCGG
TACTCATCCTGTGATGAGTACACAAAATTTGAAGTATCACTTTCCAGCCTAACATAGAGCAATGGGGTTTACAGGGTTTGA
GAAAATGTCATCTGTTTGGCTCTAACAAACAGCATGAAAACAAGCTCAGTTGCAAGGTTGAGACAGAACCACCTGGGGTCT
GTGAGATATCAAGTGGTGGAGTGCAAGAGGTGTTTTGCCAGATAATAAACTGGATTCCGAAGAGTATCATCTACTATATCAGAA
AACTGGAGAATCATCGAGGTGTTATTCATACAAGGTCCGGATGGTCACTTGATTTCTTTTACGCAGATCCAAAAGGTTCTTTT
TACCAATTTTTTCAGATGAGGTGTTGCACAACATGATAGACAAATGATTTTATGAGATTAGGTCATGCCCTGACTTAAAGAGATTCT
CTTATTGACATTGAGACTGCACTAAGGACATTGATCCTACTGATGCTCACCAACCAACAAAGAGAAATCAAAGCAGGTTCAAAA
TATTAGGTATTTAGTGATGGCCATCGTCTCAGACTTTTCATCGACCTCATTAATGGATAAGTTGAAGGAGGATCTAATCACACCTG
CCGAGAAAGTGGGTGACAGGCTGCTTCGGTTTTGATTAGGACAATTTTTGGTACTGGTGAAGGTTGTTATTGAGTGCAAAATTC
AAGTTTATGTTGAATGTGTACACCTGTGTCATTTGATACAAAGGAGACCCCTGATAGATTGACAGATCAGATAAAATGTTTTGA
AAAGTTCTTTGAGCCCAAGAGTGAGTTGGTTTCTTGTCAACCTAAGGAAACAATCACACCCGAAGAGGAATGTGTTTTTATG
AACAAATGAAGAAGTTCACCGGTAAAGATATTGATTGTGAGCATTCACCCCTGGTGTTAATTTAGAGATCTTTAGCATGATGGTA
TCTTCATTCAACAATGGCACCTTAATTTCTAAAAGGGGAGAAAAGGCTCAACAATCTGGACCCCATGACCAACTCTGGATGTGCGAC
AGCATTAGATCTCGCAAGCAACAAAAGTGTGTTGTCAATTAACATCTGAATGGAGAACGGCTTTTGGAGTATGATTTTAAACAAT
TGCTTGTAGTGCTGTGAGCCAAATACAGAGGGCTTCATGAGGAAACAAAAGTATAAGCTGAGACACTCAGATTACGAATATAAG
GTCTCAAAGCTGTCTCTAGATTAGTCATCGGTTCCAGGAAAACAGAAAGTAGACAAATTTGGAAGATGATCCGGTAGATGTGTGTTT
CGAGGGGAGGAGGACAGAACTTTTTTTCAGGAGTTTAGAAGATAAGGTGAGCTCAGCTCCACAATAACACGGTATAATAGAGGCACTAGGC
TTAATTGAAGGGCAAGGGGAGGGAATTCAGGAACACAAAAGGACTACACCACCTTCAGATTATTTTGTGAGTAAAGAGCTTAT
CTGAGGAAAGTCATTTTATCAGAAATTTTCAATTCATCTAGTAGAGGACTTTGATCCATCCTGTCTACCAATGACGACATGAGGTT
TATTTGTGAGGCTGTTGAAGGTTCAACAGAACTGTCAACATTTGATATTTTACATCAGCTGTCAAAGAACAATGTGGTCTGGATGAGA
TGGCAAGAACCTCTGTAGAAGTTCTTCTCAGAGGCTGATTGGTTCTCATGTATGAAGATGATCTGTTACAGATGAATGCAAAAT
GCGTATTCAGGGAAGTACAGACATGTCAGAGGCAAGGCTTAAATTTTAAATTTGACTGGGACAAATTTGAAGAAGATGTAAGAAT
TAGTGAAAGGGAAAGCAATTCGAATCTCTAAGTAAGGCCCTTTTATTGACAAAATGCATGAGTGTCTGCTCTAAAGAATCTGTGTT
TTTACTCAGAAAGTACCAACATCATACACTTCAGTTGGCCCTGACTCTGGGAGACTAAAATTTGCATTGTCTATCAAAAGAGAGCA
GTTGGGGGAAATAGAGAGCTTACATTGGGGATTTGAGGACAAAATGTTCAAGATTGTTAGAGATTATTTTGAATCCTTTTCT
TAGTTTCTTTTTCAGGATCTGTGTTTAAACAATGACAAGAGTTTGAATAATGCAATCTGTCAATGACTATCAATGTGAGAGAGGGGT
TGTTAAACTACAGCATGGATCACAGCAAATGGGGACCAATGATGTGCCATTCCTATTCTTAATGCTTCTCCAAATCTCAAACCTG
GGTGATGATCAGTACGTGCGTTCTGAAAAAGATCATGTTAGCACCTTGTGTGACTTGGCATATGCATAAATCTGTTGAAGTCCCTTT
CCCTGTTGTGAATGCAATGATGAAATCATATGTTAAATCAAACTCAAGCTTCTCAAAGGTCAGGAACGACTGTTACGGAGAGAA
TCTTTAGAGAGTATTTTGAATGGGGTGGTGCCATCTCACATATCTAGTCTCATTGACATGGGACAGGGGATCCTACACAATGCT
TCTGATTTTTACGGTTTAAATAGTGAAAGGTTTATCAATTATTGTATTGGTGTCATTTTTGGAGAGAGGCCAGAGCCTATACATC
AAGTGATGATCAGATCACTTATTTGACAAGAGATTGAGTGACTTAGTTGATAGTGACCCAGAAGAGTCTTGTCTGTCTGGAAT
TCCACTCTCACTTAAGTGGTTTGTGAAACAAGTTTCATCAGTCCAAAAAGTGTGGTTGGGCGGTTTGCAGCGGAATTCAAATCCAGA
TTTTATGTGTGGGGGAGGAGGTCCCTCTCCTCACGAAATTTGTGTCTCGGGCACTACACAATGTTAAGTGTAAGAACCAGCATCA
ACTTTGTGAGACAATAGATACGATTGCTGATCAAGCTATAGCAAAATGGAGTTCCAGTTTTTTTAGTAAAGTGTATCCAGAGGAGGA
CACTGGATCTCTTGAATATGCTAATTTCCCTTTAGATCCATTTCTGTTAAACACTCACACTGATGTAAGGATTGGTTAGATGGT
TCTAGAGGTTATAGAATCCAAAGACTCATTGAAGAATTGTTGCCAGTGAACAAAGATCATGAGAAAACTTGAAGAAGACTACA
TCACAAACTCAAGAACGGTGAATGTAACGAGGAATTTTTTCTAGACCTCTTCAACAGGGAAAAGAAAGAGGCCATCCTTCAATTGG
GAGAGATCTTGGTCTTGAAGATGATCTTAATGAGTTGGCAAGCATCAATGGTTGAATCTGAATGAAATGTTCCCATGAGGATG
GTTCTGAGACAAAAGTGGTTTACCATCAGTAATGACCTTTCAAGAGGAAAAGATCCCTCATTGATTTAAACACTCCAAAATAA
GCTTTGTAGTAAGTTCACAAGAGGTGCACAGAAGCTGTTGTGAGAGGCAATCAACAAATCAGCTTTTTCAGAGTTGTGCTCATCCG
GCTTTATAGGTCTCTGTAAGACTTTAGGAAGTAGGTGTGTGAGAAATAAAACAGGGAAAATATGTATATCAGAAAGGTGCTTGAA
GATCTGACCATGGATGAACATGTCACAAGGTTTCAACAAGAGTGGTGTGATGTTGTACATTTGCGACAGCAGAGACCCAGAG
GGCTCACCCTGACCATCAACCTTTTGGGGCCCTTCTGAGGACTACATTTGCATCTCATTGAGCAACTCTTTTGGAGTGGGTG
TTTGGGTTTGTAGCAAGCTGTGAAAGGAAAGAACAGAGTAACTCGGCTGTTAGGCACCTTAAATCCATGTGATTATGAGCAAGA
AAACCTGAGAGTTTCAGAGCTACTAGAGGATAAAGTGAGTTGAATCATGTAATTCATCTGTGAGGGCACTGTACCCCAAAATCTT

Figure 38 (cont'd)

TGAGGATCAGTTGCTCCCATTCATGTCTGATGTGAGCTCAAAAAATATGAGATGGAGTCCAGGATTAATTCCTTGACCTTTGTG
TGCTGATTGACATCAACTCAGAGTCTTTGTCACTCATTTCTCATGTTGTCAAATGGAAGAGGGACGAACATTACACTGTGCTGTTT
TCTGATCTCGTCAACTCTCACCAACGGTCAGACTCAAGTTTAGTTGATGAATTTGTTGTGTCAGCACAAGGGATGTCTGCAAGAACTT
TTTGAAGCAAGTGTATTTTGAATCATTTGTACGAGAGTTTGTGCAACAGCTAGGACCTTAGGTAACCTTTTCATGGTTCCCCCATA
AGGACATGATGCCATCTGAAGATGGCGCTGAAGCACTGGGACCTTCCAATCATTTATTTTGAAAGTGGTGAACAAGAAAATAGAG
AGGCCCATGTTTAGGAATGACTTGCAGTTTGGTTTTGGTTGGTTCTCTTATCGTGTGGGGGATGTTGTGTGAATGCCGCTATGTT
AATTAAGCAGGGTTTGACAGATCCAAAAGCATTTAAATCTTAAAGAGATTGTGGGATTACATGCTCAGCAGCACAGAGGGGATAT
TGGAGTTCTCAATCACAGTGGATTTACACACAACAGAACAACTGACTGCTTGAGGAAATTTTCATTGATCTTTGTGGTTAAA
TGCCAATTACAGAGTCCAGGTGTAGCTGATTACTTATCGTGCTCATTTCTTCAAAGGTGAGGTTGACAGGAGATTATAGATGA
GTGTCTCAATCTGTTGAGGACAGACCCCATCTTTAAAGCGAATGATGGAGTCTTTGACATTAGGTCTGAAGAGTTTGAAGATTACA
TGGAAGACCTTTGACACTTGGTGATTCACTAGAACTTGAACATAAGGTTCTAGAAGGATTCTGAATGAGATCAAATCTACTGAC
TTTGAGAGGATAGGGCTGAGTGGGAACCTGTGCCTCTGACCATAAGGAAGGGTGCCTCTTTGAGGGGAGGAACTTTGTTTCAGAA
TATCTCTGTGAAATGGAGACAAAGGACATGAGGTCCTTCTGGCAGAGCTCAGGGCTGTGAGAAAATTTGAGTGTCTCGGGA
GCCTCTCTGCACCGATTGAGAACTGGTGAGCACTTGTATGGAGTCAGAAATAAGTACAGTTCTTCAGGAGCTCTGCATGGACAGA
TCCGTGATGTGACACCATTATCTTTGTGCCAGATTGGTTCACCTTCAGAGATTGTAGGCTCTGCTTCAGCAGGTCAAGAAACAC
TGAATGTATGAGACAACTGGGGGACAGTTGAGCTCAAGGGGAAATCTGTGACGATTGGCTGGCGGAGCGGGTGGCCGAGGAGA
TCGACTAG

(SEQ ID NO: 9)

Translation =LCMV WE LP

MDETIADLRELCLNYIEQDERLSRQKLNFLGQREPRMVLIEGLKLLSRCIEIDSAKSGCIHNHDDKSVETILIDSGIVCPGLPLI
IPDGKYLIDNSLILLECFVRSTPASFEKKFIEDTNKLACIKEDLAVAGITLVPIVDGRCDYDNSFMPEWVNFKFRDLLFKLEYSS
QDEKVFESEYFRLCESLKTVDKRSMDSMKILKDARSFHNDIMKMDHGVNPNMSCDDVVFGINSFGRFRDRLLNGLKLRNF
QKVSPGGLIKESFELYETLTDNDIIMLSKEAVESCLPMRFITAEHGHGERSDANTEYERLLSMLNKVSKLLNTRRRQLNLND
VLCLSSLIKQSIKGLENDKHVWGCCYSSVNDRLVSLQSTKEEFMRLLKNRRKSRVHKASLDELFRVINEFIKIQKCLSTVGL
SFEHYGLSECLVQECHIPFAEFENFMAGTHPVMHYTKFEDYTFQPNIEQLRGLQSLRKLSSVCLALTNMKTSSVARLRQNQLGS
VRYQVVECKEVFCQIKKLDSEEHLLYQKTGESSRCYSIQGPDGHLISFYADPKRFFLPISFDEVLHNIMDTMISWIRSCPDLKDS
LIDIEALRTLILMLTNPTKRNQKQVQNIIRYLVMAIVSDFSSTSLMDKLKEDLITPAEKVVYRLLRFLIRITFGTGKVLSSAKF
KFMLNVSYLCHLITKETPDLTDQIKCFEKFEPKSEFGFFVNPKETITPEEECVFYEQMKKFTGKIDCQHSPTGVNLEIFSMNV
SSFNNGTLILKGEKRLNNLDPMTNSGCATALDLASNKSVVVNKHNGERLLEYDFNKLLVSAVSQITEGFMKQKYKLRHSDYEEK
VSKLVSRVLVIGSRKTEVDKLEDDPVDVCFEGEEETSFRRSLEDKVSSTITRYNRGTRLNEGQGEFEKNTKGLHHLQIIISGKRAY
LRKVILSEISFHLVEDFDPSCLTNDMDRFICEAVEGSTELSPLYFTSAVKEQCGLDEMARNLCRKFSEGDWFSCKMKMILLQMNAN
AYSGKYRHMQRQSLNFKFDWDLKLEEDVRIERESNSESLSKALSITKCMSAALKNLCFYSEESPTSYTSVGPDSGRLLKFALSYKEQ
VGGNRELYIGDLRTKMFTRLVEDYFESFSSFFSGSCLNNDKEFENAILSMITINVREGLLNSMDHSHKWPMMCPFLFLMLLQNLKL
GDDQYVRSGKDHVSTLLTWHMHKLVEVPFPVVNAMMKSYVSKLKLKSGGTTVTERIFREYFEMGVVPSHISSLIDMGQILHNA
SDFYGLISERFINYICIGVIFGERPEAYTSSDDQITLFDKRLSDLVSDPPEEVLVLEFHSLSGLLNKFISPKSVVGRFAAEFKSR
FYVWGEEVPLLTKFVSAALHNKKEPHQLCETIDTADQAIANGVPVFLVNCIQRRTLDLLKYANFPLDFLLNTHTDVKDWLDG
SRGYRIQRLIEELCPSETKIMRKLVRRLHHKLKNGECNEEFFLDLFNREKKEAILQLGEILGLEDDLNELASINWLNLMEMFPLRM
VLRQKVVPVSVMTFQEEKIPSLIKTLQNLKCSKFTRGAKLLSEAINKSAFQSCVSSGFIGLCKTLGSRVNRKNRENMYIRKVL
DLTMDHEVTRVHKQDGVMLYICDKQRHPEAHRDHINLLRPLLDWYICISLSNSFELGVWVLAEPVKGNESNSAVRHLNPDYVAR
KPESRRLLEDKVSLSLHVLIQSVRRLYPKIFEDQLLPFMSDVSSKNMRWSPRIKFLDLCLVIDINSLSLSHVVKWRDEHYTVLF
SDLVNSHQSDSSSLVDEFFVSTRDVCKNFLQVYFESFVREFVATARTLGNFSWFPHKDMMPSEDGAEALGPFQSFILKVVNKKIE
RPMFRNDLQFGFGWFSYRVGDVVCNAAMLIKQGLTDPKAFKSLRDLWDYMLSSTEGILEFSITVDFTHNQNTDCLRKFSIFVVK
CQLQSPGVADYLSCHFFKGEVDRLLDECLNLLRTDPIFKANDGVFDIRSEEFEDYMEDPLTLGDSLELELIGSRRLNEIKSTD
FERIGPEWEPVPLTIRKGALEGRNFVQNISVKLETDMRVFLAELEGCGKIGDVLGSLLLHFRFTGEHLMSEISTVLQELCMDR
SVMLTFLSFVPDWFTRDCRLCFRSKNTVMYETTGGRFLKKGKSCDDWLAERVAEEID

(SEQ ID NO: 10)

Figure 38 (cont'd)

B. Lymphocytic choriomeningitis virus (LCMV) strain P52-WE

Lymphocytic choriomeningitis virus (LCMV) strain P52-WE (L)

Source: 1-3376 Segment = S

LCMV P52-WE (L) S-Segment

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GCGCACCGGGGATCCTAGGCTTTTGGATTGCGCTTTCCTTTAGGACAATGGGTGCTGGATTCTATCCAATAAAAGGATGGGTCA
GATTGTGACAATGTTTGAGGCTTTGCCTCACATCATTGATGAGGTCATCAACATTGTCATTATTGTGCTCATTATAATCACGAGGA
TCAAAGCTGTGTACAATTTCCGCACCTGTGGGATATTAGCACTGGTCAGCTTCTTTTGGCTGGGTAGGTCCTGTGGCATGTAC
GGCCTTAATGGTCCCGACATCTATAAAGGGGTTTACCAGTTCAAATCAGTGGAGTTTGATATGTCTCACTTAAATCTGACGATGCC
CAATGCGTGCTCAGCCAACAACCTCTCATCACTACATCAGTATGGGAAGCTCTGGACTGGAGCTAACTTTCACTAACGACTCCATCC
TTAATCACAATTTTGTCAACTTAACCTCCGCTTTCAACAAAAAGACTTTTGACCATACACTCATGAGTATAGTCTCGAGTCTGCAC
CTCAGTATTAGAGGGAATTCACACCAAGCAGTGTCTTGTGATTTTAAACAATGGCATCACCATTCAATACAACCTTGTATTTC
GGACCCACAGAGCGCTATGAGCCAGTGTGGACTTTCAGAGGTAGAGTCTTGACATGTTTAGAACTGCCTTTGGAGGAAAAATACA
TGAGAGCTGGCTGGGCTGGGCTGGGCTGGGCTGGGCTGGGCTGGGCTGGGCTGGGCTGGGCTGGGCTGGGCTGGGCTGGGCTGGGCT
AGGACTTGGGAAAACCACTGTAGATATGAGGCGCTTTTGGGATGTCTAGAATCCTCTTGTCTCAGGAAAAGACAAAAGTTCTCAC
TAGGAGACTTGCAGGCACATTCACCTGGACCTGTGAGACTCCTCAGGAGTAGAAAATCCAGGTGGTTATGCTGACCAAAATGGA
TGATCCTTGCTGCAGAGCTCAAATGTTTGGGAATACAGCTGTTGCAAAATGTAATGTCAATCATGATGAAGAGTTCTGTGACATG
CTACGACTAATTGATTACAACAAGGCCGCCCTGAGTAAGTTCAAGCAAGATGTAGAGTCTGCCTTGCATGTATTCAAAACAACAGT
AAATTCTCTGATTTCCGATCAGCTGTTGATGAGGAATCATCTAAGAGATCTAATGGGGGTACCATACTGTAATTACTCAAAGTTCT
GGTATCTGGAACATGCTAAGACTGGTGAGACTAGTGTACCAAGTGTGGCTTGTCACTAATGGCTCCTACTTGAATGAGACCCAC
TTTAGCTTAATGGATCTTTTGTGATTTTTCAACATCAGCATATCTAATCAGCATCTTCTGCATCTTGTGAAGATACCAACACATA
GACACATAAAGGGCGGTTTATGTCCAAAGCCACACCGCTTGACCAACAAGGGGATCTGTAGTTGTGGTGCATTCAAGGTGCCTGGT
GTAAAACCTATCTGAAAAGACGCTGATCAGCAGCGCCTCCCTGACTCTCCACCTCGAAAAGAGGTGGAGAGTCAGGGAGGCCAGT
GGGTCTTAGAGTGTCAACATTTGGTCTCTGAAGATTAAATCATGTGGCAGGATGTTGTGAACGGTTTTTAGATCAGGGAGTCT
TGCTTGGGAAGCACTCTCAAAAATGATGCAGTCCATGAGTGCACAGTGTGGGGTGTCTTTCTCTCTTTTGTCTCTCACTACCC
CAGTGTGCATTTTGCATAGCCAGCCATATTTGTCCCACACTTTATCTTCATATTCTCTTGAGGCTCCTTGGTCTCTCAACATCA
ATGAGTTTTATGTCCCTTCTATTTTGTGAGTCCAGAAGCTTTCTGATGTCTCAGAACCCTTGACAGCTCAAAACCATCCCTTGTGG
GAGAGCACCTATACTGATGAGGTGAGCCAGGCTGTGCATTGAAGAGATCAGCAAGATCCATGCCGTGTGAATACTTTGAGTCCT
GCTTGAATTGCTTCTGGTCCGTAGGTTCCCTGTAAAAATGTATGAATTGCCATTTTGTGGTTGGAATATTGCTATCTCCACTGGA
TCATTGAACCTGCCCTCAATGTCAATCCATGTGGGAGCATTGGGATCAATCCCTCCCATCAAGTCTTTCAACAGCATTGTCTGACT
GTAATCAAGCCACCTGAGGTGGGCTGCTGCTCCAGGCACTGGCCTAGATGAGTTGGCAACAGTTTTTCATTTGTGAGATCAA
TTGTTGTGTTCTCCCATGCTCTCCCACTGACGTTCTACAGGCTATGTATGGCCATCCTTCCCTGAAAGACAGACTTTATAA
AGGATGTTTTCATAGGGATTTCTATCTCCAACCTGATCTGAGACAACATGTTGAGTTTTCTTCTGGCCCCGAGGACTGCTTTTAG
GAGATCCTCACTGTTGCTCGGTTTGTATCAAGATAGATTCCAGCATGTTCCCTCCATCTAGCAGAGCTGCCCCCGCTTTTACAGCTG
CACCAGACTGAAATTATAACCAGAGATATTGATACTAGATTGCTGTTTCAAGTAATGACCCCCAGAACTGGGTGTTATCCTTTAGC
CTTTCAAGATCACTGAGATTGCGGTATTTGACTGTGTAAGTAAGCCAAGGTCTGTGAGTGCCTGCACAACATCATTGAGTGGGT
CTGTGACTGTTTTGCCATGCAAGCCATTGTGAGGCTTGGCATTGTGCCGAACCTGATTGTTGAGAAGTATGAGTCTCTCACATCCC
AAACCTTACTACACCACTTGACCCCTGCTGAGGTCTTCTCATCCCAACCATTTGCAGTATTTGGGATCTTTGATCAAGTTGTTGT
GCTGTCAAATTTCCCATGTAGACTCCAGAAGCTTGGGCTCTCAGTTCTCATAATTTTGGCCTTCAGCTTCTCAAGATCAGCTGC
AAGGGTCATCAATTCCTCTGCACCTAAGTCTTCCCACTTTTCAAGACATTTTCTTTGATGTAGACTTCAGATCAACAAGAGAATGCA
CAGTCTGGTTAAGACTCCTGAGTCTCTGCAAGTCTTTATCATCCCTCCTTCTCTCATGATCCTCTGAACGTTGCTGACTTCA
GAAAAGTCCAACCCATTTAGAAGACTGGTTGCGTCTTGTGATGACGGCAGCCTTTACATCTGATGTAAACTCTGCAACTCCCTCCT
CAACGCTGTGTCCACTGAAAGCTTTTGTGACTTCTTGGACAAAGACATTTTGTGCACACAATGAATTTCCAAATAAAAGCGCAATTA
AATGCCTAGGATCCACTGTGCG
```

(SEQ ID NO: 11)

Figure 38 (cont'd)

Lymphocytic choriomeningitis virus (LCMV) strain P52-WE(L)

Source: 1-7236 Segment = L

LCMV P52-WE(L) L-Segment

GCGCACCGGGGATCCTAGGCGTTTGTGTCGCTGCTTTATTGACAGCTTCACTCTGCTAAACCATCAGGAAGTACCGGATCATCA
GTCATGGGCCAAGGCAAGTCCAAAGAAAGAGGGACACCAGCAATACAGGCAGAGCAGAGCTTTTGCCAGACACCACCTATCTTGG
TCCTCTAAATTGTAAATCATGTTGGCAGAAATTTGACAGCTTGGTTAGATGCCATGACCCTATCTTTGACAGACTGTCTGAATC
TCCTGCTGTAGTTTCCGACAGATGTCCTCTCTGTAAGTATCCACTGCCAACCAAAGTGTCAACAGTCCCAAGCTCCCCA
CCTCCCTATGAGGAGTGACGCCCCAGACCTCGACACAACAGGCCACCCAACACAGAAAAACCACACAAAACGGGCACACACAGAC
ACAGCAACCCAGCAGAAAGCGACGAAAACACACACACACACACACACACCTCACCCACGCGCCCCCGGACCGCGGGGGG
CGCCCCCGGGGGGCGAGCCCCCGGGGGCGGGCAGGGCCCCGCGGAGATGCCGGCTAGTCGATCTCCTCGGCCACCCGCTCCG
CCAGCCAATCGTCACAGGATTTCCCTTGAGTCTGAACCTGCCCCAGTTGTCTCATACATTACAGTGTCTTTGACCTGCTGAAG
CAGAGCCTACAATCTCTGAAGGTGAACCAATCTGGCAGAAAAGATAATGGTGTGAGCATGACGGATCTGTCCATGCAGAGCTCCTG
AAGAACTGTCAAGTATTTCTGACTCCATCAAGTGTCCAGGATCGGGTCTGAATCGGTGCAGGAGGAGGCTGCCGAGGACATCACCATT
TTCCACAGCCCTCGAGCTCTGCCAGAAAGACCTCATGTCCTTTGTCTCCAATTTACAGAGATATTCTGAACAAAGTTCCTCCCC
TCAAAGAGGGCACCTCTCTTATGGTCAGAGGCACAGGTTCCCACTCAGGCCCTATCCTCTCAAAGTCAGTAGATTTGATCTCATT
CAGAATCCTTCTAGAACCTATTAGTTCAAGTTCTAGTGAATCACCAGGTGTCAAAGGGTCTTCCATGTAATCTTCAAACCTCTTCAG
ACCTAATGTCAAAGTCCATCATTGCTTTAAAGATCGGGTCTGCTCCTCAACAGATTGAGACACTCATCTAATTAATCTCTGTGCA
ACCTCACCTTTGAAGAAATGAGAGCAGGATAAGTAATCAGCTACACCTGGACTCTGTAATTTGGCATTAAACCACAAGATCAATGA
AAATTTCTCAAGCAGTCAGTGTGTTCTGTTGTGTGAAATCCACTGTGATTGAGAACTCCAATATCCCTCTGTGCTGCTGA
GCATGTAATCCCAAAATCTCTTAAAGATTTAAATGCTTTTGGATCTGTCAAACCTGCTTAATTAACATAGCGGCATTACACACA
ACATCCCCACACAGCAATGAGAAACCAACCAAAACCAAACTCATTCTTAAACATGAGGCTCTCATATTAACTTCTGCTGCTGCA
TTTCAAATAAATGATTGGAAGGGTCCAGTGCTTCAGCGCCATCTTCAGATGGCATCATGTCTTATGGGGGAACCATGAAAGT
TACCTAAGGTCCTAGCTGTTGCAACAACTCTCGTACAAATGATTGCAAAATACACTTGCTTCAAAGAGTCTTGCAGACATCCCTT
GTGCTGACAACAAATTCATCAACTAACTTGAGTCTGACCGTTGGTGAGAGTTGACGAGATCAGAAAAACGACAGTGTAAATGTTT
GTCCCTCTTCCATTTGACAACATGAGAAATGAGTGACAAAGACTCTGAGTTGATGTCAATCAGCACACAAAGGTCAAGGAATTTAA
TCCTGGGACTCCATCTCATATTTTTGAGCTCACATCAGACATGAATGGGAGCAACTGATCCTCAAAGATTTTGGGGTACAGTCGC
CTCAGAGATTGAATTACATGATTCAAACCTCACTTTATCCTCTAGTAGTCTCGAATCTCAGGTTTCTTGTCTACATAATCACATGG
ATTTAAGTGCCTAACAGCCGAATTACTCTCGTTCCTTCTTTCACAGGTTCTGCTAAACCCAAACACCAGCTCAAAAGAGTTGC
TCAATGAGATGCAAAATGATGCCAGAGAAGGGGCTCAAAGGTTGATGTGGTCACGGTGAGGCTCTGGGTGTCTCTGCTTGTGCG
CAAATGTACAACATCACACCATCTTGTGTTGTGAACCTTGTGACATGTTCCATGGTCAGATCTTCAAGCACCTTTCTGATATA
CATATTTTCCCTGTTTATTTCTCACACCTACTTCTTAAAGTCTTACAGAGACCTATAAAGCCGGATGAGACACAACCTCTGAA
AAGCTGATTGTTGATTGCTCTGACAACAGCTTCTGTGCACCTCTTGTGAACCTTACTACAAAGCTTATTTTGGAGTGTTTAATC
AATGAGGGGATCTTTTCTCTTGAAGGTCATTACTGATGGGTAACCACTTTTGTCTCAGAACCATCTCAATGGGAACATTTT
ATTGAGATTCAACCAATTGATGCTTGCCAACCTCATTAAGATCATCCTCAAGACCAAGAATCTCTCCCAATTGAAGGATGGCCTCTT
TCTTTTCCCTGTTGAGAGGTCTAGAAAAATTCCTCGTTACATTCACCGTCTTGTGAGTTGTGATGTAGTCTTCTTACAGTCTT
CTCATGATCTTTGTTTCACTGGGACACAATTTCTCAATGAGTCTTTGGATTCTATAACCTCTAGAACCCTATAACCAATCCTTTAC
ATCAGTGTGAGTGTGTTTAAACAGAAATGGATCTAAAGGGAATTAGAATTTCAAGAGATCCAGTGTCTCTCTGATACAGTTTA
CTAAAAAACTGGAACCTCATTGCTATAGCTTGATCAGCAATCGTATCTATTGTCTCACAAGTTGATGCGGTTCTTTACACTTA
ACATTTGTGTAGTGCCGACAGACACAATTTCTGAGGAGAGGGGACCTCTCTCCCCACACATAAAATCTGGATTTGAATTCGCTGC
AAACCGGCCAACACACTTTTGGACTGATGAACCTTGTCAACAAACCACTTAAGTGAGAGTGGAAATTCAGCAAGACGAACTT
CTTCTGGGTCACTATCAACTAAGTCACTCAATCTCTGTCAAAATGAAGTATCTGATCATCACTTGAATGTATAGGCTTTGGCCTC
TCTCCAAAAATGACACCAATACAATAATTGATAAACCTTTCACTAATTAACCGTAAAAATCAGAAAGCATTTGTGAGGATCCCTG
TCCCATGTCAATGAGACTAGATATGTGAGATGGCACCACCCCACTTTCAAATACTCTCTAAAGATTCTCTCCGTAACAGTCTGTT
CTGACCTTTGAGAACTTGTGTTTGAATTAACATATGATTTTCACTTGCATTCAACACAGGGAAGGACCTTCAACAGATTTA
TGATATGCCAAGTCAACAAGGTGCTAACATGATCTTTTCAGAACGCACGTAAGTATGATCATCACCAGTTTGAATTTTGAAGTAA
CATTAGAATAGGAATGGGCACATCATTGGTCCCATTTGCTGTGATCCATGCTGTAGTTTAAACAACCTTCTCTCACATTGATAG
TCATTGACAAGATTGCATTTTCAAACCTCTTGTGATGTTTAAACAAGATCCTGAAAAGAACTAGAAAAGGATTCAAATAATCT
TCTACCAATCTTGTGAACATTTTTGTCTCAAATCCCAATGTAAAGCTCTCTATTTCCCCCAACCTGCTCTTTGTATGACAATGC
AAATTTTAGTCTCCAGAGTCAGGGCCAACTGAAGTGTATGATGTTGGTATTCTTCTGAGTAAAAACACAGATTCTTTAGAGCAG
CACTCATGCATTTTGTCAATGAAAGGGCTTACTTAGAGATTGAAATGCTTTCCCTTTCACTAATCTTACATCTTCTCCAAT
TTGTCCAGTCAAATTTAAATTTAAGCTCTGCTCTGATGTGCTGTACTTCCCTGAATACGCATTTGCATTCATCTGTAAACAA
GATCATCTTATACATGAGAACCAATCACCTCTGAGAAGAACTTTCTACAGAGGTTTCTTGCCATCTCATCCAGACACATTTGTT
CTTTGACAGCTGATGAAAAACAATGGTGACAGTTCTGTTGAACCTTCAACAGCCTCACAAATAAACCTCATGTCGTATTGGTG
AGACAGGATGGATCAAAGTCTCTACTAGATGAAATGAAATTTCTGATAAAATGACTTTCTCAGATAAGCTCTTTTACCTGACAA
AATAATCTGAAGGTGGTGTAGTCTTTTGTGTTCTTGAATTTCTCCCTCCCTTGGCCTTCATTAGCCTAGTGCTCTATTATACC
GTGTTATTGTGGAGCTGACCTTATCTTCTAACTCTGAAAAAACTTGTCTCCTCTCCCTCGAAACACACATCTACCGGATCA
TCTTCCAATTTGTCTACTTCTGTTTCTTGGAACCGATGACTAATCTAGAGACAAGCTTTGAGACCTTATATTGTAATCTGAGTG
TCTCAGCTTATCTTTGTTTCTCATGAAGCCCTCTGTAATTTGGCTCACAGCCTAACAAGCAATTTGTTAAATCATACTCCA
AAAGCCGTTCTCCATTCAGATGTTTATTGACAACCACACTTTTGTGCTTGCAGATCTAATGCTGTGCGACATCCAGAGTTGGTC
ATGGGGTCCAGATTGTTGAGCCTTTCTCCCTTTTGAATTAAGGTGCCATTGTTGAATGAAGATACCATCATGCTAAAGATCTC
TAAATTAACACCAGGGGTTGAATGCTGACAATCAATATCTTTACCGGTGAACCTTCTCATTTGTTTATATAAAAAACACATTCCTCT
CGGGTGTGATTGTTTCTTAGGGTTGACAAAGAAACCAAACTCACTCTTGGGCTCAAAGAACTTTTCAAACATTTTATCTGATCT
GTCAATCTATCAGGGGTCTCCTTTGTGATCAATGACACAGGATGACACATTCAACATAAACTTGAATTTTGCACCTCAATAACAC
CTTTTACCAGTACCAAAAAATGTCTTAATCAAAACCGAAGACGCTGTACACACTTTCTCGGAGGTTGATTAGATCTCTCT
TCACTTATCCATTAATGAGGTGATGAAAGTCTGAGACGATGGCCATCACTAAATACCTAATATTTTGAACCTGCTTTTGATTT

Figure 38 (cont'd)

CTCTTTGTTGGGTTGGTGAGCATCAGTAGGATCAATGTCCTTAGTGCAAGTCTCAATGTCAATAAGAGAATCTTTTAAGTCAGGGCA
TGACCTAATCCATGAAATCATTGTGCTATCATGTTGTGCAACACCTCATCTGAAAAAATGGTAAAAAGAACCTTTTGGATCTG
CGTAAAAGGAAATCAAGTGACCATCCGGACCTTGTATGGAATAACACCTCGATGATTCTCCAGTTTCTGATATAGTAGATGATAC
TCTTCGGAATCCAGTTTATTATCTGGCAAAACACCTCTTTGCACTCCACCACCTTGATATCTCACAGACCCAGTTGGTTCTGTCT
CAACCTTGCAACTGAGCTTGTTTTCATGCTGTTTGTAGAGCCAAACAAACAGATGACAGTTTTCTCAAACCTCTGTAAACCCCTCA
ATTGCTCTATGTTAGGCTGGAAAGTGAATCTTCAAATTTTGTGTAATGCATTACAGGATGAGTCCCGGCTCTCATAAAGTTCTCA
AATTCAGCAAATGGTATATGGCATTCTTGACGAGGCATTCTGATAGTCCGTAATGCTCAAACTAAGTCCCACTGTTGATAGGCA
TTTCTGGATTTTGTCTATGAACTCATTATGGATACCCATAAAAGCTCATCAAGAGATGCCTTTTGTGCACTCTTGATTTTCTTC
TGTTCTTCAAAGTCTCATGAATTTCTTTGGTACTTTGAAGGCTCACAGCCTATCATTCACACTACTGTAGCAACAACCAACC
CAATGTTTATCATTTTCCAACCCCTTTGGAAATTGACTGCTTAATAAGTGAAGAAAGACATAAGACATCTAAGTTCAGCAGCTGTCT
CCTTCTAGTGTTTAATAATTTTAACTTTTCACCTTGTTCAACATAGAGAGTAGCCTTTCATACTCAGTGTTAGCATCGCTTCCTC
TCTCATGCCCATGGGTCTCTGCTGTAATGAACCTCATTAGGGGCGAGGATTCAACTGCCTCTTTGCTCAACATTAATATGTATCA
TTATCAGTAAGGGTTTCATAAAGTTCAGAGAATTCTTGATTAAGCCCCAGGGCTGACCTTTTGGAAATTCCTTTTGAGTTTCCC
ATTTAACAGGTCCCTCCTAAACCTGCCAAAAAGGAATTTATGCCAAAGACCACATCATCGCAACTCATGTTGGGGTTGACACCAT
CGTGGCACATTTTCATAATCTCATCGTTATGAAATGATCTTGCGTCTTTCAAATTTTCATTGAGTCCATGCCGGAACGTTTGTCA
ACAGTGGTCTTAAGAGACTCACAGAGCCTGAAGTATTCAGACTCCTCAAAACTTTCTCATCTTGACTAGAACTCCAGGAGTTT
AAATAGGAGGTCTCTGAACCTAAATTCACCCATTCTGGCATGAACTGTTATCATAATCACACGACCATCCACTATTGGAACCA
GTGTGATGCTGCAACAGCAAGATCTTCTTTGATGCATGCTAGTTTGTGGTGTCTCAATGAACTTCTTTCAAACCTAGCTGGT
GTGCTTCTAACAAAACATTCAAGAAGAATAAGGGAATTGTCAATCAACTTATAACCATCAGGGATGATGAGTGGCAGTCTGGACA
CACAATCCCAGAGTCTATTAGGATTGTTTCAACAGATTGTGCATCGTGGTGTGTATGCAACCACTTTTGTCTGCACTGTCTATCT
CTATACAGCGTGATAACAATTTGAGTCCCTCAATTAGCACCATTCTGGGTCTCTTTGTCCCAGGAAGTTGAGTTTTGCCTTGAC
AGCCTCTCGTCTCTATGTAATTTAGACACAACCTCTCTCAAATCTGCAATAGTTTCATCCATTGCGCATCAAAAAGCCTAGGA
TCCTCGGTGCGC
(SEQ ID NO: 12)

Figure 38 (cont'd)

Lymphocytic choriomeningitis virus (LCMV) strain P52-WE(L)

Source: 1-3376 Segment = S

Protein: Pre-glycoprotein polyprotein GP complex

Gene: GPC

LCMV P52-WE(L) GPC

ATGGGTCAGATTGTGACAATGTTTGAGGCTTTGCCTCACATCATTGATGAGGTCATCAACATTGTCATTATTGTGCTCATTATAAT
CACGAGCATCAAAGCTGTGTACAATTTCCGCCACCTGTGGGATATTAGCACTGGTCAGCTTCCTTTTTTTGGCTGGTAGGTCCTGTG
GCATGTACGGCCTTAATGGTCCCGACATCTATAAAGGGGTTTACCAGTTCAAATCAGTGGAGTTTGATATGTCTCACTTAAATCTG
ACGATGCCCAATGCGTGCTCAGCCACAACCTCTCATCACTACATCAGTATGGGAAGCTCTGGACTGGAGCTAACTTTCATAACGA
CTCCATCCTTAATCACAAATTTTGCACCTTAACCTCCGCTTTCAACAAAAAGACTTTTGACCATACACTCATGAGTATAGTCTCGA
GTCTGCACCTCAGTATTAGAGGGAATTCCAACCACAAAGCAGTGTCTTGTGATTTTAACAATGGCATCACCATTCAATACAACCTG
TCATTTTCGGACCCACAGAGCGCTATGAGCCAGTGTGGACTTTTCAAGAGGTAGAGTCTTGACATGTTTGAAGTGCCTTTGGAGG
AAAAATACATGAGAAGTGGCTGGGGCTGGGCAGGTTTCAGATGGCAAGACCCTTGGTGCAGCCAAACAAGCTATCAGTACCTAATCA
TACAAAACAGGACTTGGGAAAACCACTGTAGATATGCAGGCCCTTTTGGGATGTCTAGAATCCTCTTTGCTCAGGAAAAGACAAAG
TTTCTCACTAGGAGACTTGCAGGCACATTACCTGGACCTGTGAGACTCCTCAGGAGTAGAAAAATCCAGGTGGTTATTGCCTGAC
CAAATGGATGATCCTTGCTGCAGAGCTCAAATGTTTGGGAATACAGCTGTTGCAAAATGTAATGTCAATCATGATGAAGAGTTCT
GTGACATGCTACGACTAATTGATTACAACAAGGCCGCCCTGAGTAAGTTCAAGCAAGATGTAGAGTCTGCCTTGCATGTATTCAAA
ACAACAGTAAATTCTCTGATTTCCGATCAGCTGTTGATGAGGAATCATCTAAGAGATCTAATGGGGGTACCATACTGTAATTACTC
AAAGTTCTGGTATCTGGAACATGCTAAGACTGGTGAGACTAGTGACCCAAAGTGCTGGCTTGCTCACTAATGGCTCCTACTTGAATG
AGACCCACTTTAGTGATCAAATCGAACAAGAAGCAGATAACATGATCACAGAGATGTTGAGGAAGGACTACATAAAAAGACAAGGG
AGTACTCCTTTAGCCTTAATGGATCTTTTGTGATGTTTCAACATCAGCATATCTAATCAGCATCTTCTGCATCTTGTGAAGATACC
AACACATAGACATAAAGGGCGGTTTCATGTCCAAAGCCACACCGCTTGACCAACAAGGGGATCTGTAGTTGTGGTGCATTCAAGG
TGCCTGGTGTAAAACTATCTGGAAGACGCTGA
(SEQ ID NO: 13)

Translation =

LCMV P52-WE(L) GPC

MGQIVTMFEALPHIIDEVINIVIIIVLIIITSIKAVYNFATCGILALVSLFLAGRSCGMYGLNGPDIYKGVYQFQSVEFDMSHLNL
TMPNACSAANSHHYISMGSSGLELFTNDSILNHNFCNLTSAFNKTFDHTLMSIVSSLHLSIRGNSNHKAVSCDFNNGITIQYNL
SFSDPQSAMSQCWTFRRVLDMFRTAFGGKYMRSWGWSGSDGKTTWCSTSYQYLIQNRTWENHCRYAGPFGMSRILFAQEKTK
FLTRRLAGTFTWTLSDSSGVENPGGYCLTKWMLAAELKCFGNATAVAKCNVNHDEEFCMLRLIDYNKAALSFKQDVESALHVF
TTVNSLISDQLLMRNLRLDMGVPCYNYSKFWYLEHAKTGETSVPKCWLVTNGSYLNETHFSDQIEQEADNMITEMLRKDYIKRQG
STPLALMDLLMFSTAYLISIFLHLVKIPTHRIKGGSCP KPHRLTNKGICSCGAFKVPGVKTIWKRR
(SEQ ID NO: 14)

Figure 38 (cont'd)**Lymphocytic choriomeningitis virus (LCMV) strain P52-WE(L)****Source: 1-3376 Segment = S****Protein: Nucleoprotein****Gene: NP****LCMV P52-WE(L)NP**

ATGTCTTTGTCCAAAGAAGTCAAAAGCTTTTCAGTGGACACAGGCGTTGAGGAGGGAGTTGCAGAGTTTTACATCAGATGTAAAGGC
TGCCGTCATCAAGGACGCAACCAGTCTTCTAAATGGGTTGGACTTTTCTGAAGTCAGCAACGTTCAGAGGATCATGAGAAAGGAAA
GGAGGGATGATAAGACTTGCAGAGACTCAGGAGTCTTAACCAGACTGTGCATTCTCTTGTGATCTGAAGTCTACATCAAAGAAA
AATGTTCTGAAAGTGGAAGACTTAGTGCAGAGGAATTGATGACCTTGACAGCTGATCTTGAGAAGCTGAAGGCCAAAATTATGAG
AACTGAGAGGCCCTCAAGCTTCTGGAGTCTACATGGGAAATTTGACAGCACAACTTGTATCAAAGATCCCAAACTGCAAATGG
TTGGGATGAGAAGACCTCAGCAGGGTGCAAGTGGTGTAGTAAGGGTTTGGGATGTGAAGGACTCATCATTCTGAACAATCAGTTC
GGCACAATGCCAAGCCTGACAATGGCTTGCATGGCAAAACAGTCACAGACCCCACTCAATGATGTTGTGCAGGCACTCACAGACCT
TGGCTTACTTTACACAGTCAAATACCCGAATCTCAGTGATCTTGAAGGCTAAAGGATAAACACCCAGTCTGGGGGTCATTACTG
AACAGCAATCTAGTATCAATATCTCTGGTTATAATTTTCAGTCTTGGTGCAGCTGTGAAGCGGGGCGAGCTCTGCTAGATGGAGGG
AACATGCTGGAATCTATCTTGATCAAACCGAGCAACAGTGAGGATCTCTTAAAGCAGTCTCGGGGCCAAGAAGAACTCAACAT
GTTTGTCTCAGATCAAGTTGGAGATAGAAATCCCTATGAAACATCCTTTATAAAGTCTGTCTTTTCAGGTGAAGGATGGCCATACA
TAGCCTGTAGAAGCTCAGTTGTGGGGAGAGCATGGGAGAACACAACAATTGATCTCACAAATGAAAACTTGTGGCCAACTCATCT
AGGCCAGTGCTGGAGCAGCAGGCCACCTCAGGTGGGCTTGAGTTACAGTCAGACAATGCTGTTGAAAGACTTGATGGGAGGGAT
TGATCCCAATGCTCCACATGGATTGACATTGAGGGCAGGTTCAATGATCCAGTGGAGATAGCAATATTTCAACCACAAAATGGGC
AATTCATACATTTTTACAGGGAACCTACGGACCAGAAGCAATTCAGCAGGACTCAAAGTATTCACACGGCATGGATCTTGCTGAT
CTCTTCAATGCACAGCCTGGGCTGACCTCATCAGTTATAGGTGCTCTCCACAGGGATGGTTTTGAGCTGTCAAGGTTCTGATGA
CATCAGAAAGCTTCTGGACTCACAAAATAGAAGGGACATAAACTCATTGATGTTGAGATGACCAAGGAGGCCTCAAGAGAATATG
AAGATAAAGTGTGGGACAAATATGGCTGGCTATGCAAAATGCACACTGGGGTAGTGAGAGACAAAAGAAGAAAGAGATACCCCA
CACTGTGCACTCATGGACTGCATCATTTTTGAGAGTGCTTCCAAGGCAAGACTCCCTGATCTAAAAACCGTTTCAACATCCTGCC
ACATGATTTAATCTTCAGAGGACCAATGTTGTGACACTCTAA
(SEQ ID NO: 15)

Translation =**LCMV P52-WE(L)NP**

MSLSKEVKSFWQTQALRRELQSFTSDVKA AVIKDATSLNLGLDFSEVSNVQIRIMRKERRDDKDLQRLRLSNQTVHSLVDLKSTSKK
NVLVKVGRLSAEELMTLAADLEKLKAKIMRTERPQASGVYMGNLTAQQLDQRSQILQMVGMRRPQQGASGVVRVVDVKDS SLLNNQF
GTMPSLTMACMAKQSQTPLNDVVQALTDLGLLYTVKYPNLSDLERLKDHPVLGVITEQQSSINISGYNFSLGA AVKAGAAALLDGG
NMLESILIKPSNSEDLKAVLGAKKLNMFVSDQVGDRNPYENILYKVLCSGEGWPYIACRTSVVGRAWENTTIDLNEKLVANSS
RPVPGAAGPPQVGLSYSQTMMLKDLMGGIDPNAPTWIDIEGRFNDPVEIAIFQPQNGQFIHFYREPTDQKQFKQDSKYSHGMDLAD
LFNAQPGLTSSVIGALPQGMVLSQCQSDDIRKLLDSQNRDILKIDVEMTKEASREYEDKVWDKYGWLCKRMHTGVVRDKKKKEITP
HCAIMDCIIFESASKARLPDLKTVHNILPHDLIFRGNPVVTL
(SEQ ID NO: 16)

Lymphocytic choriomeningitis virus (LCMV) strain P52-WE(L)**Source: 1-7235 Segment = L****Protein: RING finger protein Z****Gene: ZP****LCMV P52-WE(L) ZP**

ATGGGCCAAGGCAAGTCCAAAGAAGAAAGGGACACCAGCAATACAGGCAGAGCAGAGCTTTGCCAGACACCACCTATCTTGGTCC
TCTAAATTGTAAATCATGTTGGCAGAAATTTGACAGCTTGGTTAGATGCCATGACCACTATCTTTGCAGACACTGTCTGAATCTCC
TGCTGTCAGTTTCCGACAGATGTCTCTCTGTAAGTATCCACTGCCAACCAAACCTGAAGGTGTCAACAGTCCCAGCTCCCCACCT
CCCTATGAGGAGTGA
(SEQ ID NO: 17)

Translation =**LCMV P52-WE(L) ZP**

MGQGSKEERDTSNTGRAELLPDTTYLGPLNCKSCWQKFDLSVRCHDHYLCRHCLNLLLSVSDRCLCKYPLPTKLKVSTVPSSPP
PYEE

(SEQ ID NO: 18)

Figure 38 (cont'd)

Lymphocytic choriomeningitis virus (LCMV) strain P52-WE(L)

Source: 1-7235 Segment = L

Protein: RNA-directed RNA polymerase L

Gene: LCMV P52-WE(L) LP

ATGGATGAAACTATTGCAGATTTGAGAGAGTTGTGTCTAAATTACATAGAACAGGACGAGAGGCTGTCAAGGCCAAAACTCAACTT
CCTGGGACAAAGAGAACCCAGAATGGTGCTAATTGAGGGACTCAAATTGTTATCACGCTGTATAGAGATAGACAGTGCAGACAAAA
GTGGTTGCATACACAAACCACGATGACAAATCTGTTGAAACAATCCTAATAGACTCTGGGATTGTGTGTCAGGACTGCCACTCATC
ATCCCTGATGGTTATAAGTTGATTGACAATTCCTTATTCTTCTGAATGTTTTGTTAGAAAGCACACCAGCTAGTTTTGAAAAGAA
GTTCCATTGAGGACCAACAACTAGCATGCATCAAGAAGACTTGTCTGTTGCAGGCATCACACTGGTTCCAAATAGTGGATGGTC
GTTGTGATTATGATAACAGTTTCATGCCAGAATGGGTGAATTTTAAAGTTCAGAGACCTCCTATTTAAACTCCTGGAGTATTCTAGT
CAAGATGAGAAAGTTTTTGAGGAGTCTGAATACTTCAGGCTCTGTGAGTCTCTTAAGACCACTGTTGACAAACGTTCCGGCATGGA
CTCAATGAAAATTTTGAAAGACGCAAGATCATTTACATACGATGAGATTATGAAAATGTGCCACGATGGTGTCAACCCCAACATGA
GTTCCGATGTCTTGGTCTTTTGGCATAAATTCCTTTTCCAGAGGTTAGGAGGGACCTGTAAATGGGAAACTCAAAAGGAATTTG
CAAAAGGTCAGCCCTGGGGGCTTAATCAAGGAATCTCTGAACTTTATGAAACCCTTACTGATAATGATGACATATTATGTTGAG
CAAAGAGGCAGTTGAATCCTGCCCCCTTAATGAGGTTCAATACAGCAGAGACCATGGGCATGAGAGAGGAAGCGATGCTAACACTG
AGTATGAAAGGCTACTCTCTATGTTGAACAAGGTGAAAAGTTTAAATATTAAACACTAGAAGGAGACAGCTGCTGAACCTTAGAT
GTCTTATGCTCTTCTTCACTTATTAAAGCAGTCAATTTCCAAAGGTTAGGAAATGATAAATGTTGGTTGGTTGCTGCTACAGTAG
TGTGAATGATAGGCTTGTGAGCCTTCAAAGTACCAAGAAGAATTCATGAGACTTTTGAAGAACAAGAAAATCAAGAGTGCACA
AAAAGGCATCTCTTATGAGCTTTTGGGTATCCATAAATGAGTTCATAGCAAAAATCCAGAAATGCCTATCAACAGTGGGACTT
AGTTTTGAGCATTACGGACTATCAGAATGCCTCGTGCAAGAATGCCATATACCATTGCTGAATTTGAGAACTTTATGAGAGCCGG
TACCAATTTTTTTCAGATGAGGTGTTGCACAACATGATAGACACAATGATTTTCATGGATTAGGTCATGCCCTGACTTAAAGAGTCT
CTTATTGACATTGAGACTGCACTAAGGACATTGATCCTACTGATGCTCACCAACCCAACAAGAGAAATCAAAAGCAGGTTCAAAA
TATTAGGTATTAGTGATGGCCATCGTCTCAGACTTTTCATCGACCTCATTAATGGATAAGTTGAAGGAGGATCTAATCAACACCTG
CCGAGAAAGTGGGTGTACAGGCTGCTTCGGTTTTGATTAGGACAAATTTTGGTACTGGTGAAGAGGTGTTATTGAGTGCAAAATTC
AAGTTTATGTTGAATGTGTACACCTGTGTCATTTGATACAAAGGAGACCCCTGATAGATTGACAGATCAGATAAAATGTTTTGA
AAAGTTCTTTGAGCCCAAGAGTGAGTTTGGTTCTTTGTCAACCTAAGGAAACAATCACACCCGAAGAGGAATGTGTTTTTATG
AACAATGAAGAAGTTCACCGGTAAAGATATTGATTGTGACGATTCACCCCTGGTGTAAATTTAGAGATCTTTAGCATGATGGTA
TCTTCATTCAACAATGGCACCTTAATTTCTAAAAGGGGAGAAAAGGCTCAACAATCTGGACCCCATGACCAACTCTGGATGTGCGAC
AGCATTAGATCTCGCAAGCAACAAAAGTGTGGTTGTCAATTAACATCTGAATGGAGAACGGCTTTTGGAGTATGATTTTAAACAAT
TGCTTGTAGTGCTGTGAGCCAAATTACAGAGGGCTTCATGAGGAAACAAAAGTATAAGCTGAGACACTCAGATTACGAATATAAG
GTCTCAAAGCTGTCTCTAGATTAGTCATCGGTTCCAGGAAAACAGAAAGTAGACAAATTTGGAAGATGATCCGGTAGATGTGTGTTT
CGAGGGGAGGAGGAGACAAGTTTTTTCAGGAGTTTAGAAGATAAGGTGAGCTCAGCTCCACAATAACACGGTATAATAGAGGCACTAGGC
TTAATTGAAGGGCAAGGGGAGGAGAATTCAGGAACACAAAAGGACTACACCACTTCAGATTATTTTGTAGGTAAGAGAGCTTAT
CTGAGGAAAGTCATTTTATCAGAAATTTCAATTCATCTAGTAGAGGACTTTGATCCATCTGTCTACCAATGACGACATGAGGTT
TATTGTGAGGCTGTTGAAGGTTCAACAGAACTGTCAACATTTGATATTTTACATCAGCTGTCAAAGAACAAATGTGGTCTGGATGAGA
TGGCAAGAACCTCTGTAGAAGTTCTTCTCAGAGGCTGATTGGTTCTCATGTATGAAGATGATCTTGTACAGATGAATGCAAAAT
GCGTATTCAAGGAAGTACAGACATGTCAGAGGAGGAGCTTAAATTTTAAATTTGACTGGGACAAATTTGAAGAGAGATGAAGAAAT
TAGTGAAAGGGAAAGCAATTCGAATCTCTAAGTAAGGCCCTTTTATTGACAAATGCATGAGTGTCTCTAAAGAATCTGTGTT
TTTACTCAGAAAGTACCAACATCATACACTTCAGTTGGCCCTGACTCTGGGAGACTAAAATTTGCATTGTCTATACAAGAGAGCA
GTTGGGGGAAATGAGAGGCTTACATTGGGGATTTGAGGACAAAATGTTCAAGATTGTTAGAGATTATTTTGAATCCTTTTCT
TAGTTTCTTTTCAGGATCTGTGTTTAAACAATGACAAGAGTTTGAATAATGCAATCTGTCAATGACTATCAATGTGAGAGAGGGGT
TGTTAAACTACAGCATGGATCACAGCAAATGGGGACCAATGATGTGCCCATTCCTATTCTTAATGCTTCTCCAAATCTCAAACCTG
GGTGATGATCAGTACGTGCGTTCTGAAAAAGATCATGTTAGCACCTTGTGTGACTTGGCATATGCATAAATCTGTTGAAGTCCCTTT
CCCTGTTGTGAATGCAATGATGAAATCATATGTTAAATCAAACTCAAGCTTCTCAAAGGGTCAGGAACGACTGTTACGGAGAGAA
TCTTTAGAGAGTATTTTGAATGGGGTGGTGCCATCTCACATATCTAGTCTCATTGACATGGGACAGGGGATCCTACACAATGCT
TCTGATTTTTACGGTTAATTAGTGAAAGGTTTATCAATTATTGTATTGGTGTCATTTTGGAGAGAGGCCAGAGCCTATACATC
AAGTGATGATCAGATCACTTATTGACAAGAGATTGAGTGACTTAGTTGATAGTGACCCAGAAAGTCCCTGTCTGTCTGCGAAT
TCCACTCTCACTTAAGTGTTTGTGAAACAAGTTTCATCAGTCCAAAAAGTGTGGTTGGGCGTTTTGCAGCGGAATTCAAATCCAGA
TTTTATGTGTGGGGGAGGAGGTCCCTCTCCTCAGCAAATTTGTGTCTCGGGCACTACACAATGTTAAGTGTAAGAACCAGCATCA
ACTTTGTGAGACAATAGATACGATTGCTGATCAAGCTATAGCAAAATGGAGTTCAGTTTTTTTAGTAAAGTGTATCCAGAGGAGGA
CACTGGATCTCTTGAATATGCTAATTTCCCTTTAGATCCATCTTGTAAACACTCACACTGATGTAAGGATTGGTTAGATGGT
TCTAGAGGTTATAGAATCCAAAGACTCATTGAAGAATTGTTGTCAGTGAAACAAAGATCATGAGAAAATTTGAAGAAGACTACA
TCACAACTCAAGAACGGTGAATGTAACGAGGAATTTTTTCTAGACCTCTTCAACAGGGAAAAGAAAGAGGCCATCCTTCAATTGG
GAGAGATTCTTGGTCTTGAAGATGATCTTAATGAGTTGGCAAGCATCAATGGTTGAATCTGAATGAAATGTTCCCATGAGGATG
GTTCTGAGACAAAAGTGGTTTACCCTCAGTAATGACCTTTCAAGAGGAAAAGATCCCTCATTGATTTAAACACTCCAAAATAA
GCTTTGTAGTAAGTTCAACAAGAGGTGCACAGAAGCTGTTGTGAGAGGCAATCAACAAATCAGCTTTTCAAGATTGTGCTCATCCG
GCTTTATAGGTCTCTGTAAGACTTTAGGAAGTAGGTGTGTGAGAAATAAAACAGGGAAAATATGTATATCAGAAAGGTGCTTGAA
GATCTGACCATGGATGAACATGTCAAGAAGGTTCAACAACAGATGGTGTGATGTTGTACATTTGCGACAGCAGAGACCCAGA
GGCTCACCGTGACCACATCAACCTTTTGGGCCCCCTCTCTGGGACTACATTGTCATCTCATTGAGCAACTCTTTTGGAGTGGGTG
TTTGGGTTTTAGCAGAACCTGTGAAAGGAAAGAACAGAGATTAATTCGGCTGTAGGCATTTAAATCCATGTGATTATGAGCAAGA
AAACCTGAGAGTTCGAGACTACTAGAGGATAAAGTGAGTTGAATCATGTAATTCATCTGTGAGGGCACTGTACCCCAAAATCTT

Figure 38 (cont'd)

TGAGGATCAGTTGCTCCCATTCATGCTGTGATGTGAGCTCAAAAAATATGAGATGGAGTCCAGGATTAATTCCTTGACCTTTGTG
TGCTGATTGACATCAACTCAGAGTCTTTGTCACTCATTCTCATGTTGTCAAATGGAAGAGGGACGAACATTACACTGTGCTGTTT
TCTGATCTCGTCAACTCTCACCAACGGTCAGACTCAAGTTTAGTTGATGAATTTGTTGTGTCAGCACAAGGGATGTCTGCAAGAACTT
TTTGAAGCAAGTGTATTTTCAATCATTTGTACGAGAGTTTGTGCAACAGCTAGGACCTTAGGTAACCTTTTCATGGTTCCCCCATA
AGGACATGATGCCATCTGAAGATGGCGCTGAAGCACTGGGACCTTCCAATCATTTATTTTGAAAGTGGTGAACAAGAAAATAGAG
AGGCCCATGTTTAGGAATGACTTGCAGTTTGGTTTTGGTTGGTTCTCTTATCGTGTGGGGGATGTTGTGTGAATGCCGCTATGTT
AATTAAGCAGGGTTTGACAGATCCAAAAGCATTTAAATCTTAAAGAGATTGTGGGATTACATGCTCAGCAGCACAGAGGGGATAT
TGGAGTTCTCAATCACAGTGGATTTACACACAACCAAGACAACACTGACTGCTTGAGGAAATTTTCATTGATCTTTGTGGTTAAA
TGCCAATTACAGAGTCCAGGTGTAGCTGATTACTTATCGTGTCTCATTCTTCAAAGGTGAGGTTGACAGGAGATTATAGATGA
GTGTCTCAATCTGTTGAGGACAGACCCCATCTTTAAAGCGAATGATGGAGTCTTTGACATTAGGTCTGAAGAGTTTGAAGATTACA
TGGAAGACCTTTGACACTTGGTGATTCACTAGAACTTGAACATAAGGTTCTAGAAGGATTCTGAATGAGATCAAATCTACTGAC
TTTGAGAGGATAGGGCTGAGTGGGAACCTGTGCCTCTGACCATAAGGAAGGGTGCCTCTTTGAGGGGAGGAACTTTGTTTCAGAA
TATCTCTGTGAAATTGGAGACAAAAGGACATGAGGCTCTTTCTGGCAGAGCTCGAGGGCTGTGGAAAAATTTGGTGATGCTCTCGGA
GCCTCTCTGCACCGATTGAGAACTGGTGAGCACTTGATGGAGTCAGAAATAAGTACAGTTCTTCAGGAGCTCTGCATGGACAGA
TCCGTGATGTGACACCATTATCTTTGTGCCAGATTGGTTCACCTTCAGAGATTGTAGGCTCTGCTTCAGCAGGTCAAGAAACAC
TGAATGTATGAGACAACTGGGGGACAGTTGAGCTCAAGGGGAAATCTGTGACGATTGGCTGGCGGAGCGGGTGGCCGAGGAGA
TCGACTAG
(SEQ ID NO: 19)

Translation =**LCMV P52-W~~E~~(L) LP**

MDETIADLRELCLNYIEQDERLSRQKLNFLGQREPRMVLI EGLKLLSRCIEIDSADKSGCIHNHDDKSVETILIDSGIVCPGLPLI
IPDGYKLIDNSLILLECFVRSTPASFEKKFI EDTNKLACTKEDLAVAGITLVPIVDGRCDYDNSFMPEWVNFKFRDLLFKLLEYS
QDEKVFEESEYFRLCESLKTVDKRSMDMSKILKDARSFHNDIMKCHDGVNPNMSCDDVVFGINSFGRFRDLLNGKLRNF
QKVPSPGLIKEFSELYETLTDNDLILMLSKEAVESCPLMRFI TAETHGHERGSDANTEYERLLSMLNKVKS LKLLNTRRRQLNLND
VLCLSSLIKQSI SKGLENDKHVWGCCYSSVNDRLVSLQSTKEEFMRLLKNRRKRSRVHKKASLDELFRVSI NEFI AKIQKCLSTVGL
SFEHYGLSECLVQECHI PFAEFENFMRAGTHPVMHYTKFEDYTFQPNIEQLRGLQSLRKLSSVCLALTN SMKTS SVARLRQNQLGS
VRYQVVECKEVFCQIIKLDSEEHLLYQKTGESSRCYSIQGPDGHLISFYADPKRFFLPISFDEVLHNMDTMSWIRSCFDLKD
SIDIETALRTLILMLTNPTKRNQKQVQNI RYLVMAIVDSFSS TSLMDKLKEDLITPAEKVVYRLLRFLIRTI FGTGEKVLLSAKF
KFMLNVSYLCHLITKETPDRLTDQIKCFEKFEPKSEFGFFVNPKETITPEEECVFYEQMKKFTGKDIDCQHSTPGVNLEIFSMV
SSFNNGTLILKGEKRLNNLDPMTNSGCATALDLASNKSVVNKHLNGERLLEYDFNKLIVSAVSQITEGFMRKQKYKLRHSDY EYK
VSKLVSRLVIGSRKTEVDKLEDDPVDVCFEGEEETSFFRSL EDKVSSTITRYNRGTRLNEGQGEGEFKN TKGLHHLQIIISGKRAY
LRKVLSEISFHLVEDFDP SCLTNDDMRFICEAVEGSTELSPLYFTSAVKEQCGLDEMARNLCRFFFSEGDWFSCKMKMILLQMNAN
AYSGKYRHMQRQSLNFKFDWDKLEEDVRI SERESNSESLKALSITKCMSAALKNL CFYSEESPTSYTSVGPDSGR LKFALSYKEQ
VGGNRELYIGDLRTKMFTRLVEDYFESFSSFFSGSCLNNDKEFENAIL SMTINVREGLLNYSMDH SKWGPMMC PFLLFLLMLLQNLKL
GDDQYVRSRGKDHVSTLLTWHMHKLVEVPFPVNNAMMKS YVKS KLKLLKSGSTTVTERI FREYFEMGVVPSHISSLIDMGQIGILHNA
SDFYGLISERFINYCI GVI FGERPEAYTSDDQITLFDKRLSDLVSDPEEVVLLEFHSHLSGLLNKFISPKSVVGRFAAEFKSR
FYVWGEVPLLTKFVSAALHNVKCEPHQLCETIDT IADQAIANGVPVFLVNCIQRRTLDLLKYANFPLDPFLNTHTDVKDWLDG
SRGYRIQRLIEELCPSETKIMRKLVRRLHHLKNGECNEEFFLDLFNREKKEAILQLGEILGLEDDLNELASINWNLNLMEMFLRM
VLRQKVVPYSVMTFQEEKIPSLIKTLQNKLC SKFTRGAQKLLSEAINKSAFQSCVSSGFI GLCKTLGSRVNRKNRENMYIRKVLE
DLTMDHEVTRVHKQDGVMLYICDKQRHPEAHRDHINLLRPLLDWYICISLSNSFELGVVLAEPVKGNESNSAVRHLN PCDYVAR
KPESRRLLEDKVSLNHVIQSVRRLYPKIFEDQLLPFMSDVSSKNMRWSPRIKFLDLCVLIDINSESLISHVVKWRDEHYTVLF
SDLVNSHQSDSSSLVDEFVVS TRDVCKNFKQVYFESFVREFVATARTLGNFSWFPHKDMMP SEDGAEALGPFQSFILKVVNKKIE
RPMFRNDLQFGFGWFSYRVGDVVCNAAMLIKQLTDPKAFKSLRDLWDYMLS STEGILEFSITVDFTHNQNTDCLRKFSLI FVVK
CQLQSPGVADYLSCHFFKGEVDRLLDECLNLLRTDPIFKANDGVFDIRSEEFEDYMEDPLTLGDSLELELIGSRRIINEIKSTD
FERIGPEWEPVPLTIRKGALEGRNFVQNISVKLET KDMRVFLAELEGCGKIGDVLGSLLLHRFRTGEHLMSEISTVLQELCMDR
SVMLTPLSFVPDWFTRDCRLCFRSKNTVMYETTGGRFRLKGKSCDDWLAERVAEEID
(SEQ ID NO: 20)

Figure 38 (cont'd)

C. Lymphocytic choriomeningitis virus (LCMV) strain Armstrong 53b

Lymphocytic choriomeningitis virus (LCMV) strain Armstrong 53b

Source: 1-3376 Segment = S

LCMV Armstrong S-Segment

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CGCACCGGGGATCCTAGGCTTTTGGATTGCGCTTTCCTCTAGATCAACTGGGTGTGAGGCCCTATCCTACAGAAGGATGGGTGAG
ATTGTGACAAATGTTTGGGCTCTGCCTCACATCATCGATGAGGTGATCAACATTGTCATTATTGTGCTTATCGTGATCAGGGGTAT
CAAGGCTGTCTACAATTTTCCACCTGTGGGATATTCGCATTGATCAGTTTCCTACTTCTGGCTGGCAGGTCCCTGTGGCATGTACG
GTCTTAAAGGACCCGACATTTACAAAGGAGTTTACCAATTTAAGTCAGTGGAGTTTGATATGTCACATCTGAACCTGACCATGCCC
AACGCATGTTTCAGCCAACAACCTCCACCATTACATCAGTATGGGGACTTCTGGACTAGAATTGACCTTCACCAATGATTCCATCAT
CAGTCACAACCTTTTGAATCTGACCTCTGCCTTCAATAAAAAGACCTTTGACCACACACTCATGAGTATAGTTTCGAGCCTACACC
TCAGTATCAGAGGGAACTCCAACATAAGGCAGTATCCTGCGACTTCAACAATGGCATAACCATCCAATACAACCTTGACATTCTCA
AATGCACAAAGTGCTCAGAGCCAGTGTAGAACCTTCAGAGGTAGAGTCTTAGATATGTTTAGAACTGCCTTCGGGGGGAAATACAT
GAGGAGTGGTGGGGCTGGACAGGCTCAGATGGCAAGACCACCTGGTGTAGCCAGACGAGTTACCAATACCTGATTATACAAAATA
GAACCTGGGAAAACCACTGCACATATGCAGGTCCTTTGGGATGTCCAGGATTCTCCTTCCCAAGAGAAGACTAAGTTCTTCACT
AGGAGTACGCGGGACATTCACCTGGACTTTGTGAGACTCTTCAGGGGTGGAGAATCCAGGTGGTTATTGCCTTAAATGAGACCGAT
GATTCTTGCTGCAGAGCTTAAAGTGTTCGGGAACACAGCAGTTGCGAAATGCAATGTAATCATGATGAAGAATTCTGTGACATGC
TGCGACTAATTGACTACAACAAGGCTGCTTTGAGTAAGTTCAAAGAGGACGTAGAATCTGCCTTGCACTTATTCAAAACACAGTG
AATTCCTTGATTTGATCACTACTGATGAGGAACCACTTGAGAGATCTGATGGGGTGCCATATTGCAATTACTCAAAGTTTGTG
GTACCTAGAACATGCAAGACCGCGCAAACTAGTGTCCCAAGTCTGGCTTGTGACCAATGGTCTTACTTAATGAGACCCACT
TCAGTGATCAAAATCGAACAGGAAGCCGATAACATGATTACAGAGATGTTGAGGAAGGATTACATAAGAGGCAGGGGAGTACCCCC
CTAGCATTGATGGACCTTCTGATGTTTTCCACATCTGCATATCTAGTCAGCATCTTCCTGCACCTTGTCAAAAATACCAACACACAG
GCACATAAAGGTGGCTCATGTCCAAGCCACACCGATTAACCAACAAAGGAATTTGTAGTTGTGGTGCAATTTAAGGTGCCTGGTG
TAAAAACCGTCTGGAAAAGACGCTGAAGAACAGCGCTCCCTGACTCTCCACCTCGAAAGAGGTGGAGAGTCAGGGAGGCCACAGAG
GGTCTTAGAGTGTCAACAATTTGGGCCTCTAAAAATTAGGTGATGTGGCAGAATGTTGTGAACAGTTTTTCAGATCTGGGAGCCTT
GCTTTGGAGGCGCTTCAAAAATGATGCAGTCCATGAGTGCACAGTGCAGGGGTGATCTCTTCTCTTTTTGTCCCTTACTATTCC
AGTATGCATCTTACACAACCAGCCATATTTGTCCACACTTTGTCTTCACTCCCTCGAAGCTTCCCTGGTCATTTCAACATCGA
TAAGCTTAATGTCTTCTTCTTCTGTGAGTCCAGAAGCTTCTGATGTCATCGGAGCCTTGACAGCTTAGAACCATCCCTGCGGA
AGAGCACCTATAACTGACGAGGTCAACCCGGGTTCGCGATTGAAGAGGTGGCAAGATCCATGCCGTGTGAGTACTTGAATCTTG
CTTGAATGTTTTTATCAACGGGTTCCTGTAAAAGTGTATGAAGTCCCGTCTGTGGTTGGAAAATTGCTATTTCCACTGGAT
CATTAAATCTACCCTCAATGTCAATCCATGTAGGAGCGTTGGGGTCAATTCCCTCCATGAGGTCTTTAAAGCATTGTCTGGCTG
TAGCTTAAGCCACCTGAGGTGGACCTGCTGCTCCAGGCGCTGGCTGGGTGAGTTGACTGCAGGTTTCTCGCTTGTGAGATCAAT
TGTTGTGTTTTCCATGCTCTCCCAACAATCGATGTTCTACAAGCTATGTATGGCCATCCTTCACCTGAAAGGCAAACTTTATAGA
GGATGTTTTATAAGGGTTCCTGTCCCAACTTGGTCTGAAACAAACATGTGAGTCTTCTTGGCCCCGAGAACTGCCTTCAAG
AGGTCCTCGCTGTTGCTTGGCTTGATCAAAATTGACTTAACATGTTACCCCCATCCAACAGGGCTGCCCTGCCTTACGGCAGC
ACCAAGACTAAAGTTATAGCCAGAAATGTTGATGCTGGACTGCTGTTGAGTGATGACCCCAAGAACTGGGTGCTTGTCTTTCAGCC
TTTCAAGATCATTAAGATTTGGATACTTGAAGTGTGTAAGCAAGCAAGGTCTGTGAGCGCTTGTACAACGTCATTGAGCGGAGTC
TGTGACTGTTTGGCCATACAAGCCATAGTTAGACTTGGCATTGTGCCAATGATTGTTCAAAAGTGATGAGTCTTTCACATCCCA
AACTCTTACCACACCACTTGCACCTGCTGAGGCTTCTCATCCCAACTATCTGTAGGATCTGAGATCTTGGTCTAGTTGCTGTG
TTGTTAAGTTCCCATATATATACCCCTGAAGCCTGGGGCTTTCAGACCTCATGATCTTGGCCTTCAGCTTCTCAAGGTGAGCCGCA
AGAGACATCAGTTCTTCTGCACTGAGCCTCCCACTTTCAAAACATTTCTTCTTGTGTTGACTTTAAATCCACAAGAGAATGTAC
AGTCTGGTTGAGACTTCTGAGTCTCTGTAGGTCTTGTGATCTCTCTTTTCTTCTCATGATCTCTGAACATTGCTGACCTCAG
AGAAGTCCAACCCATTGAGAAGGTTGGTTGCATCCTTAATGACAGCAGCCTTCACATCTGATGTGAAGCTCTGCAATTTCTTCTC
AATGCTTGCCTCCATTGGAAGCTCTTAACCTCCTTAGACAAGGACATCTTGTGCTCAATGGTTTCTCAAGACAAATGCGCAATCA
AATGCTAGGATCCACTGTGCG
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(SEQ ID NO: 21)

Figure 38 (cont'd)

Lymphocytic choriomeningitis virus (LCMV) strain Armstrong 53b

Source: 1-7228 Segment = L

LCMV Armstrong L-Segment

CGCACCGGGGATCCTAGGCGTTTAGTTCGCGCTGTTTGGTTGCACAACTTTCTTCGTGAGGCTGTGAGAACTGGACCTGGCTGATAG
CGATGGGTCAAGGCAAGTCCAGAGAGGAGAAAGGCACCAATAGTACAAACAGGGCCGAAATCCTACCAGATACCACCTATCTTGGC
CCTTTAAGCTGCAAACTCTTGCTGGCAGAAATTTGACAGCTTGGTAAGATGCCATGACCACTACCTTTGCAGGCACTGTTTAAACCT
TCTGCTGTGATATCCGACAGGTGTCTCTTTGTAATATCCATTACCAACCAGATTGAAGATATCAACAGCCCCAAGCTCTCCAC
CTCCCTACGAAGAGTAACACCGTCCGGCCCCGGCCCCGACAAACAGCCAGCACAAGGGAACCGCACGTGCGCCCAACGCACACAGA
CACAGCACCAACACAGAAACACGACACACACACACACACAGCCAGGACGCGCCCCAACACCGGGGGGCGCCCCCCCCG
GGGGGCGCCCCCGGGAGCCCGGGCGGAGCCCAACGGAGATGCCATCAGTCGATGTCTCGGCCACCGACCCGCGCCAGCCAATC
GTCGACGACCTCCCTTGAGTCTAAACCTGCCCCCACTGTTTATACATCAAAGTGCTCTAGATTTGCTAAACAAAGTCTGC
AATCCTTAAAGGCGAACCAGTCTGGCAAAAGCGACAGTGAATCAGCAGAATAGATCTGTCTATACATAGTTCCTGGAGGATTACA
CTTATCTCTGAAGCAACAAATGTTCAACAGTCTGAACTCAGTAAGTGAAGAGGTTCCCAAGGACATCACTAATCTTTTCATAGCC
CTCAAGTCTGTAGAAAGACTTTTCATGTCTTGGTCTCCAGCTTCACAATGATATTTTGGACAAGGTTTCTTCTTCAAAAAGGG
CACCCATCTTTACAGTCAGTGGCAGAGGCTCCCACTCAGTCCAACTCTCTCAAAGTCAATAGATCTAATCCCATCCAGTATTCTT
TTGGAGCCCAACAACCTCAAGCTCAAGAGAATCACCAAGTATCAAGGGATCTTCCATGTAATCCTCAAACCTCTTCAGATCTGATATC
AAAGTCAACATCGTTCACTTGAAGACAGAGTCTGTCTCAGTAAGTGAAGGCAATTCTTCTATCTATCTCACCCT
TAAAGAGGTGAGAGCATGATAAAGTTGAGCCACACCTGGATTCTGTAATTTGGCACCTAACCAAGAATATCAATGAAAATTTCTTT
AAACAGTCAGTATTATTCTGATTGTGCGTAAAGTCCACTGAAATTTGAAAACCTCAATACCCCTTTTGTGTAGTTGAGCATGTAGTC
CCACAGATCCTTTAAGGATTTAAATGCTTTGGGTTTGTGAGGCCCTGCCAATCAACATGGCAGCATTACACACAACATCTCCCA
TTTCGTAAGAGAACCCAAACCAAACTGCAAAATCTTCCCACTAAGGCTTCCACATTTTGTTCACCACTTCTGAGGAC
AATGATTGAAAGGGGCGCAGTGCCTCAGCACCATCTTCAGATGGCATCATTTCTTTATGAGGGAACCATGAAAATTTGCCTAATGT
CCTGGTTGTTGCAACAAATTTCTCGAACAATGATTCAAAATACACCTGTTTAAAGAAGTTCTTGACAGACATCCCTCGTGTAAACAA
CAAATTCATCAACAGACTGGAGTCAGATCGCTGATGAGAATTTGGCAAGGTGAGAAAACAGAACAGTGTAAATGTTTCATCCCTTTTC
CACTTAACAACATGAGAAATGAGTGACAAGGATTCTGAGTTAATATCAATTAACACAGAGGTCAAGGAATTTAATTTCTGGGACT
CCACCTCATGTTTTTTGAGCTCATGTGACACATAAATGGAAGAAGCTGATCCTCAAAGATCTTGGGATATAACCGCCTCAGAGATT
GAATCACTTGGTTCAAATTCATTTGTCTCCAGTAGCCTTGAGCTCTCAGGCTTTCTTGCTACATAATCACATGGGTTTAAAGTGC
TTAAGAGTTAGGTTCTCACTGTTATTCTTCCCTTTGGTTCGTTCTGTAGGACCCAAACCCCACTCAAAGAGTTGCTCAATGA
AATACAAATGTAGTCCCAAGAGAGGCTTAAAGGCAATATGATCAGGTTGGGCTTCTGGATGAGACTGTTTGTGACAAATGT
ACAGCGTTATACCATCCCGATTGCAAACTCTTGTACATGATCATCTGTGGTTAGATCCTCAAGCAGCTTTTGTATACAGATTT
TCCCTATTTTTGTTTTCTCACACACCTGCTTCTAGAGTTTGGCAAGGCTATAAAGCCAGATGAGATACAACCTGGAAGCTGA
CTTGTGATTGCTTCTGACAGCAGCTTCTGTGACCCCTTGTGAATTTACTACAAAGTTTGTCTGGAGTGTCTTATCAATGATG
GGATTCTTCTCTTGGAAAGTCATCACTGATGGATAAACCACTTTTGTCTTAAACCATCCTTAATGGGAACATTTTCATTCAAA
TTCAACCAGTTAATCATCTGTAACCTGATTGATCTTCTCAAGACCGAGGAGGTCTCCCAATTGAAGAATGGCTCCTTTTATC
TCTGTTAAATAGGTTAAGAAAAATTTCTTCAATTAATTCACCATTTTGTAGCTTATGATGCAAGTTTCTTACAAGCTTTCTTACAA
CCTTTGTTTTCATTAGGACACAGTTCTCTCAATGAGTCTTTGTATTCTGTAACTCTAGAACCATCCAGCCAATCTTTCACATCAGTG
TTGGTATTCTAGTAGAAATGGATCCAAAGGGAATTTGGCAATCTTTAGGAGGTCCAGTGTCTCCTTTGGTACTATTTCATTCAGGA
GACTGGGACGCCATTTGCGATGGCTTGATCTGCAATTGTATCTATTGTTTACAAAGTTGATGTGGCTCTTTACACTTGACATTGT
GTAGCGCTGACATACAACTTTGTGAGAAAGAGGACTTCTCCCCCATACATAGAATCTAGATTTAAATCTCGAGCGAACCTC
CCAGCCACACTTTTGGGCTGATAAATTTGTTTAAACAAGCGCTCAGATGAGATTGGAATTTCAACAGGCAAGGACTTCTCCCGG
ATCACTTACAAACAGGCTCACTCAGCTCTCTCAATTAAGTGATCTGATCATCACTTGATGTGTAAGCTCTGTTCTTCTGCCAA
AGATAACACCAATGCAGTAGTTGATGAACCTCTCGCTAAGCAAACCATAGAAGTCAGAAGCATTATGCAAGATTCCCTGCCCCATA
TCAATAAGGCTGGATATATGGGATGGCACTATCCCATTTCAAATATTGTCTGAAAATTTCTCTCAGTAACAGTTGTTTCTGAACC
CCTGAGAAGTTTTAGCTTTCGACTTGACATATGATTTCACTTTCATCACTTGCATTCACAACAGGAAAGGGGACCTCGACAAGCTTATGCACTGT
GCCAAGTTAACAAAGTGCTAACATGATCTTCTCCGGAAACGCACATATGGTCATCACCTAGTTTGTAGATTTTGTAGAAACATTAAG
AACAAAAATGGGCACATCATTTGGTCCCATTTGCTGTGATCCATACTATAGTTTAAAGAACCCTTCCCGCACATTGATAGTCATTGA
CAAGATTGCATTTTCAAATCTCTTATCATTTGTTTAAACAGGAGCTGAAAAGAACTTGAAGAAAGCTCAAAATAATCTTCTATTA
ACCTTGTGAACATTTTGTCTCAAATCTCAATATAGAGTTCTCTATTTTCCCAACCTGCTCTTTATAAGATAGTGCAAAATTT
AGCCTTCCAGAGTCAGGACCTACTGAGGTGATGATGTTGGTGATTCTTCTGAGTAGAAGCACAGATTTTTCAAAGCAGCACTCAT
ACATTTTGTCAACGACAGAGCTTTACTAAGGGACTCAGAATTACTTCCCTCTCACTGATCTCAGCTCTTCTTCAGTTTGTGCC
AGTCAAAATTTGAAATTCAGCCTTGCCCTTGCATATGCCTGTATTTCCCTGAGTACGCATTTGCATTCAATTTGCAACAGAATCATC
TTCATGCAAGAAACCAATCATTTCTCAGAAAAGAACTTTCTACAAAGGTTTTTTGCCATCTCATCGAGGCCACACTGATCTTTAAT
GACTGAGGTGAAATACAAAGGTGACAGCTCTGTGGAACCTCAACAGCCTCACAGATAAATTTTCATGTGATCATTTGGTTAGACATG
ATGGGTCAAAGTCTTCTACTAAATGGAAAGATATTTCTGACAAGATAACTTTTCTTAAGTGAGCCATCTTCCCTGTTAGAAATAGC
TGTAATGATGTAGTCCCTTTGTATTTGTAAGTTTTTCTCCATCTCCTTTGTCAATTTGGCCCTCTACCTCTTCTGTACCGTGCTAT
TGTGGTGTGACTTTTCTTCGAGACTTTTGAAGAAGCTTGTCTTCTTCTCCATCAAAACATATTTCTGCGCAGGTGTGCTTCCG
ATCTCCCTGTCTCTTCTCCCTTGAACCGATGACCAATCTAGAGACTAAGTTGGAACCTTTATATTCATAGTCTGAGTGGCTCAAC
TTATACTTTTGTCTTCTACGAACTCTCCGTAATTTGACTCACAGCACTAACAGCAATTTGTTAAAGTCATATTCAGAAGTCG
TTCTCCATTTAGATGCTTATTAACCACCACTTTTGTACTAGCAAGATCTAATGCTGTGCGACATCCAGAGTTAGTCATGGGAT
CTAGGCTGTTTAGCTTCTTCTCTCTTGTAAAATTAAGTGCCGTTGTTAAATGAAGACACCATTAGGCTAAAGGCTTCAGATTA
ACACCTGGAGTTGTATGCTGACAGTCAATTTCTTACTAGTGAATCTCTTCATTTGCTCATAGAACACACATTTCTTCTCAGGAGT
GATTGCTTCTTGGGTTGACAAAAAACCAATTTGACTTTTGGGCTCAAAGAACTTTTCAAACATTTTATCTGATCTGTAGCC
TGTCAGGGGTCTCCTTTGTGATCAAATGACACAGGTATGACACATTCACATAAATTTAAATTTTGCACCTCAACAACACCTTCTCA
CCAGTACCAAAATAGTTTTATTAGGAATCTAAGCAGCTTATACACACCTTCTCAGCAGGTGTGATCAGATCTCCTCCTCACTT
ATCCATTAATGATGTAGATGAGAAATCTGACACTATTGCCATCACCAATATCTGACACTCTGTACCTGCTTTTGATTCTCTTTG

Figure 38 (cont'd)

TTGGGTTGGTGAGCATTAGCAACAATAGGGTCCTCAGTGCAACCTCAATGTCGGTGAGACAGTCTTCAAATCAGGACATGATCTA
ATCCATGAAATCATGATGTCTATCATATTGTATAAGACCTCATCTGAAAAAATGGTAAAAAGAACCTTTTAGGATCTGCATAGAA
GGAAATTAAATGACCATCCGGGCCCTGTATGGAGTAGCACCTTGAAGATTCTCCAGTCTTCTGGTATAATAGGTGGTATCTTCAG
AGTCCAGTTTTATTACTTGGCAAAACACTTCTTTGCATTCTACCACTTGATATCTCACAGACCCATTTTGATTTTGCCTTAGTCTA
GCAACTGAGCTAGTTTTCTACTGTTTGTAAAGCCAGACAAACAGATGATAATCTTCTCAGGCTCTGTATGTTCTTCAGCTGCTC
TGTGCTGGGTTGGAAATTGTAATCTTCAAACCTTCGTATAATACATTATCGGGTGAGCTCCAATTTTCATAAAGTTCTCAAATTCAG
TGAATGGTATGTGGCATTCTTGCTCAAGGTGTTTCAGACAGTCCGTAATGCTCGAAACTCAGTCCCACCACTAACAGGCATTTTGA
ATTTTGGCAATGAACTCACTAATAGACGCCCTAAACAATTCTCAAAGACACCTTTCTAAACACCTTTGACTTTTTTCTATTCCCT
CAAAAGTCTAATGAACTCCTCTTTAGTGCTGTGAAAGCTTACCAGCCTATCATTCACTACTATAGCAACAACCCACCCAGTGTT
TATCATTTTTTAACCTTTGAATTTGACTGTTTTATCAATGAGGAAAGACACAAAACATCCAGATTTAAACAAGTGTCTCCTTCTA
GTATTTCAACAGTTTCAAACCTTTGACTTTGTTTAAACATAGAGAGGAGCCTCTCATATTAGTGCTAGTCTCACTTCCCTTTTCGTG
CCCATGGGCTCTGTCAGTTATGAATCTCATCAAAGGACAGGATTCCACTGCCTCCCTGCTTAATGTTAAGATATCATCACTATCAG
CAAGTTTTTCATAGAGCTCAGAGAATTCTTGATCAAGCCTTCAGGGTTTACTTTCTGAAAGTTTCTCTTAAATTTCCCACTTTCT
AAATCTCTTCTAAACCTGCTGAAAAGAGAGTTTATTCAAAAACCATCATCACAGCTCATGTTGGGGTTGATGCCTTCGTGGCA
CATCCTCATAATTTTCATTATGAGTTGACCTCGCATCTTTCAGAATTTTCATAGAGTCCATACCGGAGCGCTTGTGATAGTAG
TCTTCAGGGACTCACAGAGTCTAAAATATTCAGACTCTTCAAAGACTTTCTCATTTTGGTTAGAATACTCCAAAAGTTTGAATAAA
AGGTCTCTAAATTTGAAGTTTGCCCACTCTGGCATAAAACCTATTATCATAATCACACGACCATCTACTATTGGAACATAATGTGAC
ACCCGCAACAGCAAGGTCTTCCCTGATGCATGCCAATTTGTTAGTGTCTCTATAAAATTTCTTCTCAAACCTGGCTGGAGTGCTCC
TAACAAAACACTCAAGAAGAATGAGAGAATTGTCTATCAGCTTGTAAACCATCAGGAATGATAAGTGGTAGTCTGGGCATACAATT
CCAGACTCCACAAAATTTTCCACAGACTTATCGTCGTGGTTGTGTGTCAGCCACTCTTGTCTGCACTGTCTATTTCAATGCA
GCGTGACAGCAACTTGAGTCCCTCAATCAGAACCATTCTGGGTTCCCTTTGTCCCAGAAAGTTGAGTTTCTGCCTTGACAACCTCT
CATCTGTTCTATATAGTTTAAACATAACTCTCTCAATTCTGAGATGATTTTCATCCATTGCGCATCAAAAAGCCTAGGATCCTCGG
TGC

(SEQ ID NO: 22)

Figure 38 (cont'd)

Lymphocytic choriomeningitis virus (LCMV) strain Armstrong 53b

Source: 1-3376 Segment = S

Protein: Pre-glycoprotein polyprotein GP complex

Gene: GPC

LCMV Armstrong GPC

ATGGGTCAGATTGTGACAATGTTTGAGGCTCTGCCTCACATCATCGATGAGGTGATCAACATTGTCATTATTGTGCTTATCGTGAT
CACGGGTATCAAGGCTGTCTACAATTTTGCCACCTGTGGGATATTCGCATTGATCAGTTTCCTACTTCTGGCTGGCAGGTCCTGTG
GCATGTACGGTCTTAAGGGACCCGACATTTACAAAGGAGTTTACCAATTTAAGTCAGTGGAGTTTGATATGTCACATCTGAACCTG
ACCATGCCCAACGCATGTTTCAGCCACAACCTCCCACCATTACATCAGTATGGGGACTTCTGGACTAGAATTGACCTTCACCAATGA
TTCCATCATCAGTCACAACCTTTTGCAATCTGACCTCTGCCTTCAATAAAAAGACCTTTGACCACACACTCATGAGTATAGTTTCGA
GCCTACACCTCAGTATCAGAGGGAACTCCAACATAAGGCAGTATCCTGCGACTTCAACAATGGCATAAACCATCCAATACAACCTTG
ACATTCTCAAATGCACAAAGTGCTCAGAGCCAGTGTAGAACCCTTCAGAGGTAGAGTCCTAGATATGTTTAGAACTGCCTTCGGGGG
GAAATACATGAGGAGTGGCTGGGGCTGGACAGGCTCAGATGGCAAGACCACCTGGTGTAGCCAGACGAGTTACCAATACCTGATTA
TACAAAATAGAACCTGGGAAAACCACTGCACATATGCAGGTCTTTTGGGATGTCCAGGATTCTCCTTTCCCAAGAGAAGACTAAG
TTCTTCACTAGGAGACTAGCGGGCACATTACCTGGACTTTGTCCAGACTCTTCAGGGGTGGAGAATCCAGGTGGTTATTGCCTGAC
CAAATGGATGATTCTTGCTGCAGAGCTTAAGTGTTCGGGAACACAGCAGTTGCGAAATGCAATGTAATCATGATGAAGAATTCT
GTGACATGCTGCGACTAATTGACTACAACAAGGCTGCTTTGAGTAAGTTCAAAGAGGACGTAGAATCTGCCTTGCACTTATTCAAA
ACAACAGTGAATTCTTTGATTTAGATCAACTACTGATGAGGAACCACTTGAGAGATCTGATGGGGGTGCCATATTGCAATTACTC
AAAGTTTGTGACCTAGAACATGCAAAGACCGGGCAAACCTAGTGTCCCCAAGTGCTGGCTTGTCCCAATGGTTCTTACTTAAATG
AGACCCACTTCAGTGATCAAATCGAACAGGAAGCCGATAACATGATTACAGAGATGTTGAGGAAGGATTACATAAAGAGGCAGGGG
AGTACCCCCCTAGCATTGATGGACCTTCTGATGTTTCCACATCTGCATATCTAGTCAGCATCTTCCTGCACCTTGTCAAAATACC
AACACACAGGCACATAAAAGGTGGCTCATGTCCAAAGCCACACCGATTAAACCAACAAAGGAATTTGTAGTTGTGGTGCATTTAAGG
TGCCTGGTGTAAAAACCGTCTGGAAGACGCTGA
(SEQ ID NO: 23)

Translation =

LCMV Armstrong GPC

MGQIVTMFEALPHIIDEVINIVIIVLIVITGIIKAVYNFATCGIFALISFLLLAGRSCGMYGLKGPDIYKGVYQFQSVEFDMSHLNL
TMPNACSAANSHHYISMGTSGLLELFTNDSII SHNFCNLTSAFNKKTFDHTLMSIVSSLHLSIRGNSNYKAVSCDFNNGITIQYNL
TFSNAQSAQSQCRTRFRGRVLD MFRTAFGGKYMRSWGWTGSDGKTTWCSTSYQYLI IQNRTWENHCTYAGPFGMSRILLSQEKTK
FFTRRLAGTFTWTLSDSGVENPGGYCLTKWMILAAELKCFGN TAVAKCNVNHDEEFCDMLRLIDYNKAALS KFKEDVESALHLFK
TTVNSLISDQLLMRNLRLDLMGVPCNYSKFWYLEHAKTGETSVPKCVLVTNGSYLNETHFSDQIEQ EADNMITEMLRKDYIKRQG
STPLALMDLLMFST SAYLVSI FLHLVKI PTHRHI KGGSCP KPHRLTNKGICSCGAFKVPGVKTVWKR
(SEQ ID NO: 24)

Figure 38 (cont'd)

Lymphocytic choriomeningitis virus (LCMV) strain Armstrong 53b

Source: 1-3376 Segment = S

Protein: Nucleoprotein

Gene: NP

LCMV Armstrong NP

ATGTCCTTGCTCTAAGGAAGTTAAGAGCTTCCAATGGACGCAAGCATTGAGAAGAGAATTGCAGAGCTTCACATCAGATGTGAAGGC
TGCTGTCATTAAGGATGCAACCAACCTTCTGAATGGGTTGGACTTCTCTGAGGTCAGCAATGTTGAGAGGATCATGAGGAAGGAAA
AGAGAGATGACAAAGACCTACAGAGACTCAGAAGTCTCAACCAGACTGTACATTCTTTGTGGATTTAAGTCAACATCAAAGAAG
AATGTTTGAAGTGGGGAGGCTCAGTGCAGAAGAACTGATGTCCTTGCAGGCTGACCTTGAGAAGCTGAAGGCCAAGATCATGAG
GTCTGAAAGGCCAGGCTTCAGGGGTATATATGGGGAACCTAACACACAGCAACTAGACCAAAGATCTCAGATCCTACAGATAG
TTGGGATGAGAAAGCCTCAGCAGGGTGCAAGTGGTGTGGTAAGAGTTTGGGATGTGAAAGACTCATCACTTTTGAACAATCAATTT
GGCACAATGCCAAGTCTAATATGGCTTGTATGGCCAAACAGTCACAGACTCCGCTCAATGACGTTGTACAAGCGCTCACAGACCT
TGGCTTGCTTTACACAGTCAAGTATCCAAATCTTAATGATCTTGAAGGCTGAAAGACAAGCACCCAGTCTGGGGGTCACTACTG
AACAGCAGTCCAGCATCAACATTTCTGGCTATACTTTAGTCTTGGTGTGCGCTGAAGGCAGGGGCAGCCCTGTTGGATGGGGGT
AACATGTTAGAGTCAATTTTGATCAAGCCAAGCAACAGCGAGGACCTCTTGAAGGCAGTCTCGGGGCCAAGAGAAAACCTCAACAT
GTTTGTTCAGACCAAGTTGGGGACAGGAACCCCTTATGAAAACATCCTCTATAAAGTTTGCCCTTCAGGTGAAGGATGGCCATACA
TAGCTTGTTAGAACATCGATTGTGGGGAGAGCATGGGAAAACACAACAATTGATCTCACAGCGAGAAACCTGCAGTCAACTCACCC
AGGCCAGCGCTGGAGCAGCAGGTCCACCTCAGGTGGGCTTAAGCTACAGCCAGACAATGCTTTTAAAGACCTCATGGGAGGAAT
TGACCCCAAGCGCTCCTACATGGATTGACATTGAGGGTAGATTTAATGATCCAGTGGAAATAGCAATTTTCAACCACAGAACGGGC
AGTTCATACACTTTTACAGGGAACCCGTTGATCAAAAACAATTCAAGCAAGATTCCAAGTACTCACACGGCATGGATCTTGCCGAC
CTCTTCAATGCGCAACCCGGGTTGACCTCGTCAGTTATAGTGCTCTTCCGCAAGGGATGGTTCTAAGCTGTCAAGGCTCCGATGA
CATCAGAAAGCTTCTGGACTCACAGAATAGGAAGGACATTAAGCTTATCGATGTTGAAATGACCAGGGGAAGCTTCGAGGGAGTATG
AAGACAAAGTGTGGGACAAATATGGCTGGTGTGTAAAGTGCATACTGGAATAGTAAGGGACAAAAGAGAAAGAGATCACCCCG
CACTGTGCACTCATGGACTGCATCATTTTGAAGCGCCTCCAAAGCAAGGCTCCAGATCTGAAAACCTGTTCAACATTTCTGCC
ACATGACCTAATTTTATAGAGGCCAAATGTTGTGACACTCTAA
(SEQ ID NO: 25)

Translation =

LCMV Armstrong NP

MSLSKEVKSFWQTQALRRELQSFTSDVKA AVIKDATNLLNGLDFSEVSNVQIRIMRKEKRDDKDLQRLRLSNQTVHSLVDLKSTSKK
NVLVKVGRLSAEELMSLAADLEKLKAKIMRSERPQASGVYMGNLTTQQLDQRSQILQIVGMRKPQQGASGVVRVWDVKDSLLNNQF
GTMPSLTMACMAKQSQTPLNDVVQALTDLGLLYTVKYPNLNDLERLKDHPVLGVITEQQSSINISGYNFSLGA AVKAGAAALLDGG
NMLESILIKPSNSEDLLKAVLGA KRKLNMFVSDQVGDRNPYENILYKVLCSGEGWPYIACRTSIVGRAWENTTIDLTSKPAVNSP
RPAPGAAGPPQVGLSYSQTMLLKDLMGGIDPNAPTWIDIEGRFNDPVEIAIFQPQNGQFIHFYREFVDQKQFKQDSKYSHGMDLAD
LFNAQPGLTSSVIGALPQGMVLSCQGSDDIRKLLDSQNRKDIKLIDVEMTREASREYEDKVDKYGWLCKRMHTGIVRDKKKKEITP
HCALMDCII FESASKARLPDLKTVHNILPHDLIFRGNPVVTL
(SEQ ID NO: 26)

Lymphocytic choriomeningitis virus (LCMV) strain Armstrong 53b

Source: 1-7228 Segment = L

Protein: RING finger protein Z

Gene: ZP

LCMV Armstrong ZP

ATGGGTCAAGGCAAGTCCAGAGAGGAGAAAGGCACCAATAGTACAAACAGGGCCGAAATCCTACCAGATACCACCTATCTTGCCCC
TTTAAGCTGCAAATCTTGCTGGCAGAAATTTGACAGCTTGGTAAGATGCCATGACCACCTACCTTTGCAGGCACTGTTTAAACCTTC
TGCTGTCAGTATCCGACAGGTGTCTCTTTGTAAATATCCATTACCAACCAGATTGAAGATATCAACAGCCCCAAGCTCTCCACCT
CCCTACGAAGAGTAA
(SEQ ID NO: 27)

Translation =

LCMV Armstrong ZP

MGQGSREEKGTNSTNRAEILPDTTYLGPLSCKSCWQKFDLSVRCHDHYLCRHCLNLLSVSDRCPLCKYPLPTRLKISTAPSSPP
PYEE

(SEQ ID NO: 28)

Figure 38 (cont'd)

Lymphocytic choriomeningitis virus (LCMV) strain Armstrong 53b

Source: 1-7228 Segment = L

Protein: RNA-directed RNA polymerase L

Gene: LP

LCMV Armstrong LP

ATGGATGAAATCATCTCAGAATTGAGAGAGTTATGTTTAACTATATAGAACAGGATGAGAGGTTGTCAAGGCAGAACTCAACTT
TCTGGGACAAAGGGAAACCCAGAATGGTTCTGATTGAGGGACTCAAGTTGCTGTCACGCTGCATTGAAATAGACAGTGCAGACAAGA
GTGGCTGCACACACAACCACGACGATAAGTCTGTGGAAACAATTTTGGTGGAGTCTGGAATTGTATGCCAGGACTACCACTTATC
ATTCTGATAGGTTACAAGCTGATAGACAATCTCTCATTCTTCTGGAGTGTGTTGTAGGAGCACTCCAGCCAGTTTGGAGAAGAA
ATTTATAGAGGACACTAACAAATTTGGCATGCATCAGGGAAGACCTTGCTGTTGCGGGTGTACATTAGTTCAAATAGTAGATGGTC
GTTGTGATTATGATAATAGTTTATGCCAGAGTGGGCAAACTTCAAATTTAGAGACCTTTTATTCAAACCTTTTGGAGTATTCTAAC
CAAAATGAGAAAGTCTTTGAAGAGTCTGAATATTTTAGACTCTGTGAGTCCCTGAAGACTACTATCGACAAGCGCTCCGGTATGGA
CTCTATGAGAGGCTCCTCTCTATGCTGAGAGTCAACTCATAATGATGAAATTTAGAGGATGTGCCACGAAGGCATCAACCCCAACATGA
GCTGTGATGATGTGGTTTTTGAATAAACTCTCTTTTCAGCAGGTTTAGAAGAGATTTAGAAAGTGGGAAATTAAGAGAAACTTT
CAGAAAGTAAACCCCTGAAGGCTTGATCAAGGAATCTCTGAGCTCTATGAAAACCTTGCTGATAGTGATGATATCTTAACATTAAAG
CAGGGAGGCAGTGGAAATCCTGTCTTTGATGAGATTATAACTGCAGAGACCCATGGGCACGAAAGGGGAAGTGAAGTACGACTG
AATATGAGAAATCTCTCTCTATGTTTAAACAAAGTCAAGAGTCTTGAAGTCTTGAATACTAGAAGGAGACAGTTGTTAAATCTGGAT
GTTTTGTGCTCTTCTCATTGATAAAACAGTCGAAATTCAGAGGTTTAAAAATGATAAACACTGGGTGGGTTGTTGCTATAGTAG
TGTGAATGATAGGCTGGTAAGCTTTACAGCACTAAGAGGAGTTCATTAGACTTTTGGGAATAGAAAAAGTCAAAGTGTGTTA
GAAAGGTGCTTTTGGGAATGTTTAGGGCGTCTATTAGTGAGTTCATTGCAAAAATTCAAAAATGCCTGTAGTGGTGGGACTG
AGTTTCGAGAAATCTTCAAGGTGCTACTCCATACAAGGCCCGGATGGTCATTTAATTTCTTCTATGCAGAGCTCTAAAAGGTTCTTTT
AGCTCACCCGATAATGTATTATACGAAGTTTGAAGATTACAATTTCAACCCAGCACAGAGCAGTGAAGAACATACAGAGCCTGA
GAAGATTATCATCTGTTGTCTGGCTTAACAAACAGTATGAAAACCTAGCTCAGTTGCTAGACTAAGGCAAAATCAAATAGGGTCT
GTGAGATATCAAGTGGTAGAATGCAAGAAGTGTGTTGCCAAGTAATAAACTGGACTCTGAAGAATACCACTATTATACCAGAA
GACTGGAGAATCTTCAAGGTGCTACTCCATACAAGGCCCGGATGGTCATTTAATTTCTTCTATGCAGAGCTCTAAAAGGTTCTTTT
TACCAATTTTTTCAGATGAGGTCTTATACAATATGATAGACATCATGATTTTCATGGATTAGATCATGTCCTGATTTGAAAGACTGT
CTCACCGACATTGAGGTTGCACTGAGGACCTATTGTTGCTAATGCTCACCACCCCAACAAAGAGAAATCAAAGCAGGTACAGAG
TGTCAGATATTTGGTGATGGCAATAGTGTGAGATTCTCATCTACATCATTAAATGGATAAGTTGAGGGAGGATCTGATCACACCTG
CTGAGAAGGTGGTGATAAGCTGCTTAGATTCTTAATAAAACCTATTTTGGTACTGGTGAGAAGGTGTTGTTGAGTGCAAAATTT
AAATTTATGTTGAATGTGTCATACCTGTGTCATTTGATCACAAGGAGACCCCTGACAGGCTAACAGATCAGATAAAATGTTTTGA
AAAGTCTTTTGAAGCCAAAAGTCAATTTGGTTTTTTTGTCAACCCCAAGGAAGCAATCACTCCTGAGGAAGAATGTGTGTTCTATG
AGCAATGAAGAGATTCACTAGTAAAGAAATGACTGTGAGCATACAACTCCAGGTGTTAATCTGGAAGCCTTTAGCCTAATGGTG
TCTTCATTTTAAACAGGCACCTTTAATTTTCAAAGGAGAGAGAAAGGCTCAACACCAATAGCAGGTTACAGAGGTAGGAGGG
AGCATTAGATCTTGCTAGTAACAAAAGTGTGGTGGTTAATAAGCATCTAAATGGAGAACGACTTCTGGAATATGACTTTAACAAAT
TGCTTGTTAGTGCTGTGAGTCAAATACGAGAGTTCCTGAAGAAAACAAAAGTATAAGTTGAGCCACTCAGACTATGAATATAAAA
GTTTCCAAGTTAGTCTCTAGATTGGTCATCGGTTCCAAGGAGAGAGACAGGGAGATCGGAAGACAACCTGGCAGAAATATGTTT
TGATGAGAGAAGAGAGACAGGCTCTTCAAAGTCTCGAAGAAAAGGCTCAACACCAATAGCAGGTTACAGAGGTAGGAGGG
CCAATGACAAAGGAGATGGAGAAAACTTACAAATACAAAAGGACTACATCATTTACAGCTTATTCTAACAGGGAAGATGGCTCAC
TTAAGAAAAGTTATCTTGTGAGAAATATCTTTCCATTTAGTAGAAGACTTTGACCCATCATGTCTAACCAATGATGACATGAAAT
TATCTGTGAGGCTGTTGAGGGTTCCACAGAGCTGTCACCTTTGTATTTACCTCAGTCATTAAAGATCAGTGTGGCTCGATGAGA
TGGCAAAAACCTTTGTAGAAAGTTCTTTTCTGAGAAATGATGGTTTCTGATGAAGATGATTCGTTGCAAAATGAATGCAAT
GCGTACTCAGGGAATACAGGCATATGCAAGGCAAGGCTTGAATTTCAAATTTGACTGGGACAACTGGAAGAAAGCTGAGAAAT
CAGTGAGAGGGAAAGTAATCTGAGTCCCTTAGTAAAGCTCTGTGCTTGACAAAATGTATGAGTGTCTGTTGAAAAATCTGTGCT
TCTACTCAGAAAGATCACAACATCATACACCTCAGTAGGCTCTGACTCTGGAAGGCTGAAATTTGCACTATCTTAAAGAGCAG
GTTGGGGAAATAGAGAACTCTATATTGGAGATTGAGGACAAAAATGTTTACAAGGTTAATAGAAGATTATTTGAGTCTTTTTC
AAGTTTCTTTTCAAGCTCCTGTTTAAACAATGATAAGGAATTTGAAAATGCAATCTTGTCAATGACTATCAATGTGCGGGGAAGGGT
TCTTAAACTATAGTATGGATCACAGCAAAATGGGGACCAATGATGTGCCCATTTTGTCTTAAATGTTTCTACAAAATCTCAAACTA
GGTGATGACCAGTATGTGCTTCCGGGAAAGATCATGTTAGCACCTTTGTTAACTTGGCACATGCATAAGCTTGTGAGGTCCTCTT
TCCTGTTGTGAATGCAATGATGAAATCATATGTCAAGTCGAAGCTAAAACCTCTCAGGGGTTGAGAAACAACCTGTACTGAGAGAA
TTTTGAGACAATATTTTGAATGGGGATAGTGCCATCCCATATATCCAGCCTTATGATATGGGGCAGGGAATCTTGCAATATGCT
TCTGACTTCTATGGTTTCTTAGCGAGAGGTTTCATCAACTACTGCATTGGTGTATCTTTGGCGAAAGACCAGAGGCTTACACATC
AAGTGATGATCAGATCACTTTATTTGATAGGAGGCTGAGTGACCTGGTTGTAAGTGATCCGGAGGAAGTCTTGTCTGTTGGAAT
TCCAATCTCATCTGAGCGGCTTGTAAACAAATTTATCAGCCAAAAGTGTGGCTGGGAGGTTGCTGCAAGATTTAAATCTAGA
TTCTATGTATGGGGGAGGAAGTCCCTCTTCTCAGAAAGTTGTATCTGCAGCGCTACACAATGTCAAGTGTAAGAGGCCACATCA
ACTTTGTGAAACAATAGATACAATTCAGATCAAGCCATCGCAATGGCGTCCAGTCTCCCTAGTTAATAGTATCCAAGGAGAA
CACTGGACCTCTAAAGTATGCCAATTTCCCTTTGGATCCATTTCTACTGAATACCAACACTGATGTGAAAGATTGGCTGGATGGT
TCTAGAGGTTACAGAATACAAAGACTCATTGAGGAAGTGTGCTTAATGAAACAAAGGTTGTAAGAAAGCTTGAAGGAACTGCA
TCATAAGCTCAAAAATGGTGAATTTAATGAAGAAATTTTCTTAGACCTATTTAACAGAGATAAAAAGGAGGCCATCTTCAATTGG
GAGACCTCCTCGGTCTTGAAGAAGATCTGAATCAGTTAGCAGATGTTAACTGGTTGAATTTGAATGAAATGTTCCCATTAAGGATG
GTTTTAAGACAAAAGGTGGTTTATCCATCAGTGATGACTTTCAGAGGAAAGAAATCCCATCATGATCAAGACACTCCAGAACAA
ACTTTGTAGTAAATTCACAAGGGGTGCACAGAAGCTGCTGTGAGAAGCAATCAACAAGTCAGCTTTCCAGAGTTGTATCTCATCTG
GCTTTATAGGCCCTTTGCAAACTCTAGGAAGCAGGTGTGTGAGAACAACAAAATAGGGAAAATCTGTATATCAAAAAGCTGCTTGAG
GATCTAACACAGATGATCATGTGACAAGAGTTTGAATCGGGATGGTATAACGCTGTACATTTGTGACAAACAGTCTCATCCAGA
AGCCACCGCTGATCATATATGCTTTTAAAGCCTCTTCTTTGGGACTACATTTGTATTTTATTGAGCACTCTTTTGGTGGGTG
TTTGGGTCTAGCAGAACCACCAAGGGAAGAATAACAGTGAGAACCTAACTCTTAAGCACTTAAACCCATGTGATTATGTAGCA

Figure 38 (cont'd)

AGAAAGCCTGAGAGCTCAAGGCTACTGGAGGACAAAGTGAATTTGAACCAAGTGATTCAATCTGTGAGGCGGTTATATCCCAAGAT
CTTTGAGGATCAGCTTCTTCCATTTATGTCTGACATGAGCTCAAAAAACATGAGGTGGAGTCCCAGAATTAATTCCTTGACCTCT
GTGTTTAAATGATATTAACCTCAGAATCCTTGTCACCTCATTTCTCATGTTGTTAAGTGGAAAAGGGATGAACATTACACTGTTCTG
TTTTCTGACCTTGCCAATTCTCATCAGCGATCTGACTCCAGTCTGGTGTATGAATTTGTTGTTAGCACGAGGGATGTCTGCAAGAA
CTTCTTAAACAGGTGATTTTGAATCATTGTTTCGAGAATTTGTTGCAACAACAGGACATTAGGCAATTTTTCATGGTTCCTC
ATAAAGAAATGATGCCATCTGAAGATGGTGTGAGGCACTGGGCCCTTTCAATCATTGTCTCAAAGGTGGTGAACAAAAATGTG
GAGAGGCCTATGTTTAGGAATGATTGTCAGTTTGGTGGTGGTGGTCTTACCGAATGGGAGATGTTGTGTGAATGCTGCCAT
GTTGATTAGGCAGGGCTGACAAACCCAAAGGCATTTAAATCCTTAAAGGATCTGTGGGACTACATGCTCAACTACACAAAAGGGG
TATTGGAGTTTCAATTTCACTGGACTTTACGCACAATCAGAATAATACTGACTGTTTAAAGGAAATTTTTCATGATATTCTTGGTT
AGGTGCCAATTACAGAATCCAGGTGTGGCTGAACTTTTATCATGCTCTCACCTCTTTAAGGGTGAGATAGATAGAAGAATGTTGGA
TGAATGCCTCCACTTACTGAGGACAGACTCTGTCTTCAAGGTGAACGATGGTGTCTTGTATATCAGATCTGAAGAGTTTGGAGATT
ACATGGAAGATCCCTTGATACTTGGTGATTCTCTTGAGCTTGAGTTGTTGGGCTCCAAAAGAATACTGGATGGGATTAGATCTATT
GACTTTGAGAGAGTTGGACCTGAGTGGGAGCCTGTGCCACTGACTGTAAAGATGGGTGCCCTTTTGAAGGAAGAAACCTTGCCA
AAATATCATTTGTGAAGCTGGAGACCAAGGACATGAAAGTCTTTCTAGCAGGACTTGAGGGCTATGAAAAGATTAGTGATGTCCTTG
GGAACCTCTTCTGCATCGATTGAGAACTGGTGAACATTTGTTGGGTTCAGAGATAAGTGAATCCTCCAGGAACATATGTATAGAC
AGATCTATTCTGCTGATTCCACTGTCGCTTTTGCCAGACTGGTTCGCCTTTAAGGATTGCAGACTTTGTTTTAGCAAATCTAGGAG
CACTTTGATGTATGAACAGTGGGGGGCAGGTTTAGACTCAAGGGGAGGTCTGCGACGATTGGCTGGGCGGGTCCGGTGGCCGAGG
ACATCGACTGA
(SEQ ID NO: 29)

Translation =**LCMV Armstrong LP**

MDEIISELRELCLNYIEQDERLSRQKLNFLGQREPRMVLIEGLKLLSRCIEIDSAADKSGCTHNHDDKSVETILVESGIVCPGLPLI
IPDGYKLIDNSLILLECFVRSTPASFEKKFIEDTNKLACIREDLAVAGVTLVPIVDGRCDYDNSFMPWEANFKFRDLLFKLEYSN
QNEKVFEESEYFRLCESLKTIDKRSMDSMKILKDARSTHNDIMRMCHEGINPNMSCDDVVFGINSLFSRFRDLESGLKLRNF
QKVNPEGLIKEFSELYENLADSDDIITLSREAVESCLPMRFITAEHGHGSETSTEYERLLSMLNKVSKLKLNTRRRQLNLND
VLCLSSLIKQSKFKGLKNDKHVWGCCYSSVNDRLVSFHSKEEFIRLLRNRRKSKVFRKVSFEELFRASISEFIAKIQKCLLVVGL
SFEHYGLSEHLEQECHIPFTEFENFMKIGAHPIMYTTFEDYNFQFSTEQLKNIQSLRRLSSVCLALTNMKTSSVARLRQNIQS
VRYQVVECKEVFCQVIKLDSEYHLLYQKTGESSRCYSIQGPDGHLISFYADPKRFFLPIFSDEVLYNMIDIMISWIRSCPDLKDC
LTDIEVALRLLLLMLTNPTKRNQKQVQSVRYLVMAIVSDFSSTSLMDKLREDLITPAEKVVYKLLRFLIKTIFGTGEKVLLSAKF
KFMLNVSYLCHLITKETPDRITDQIKCFEKFEPKSKQFGFFVNPKEAITPEEECVFYEQMKRFTSKEIDCQHTTPGVNLEAFSLMV
SSFNNGTLIFKGEKLNLSLDPMTNSGCATALDLASNKSVVNKHNLINGERLLEYDFNKLLVSAVSQITESFVRKQKYKLSHSDYEEK
VSKLVSRLVIGSKGEETGRSEDNLAEICFDGEEETSFFKSLLEKVNTTIARYRRGRRANDKGDGEKLTNTKGLHHLQLILTGKMAH
LRKVILSEISFHLVEDFDPSCLTNDMMKFICEAVEGSTELSPLYFTSVIKDQCGLDEMAKNLCRKFFSENDWFSCMKMILLQMNAN
AYSGKYRHMQRQGLNFKFDWDKLEEDVRI SERESNSESLSKALS LTKCMSAALKNLCFYSEESPTSYTSVGPDSGRKLFALS YKEQ
VGGNRELYIGDLRTKMFTRLIEDYFESFSFFSGSCLNNDKEFENAILSMTINVREGFLNYSMDHSHKWGPMMPFLFLMFLQNLKL
GDDQYVRSGKDHVSTLLTWHMHKLVEVPPFVNVNMMKSYVSKLKLRLRGSETTVTERIFRQYFEMGIVP SHISSLIDMGQGI LHN
SDFYGLLSERFINYICIGVIFGERPEAYTSDDQITLFDRLSDLVSDPEEVLVLEFQSHLSGLLNKFISPKSVAGRFEEAFKSR
FYVWGEVPLLTKFVSAALHNKCKEPHQLCETIDTADQAIANGVPVSLVNSIQRRITDCLKYANFPLDFLLNTNTDVKDWLDG
SRGYRIQRLIEELCPNETKVVRKLVRLHHLKNGEFNEEFFLDLFNRDKKEAILQLGDLGLLEEDLNQLADVNWNLNEMFPLRM
VLRQKVVPVSVMTFQEERI PSLIKTLQNKLC SKFTRGAQKLLSEAINKSAFQSCISSGFIGLCKTLGSRVNRKNRENLYIKKLE
DLTTDDHVTRVCNRDITLYICDKQSHPEAHRDHICLLRPLLDWDYICISLSNSFELGVVWLAEPTKGKNSSENLT LKHLNPCDYVA
RKPESSRLLEDKVNLNQVIQSVRRLYPKIFEDQLLPFMSDMS SKNMRWSPRIKFLDLCVLIDINSESLSI SHVVWKWRDEHYTVL
FSDLANSRQSDSSLVDEFVSTRDVCKNFKLQVYFESFVREFVATRTTLGNFSWFFPHKEMMPSEDGAELGPQSFVSKVNVKNV
ERPMPFRNDLQFGFWFSYRMGDVVCNAAMLIRQGLTNPKAFKSLKDLWDYMLNYTKGVLEFSISVDFTHNQNNTDCLRKFSLI FLV
RCQLQNPVGAELLSCSHLFKEIDRRMLDECLHLLRTDSVFKVNDGVFDIRSEEFEDYMEDPLILGDSLELELLGSKRIDGIRSI
DFERVGPWEVPVPLTVKMGALFEGRNLVQNIIVKLETKDMKVFLAGLEGYEKISDVLGNLFLHRFRTGEHLLGSEISVILQELCID
RSILLIPLSLPLPDWFAFKDCRLCFSKSRSTLMYETVGGFRFLKGRSCDDWLGGSAVEDID
(SEQ ID NO: 30)

Figure 38 (cont'd)

D. Lymphocytic choriomeningitis virus (LCMV) strain Clone13

Lymphocytic choriomeningitis virus (LCMV) strain Clone13

Source: 1-3377 Segment = S

LCMV Clone13 S-Segment

GCGCACC GGGGATCCTAGGCTTTTGGATTGCGCTTTCCTCTAGATCAACTGGGTGTGAGGCCCTATCCTACAGAAGGATGGGTCA
GATTGTGACAATGTTTGAGGCTCTGCCTCACATCATCGATGAGGTGATCAACATTGTCTATTGTGCTTATCGTGATCACGGGTA
TCAAGGCTGTCTACAATTTTGCCACCTGTGGGATATTCCGATTGATCAGTTTCTTACTTCTGGCTGGCAGGTCTGTGGCATGTAC
GGTCTTAAGGGACCCGACATTTACAAAGGAGTTTACCAATTTAAGTCAGTGGAGTTTGATATGTACATCTGAACCTGACCATGCC
CAACGCATGTTTCAGCCAACAACCTCCACCATTACATCAGTATGGGGACTTCTGGACTAGAATTGACCTTACCATGATTCATCA
TCAGTCACAACCTTTGCAATCTGACCTCTGCCTTCAACAAAAAGACCTTTGACCACACACTCATGAGTATAGTTTCGAGCCTACAC
CTCAGTATCAGAGGGAACCTCAACTATAAGGCAGTATCCTGCGACTTCAACAATGGCATAACCATCCAATACAACCTTGACATTCTC
AGATGCACAAAGTGCTCAGAGCCAGTGTAGAACCCTCAGAGGTAGAGTCTTAGATATGTTTAGAACTGCCTTCGGGGGGAATACA
TGAGGAGTGGCTGGGCTGGACAGGCTCAGATGGCAAGACCACCTGGGTGAGCCAGACGAGTTACCAATACCTGATTATACAAAAT
AGAACCTGGGAAAACCATGCACATATGCAGGCTCTTTGGGATGTCAGGATTCTCCTTTCCCAAGAGAAGACTAAGTTCTCTCAC
TAGGAGACTAGCGGGCAGATTACCTGGACTTTGTGAGACTCTTTCAGGGGTGGAGAATCCAGGTGGTTATTCGCTGACCAATGGA
TGATTCTTGCTGCAGAGCTTAAGTGTTCGGGAACACAGCAGTTCGCAAAATGCAATGTAATCATGATGAAGAATTCTGTGACATG
CTGCGACTAATTGACTACAACAAGGCTGCTTTGAGTAAAGTTCAAAGAGGACGTAGAATCTGCCTTGCACTTATTCAAAACAACAGT
GAATTCTTTGATTACAGATCAACTACTGATGAGGAACCACTTGAGAGATCTGATGGGGGTGCCAATTGCAATTAAGTTT
GGTACCTAGAACATGCAAGACCGGCGAACTAGTGTCCCAAGTGTGCTGCTGTCACCAATGGTTCTTACTTAAATGAGACCCAC
TTCAGTGACCAAATCGAACAGGAAGCCGATAACATGATTACAGAGATGTTGAGGAAGGATTACATAAAGAGGCAGGGGAGTACCCC
CCTAGCATTGATGGACCTTCTGATGTTTTCCACATCTGCATATCTAGTCAGCATCTTCTGCACCTTGTCAAAATACCAACACACA
GGCAGATAAAAGGTGGCTCATGTCCAAAGCCACACCGATTAAACCAACAAAGGAATTTGTAGTTGTGGTGCAATTAAGGTGCTGGT
GTAAAAACCTGCTGGAAAAGACGCTGAAGAACAGCGCCTCCCTGACTCTCCACCTCGAAAGAGGTGGAGAGTCAGGGAGGCCAGA
GGGTCTTAGAGTGTACAACATTTGGGCCCTCAAAAATTAGGTTCATGTGCAGAAATGTTGTGAACAGTTTTTCAGATCTGGGAGCCT
TGCTTTGGAGGCGCTTTCAAAAATGATGCAGTCCATGAGTGCACAGTGGGGGTGATCTCTTCTCTTTTGTCCCTTACTATTC
CAGTATGCATCTTACACAACCAGCCATATTTGTCCACACTTTGTCTTCTACTCCCTCGAAGCTTCCCTGGTCAATTCACATCG
ATAAGCTTAATGTCTTCTTATTCTGTGAGTCCAGAAGCTTTCTGATGTCATCGGAGCCTTGACAGCTTAGAACCATCCCTGCGG
AAGAGCACCTATAACTGACGAGGTCAACCCGGGTTGCGCATTGAAGAGGTCGGCAAGATCCATGCCGTGTGAGTACTTGAATCTT
GCTTGAATGTTTTTGATCAACGGGTTCCCTGTAAAAGTGTATGAACTGCCCCTTCTGTGGTTGGAAAATTGCTATTTCCACTGGA
TCATTAAATCTACCCTCAATGTCAATCCATGTAGGAGCGTTGGGGTCAATTCCTCCCATGAGGTCTTTTAAAGCATTGTCTGGCT
GTAGCTTAAGCCACCTGAGGTGGACCTGCTGCTCCAGGCGCTGGCCTGGGTGAATTGACTGCAGGTTTCTCGCTTGTGAGATCAA
TTGTTGTGTTTTCCCATGCTCTCCCAACATCGATGTTCTACAAGCTATGTATGGCCATCCTTCACCTGAAAGGCAAACTTTATAG
AGGATGTTTTCATAGGGTTCCTGTCCCCAAGTGGTCTGAAACAAACATGTTGAGTTTTCTCTTGGCCCCGAGAACTGCCTTCAA
GAGGTCTCGCTGTTGCTTGGCTTGATCAAAATTGACTCTAACATGTTACCCCATCCAAACAGGCTGCCCTGCCTTCACGGCAG
CACCAAGACTAAAGTTATAGCCAGAAATGTTGATGCTGGACTGCTGTTTCAGTGATGACCCCCAGAACTGGGTGCTTGTCTTTCAGC
CTTTCAAGATCATTAAAGATTGGATACTTGACTGTGTAAGCAAGCCAAAGGTCTGTGAGCGCTTGTACACGTCATTGAGCGGAGT
CTGTGACTGTTTGGCCATACAAGCCATAGTTAGACTTGGCATTGTGCCAAATTGATTGTTCAAAAGTGATGAGTCTTTCACATCCC
AACTCTTACCACACCACTTGCAACCCTGCTGAGGCTTTCTCATCCCAACTATCTGTAGGATCTGAGATCTTTGGTCTAGTTGCTGT
GTTGTTAAGTTCCCATATATACCCCTGAAGCCTGGGGCTTTTCAGACCTCATGATCTTGGCCTTCAGCTTCTCAAGGTGAGCCGC
AAGAGACATCAGTTCTTCTGCACTGAGCCTCCCACTTTCAAAACATTCTTCTTTGATGTTGACTTTAAATCCACAAGAGAATGTA
CAGTCTGGTTGAGACTTCTGAGTCTCTGTAGGTCTTTGTCTCTCTTTTCTCTCTCATGATCCTCTGAACATTGCTGACCTCA
GAGAAGTCCAACCCATTGAGAAGTTGGTTGCATCCTTAATGACAGCAGCCTTCACATCTGATGTGAAGCTCTGCAATTCTCTTCT
CAATGCTTGGCTCCATTGGAAGCTCTTAACCTCCTTAGACAAGGACATCTTGTGCTCAATGGTTCTCAAGACAAATGCGCAATC
AAATGCCTAGGATCCACTGTGCG
(SEQ ID NO: 31)

Figure 38 (cont'd)

Lymphocytic choriomeningitis virus (LCMV) strain Clone13

Source: 1-7229 Segment = L

LCMV Clone13 L-Segment

GCGCACCGGGGATCCTAGGCGTTTGTGCGCTGTTTGGTTGCACAACCTTCTTCGTGAGGCTGTGAGAAGTGGACCTGGCTGATA
GCGATGGGTCAAGGCAAGTCCAGAGAGGAGAAAGGCCAACATAGTACAAACAGGGCCGAAATCCTACAGATACCACCTATCTTGG
CCCTTTAAGCTGCAAAATCTTGCTGGCAGAAATTTGACAGCTTGGTAAGATGCCATGACCACTACCTTTGCAGGCACTGTTTAAACC
TTCTGCTGTGAGTATCCGACAGGTGTCCTCTTTGTAAATATCCATTACCAACAGATTGAAGATATCAACAGCCCCAAGCTCTCCA
CCTCCCTACGAAGAGTAACACCGTCCGGCCCCGGCCCCGACAAACAGCCAGCACAAGGGAACCGCAGCTCACCCACGCACACAG
ACACAGCACCACCAACCAAGTCCAGACACACACACACACACACAGCCACACGCGCGCCCCACCACCGGGGGGCGCCCCCCCC
GGGGGGCGGGCCCCGGGAGCCCGGGCGGAGCCCCACGGAGATGCCCATCAGTCGATGTCTCGGCCACCGACCCGCGCCAGCCAAT
CGTCGAGGACCTCCCTTGTAGTCTAAACCTGCCCCCCACTGTTTCATACATCAAAGTGCTCCTAGATTGTCTAAACCAAAGTCTG
CAATCCTTAAAGGCGAACCACTGCTGGCAAAAGCGACAGTGAATCAGCAGAATAGATCTGTCTATACATAGTTCTTGAGGATTAC
ACTTATCTCTGAAGCAACCAATGTTTACAGTCTGAACTCAGTGAATCAGGAAAGAGGTTCCCAAGGACATCACTAATCTTTTCATAGC
CCTCAAGTCTGCTAGAAAGACTTTTATGTCTTGGTCTCCAGCTTCAATGATATTTTGGACAAGGTTTCTTCTTCAAAAAGG
GCACCCATCTTTACAGTCACTGGCAGAGGCTCCCACTCAGGTCCAACCTCTCTCAAAGTCAATAGATCTAATCCCATCCAGTATTCT
TTTGGAGCCCAACAACCTCAAGCTCAAGAGAATCACCAGTATCAAGGGATCTTCCATGTAATCCTCAAACCTTTCAGATCTGATAT
CAACGACACCATCGTTCACCTTGAAGACAGAGTCTGTCTCAGTAAAGTGGAGGCATTCACTCAACATCTTCTATCTATCTCACCC
TTAAAGAGGTGAGAGCATGATAAAGTTTCAAGCCACACCTGGATTCTGTAATTTGGCACCTAACCAAGAATATCAATGAAAATTTCT
TAAACAGTCACTATTATCTGATTGTGCGTAAAGTCCACTGAAATGAAAACCTCAATACCCCTTTTGTGTAGTTGAGCATGTAGT
CCCACAGATCCTTTAAGGATTTAAATGCCCTTTGGGTTTGTCAAGCCCTGCCTAATCAACATGGCAGCATATACACACAACATCTCCC
ATTTCGTAACCAACATGAGAAATGAGTGACAAGGATCTGAGTTAATATCAATTAACACAGAGGTCAAGGAATTTAATCTGGGAC
AAATGATTGAAAGGGGCGGAGTGCCTCAGCACCATCTTCAGATGGCATCATTTCTTTATGAGGGAACCATGAAAATTTGCCTAATG
TCCTGGTTGTTGCAACAAATCTCGAACAAATGATTCAAAATACACCTGTTTAAAGAGTTCTTCGACAGATCCCTCGTGCTAACA
ACAAATTCATCAACCAGACTGGAGTCAGATCGCTGATGAGAATTTGGCAAGGTGAGAAAACAGAACAGTGAATGTTTATCCCTTTT
CCACTTAACACATGAGAAATGAGTGACAAGGATCTGAGTTAATATCAATTAACACAGAGGTCAAGGAATTTAATCTGGGAC
TCCACCTCATGTTTTTTGAGCTCATGTGACACATAAATGGAAGAAGCTGATCCTCAAAGATCTTGGGATATAGCCGCTCACAGAT
TGAATCACTTGGTTCAAATTCACCTTGTCTCCAGTAGCCTTGTGCTCAGGCTTCTTGTCTACATAATCACATGGGTTTAAAGT
CTTAAGAGTTAGGTTCTCACTGTTATTTCTCCCTTTGGTGGTTCTGTAGGACCCAAACACCCAACTCAAAGAGTTGCTCAATG
AAATACAAATGTAGTCCCAAAGAGAGGCTTAAAGGCATATATGATCACGGTGGGCTTCTGGATGAGACTGTTTGTCAACAAATG
TACAGCGTTATACCATCCGATTGCAAACTCTTGTACATGATCATCTGTGGTTAGATCCTCAAGCAGCTTTTGTATATACAGATT
TTCCCTATTTTGTCTTCTCACACACCTGCTTCTAGAGTTTGTCAAGGCTTATAAAGCCAGATGAGATACAACCTCTGGAAGGCTG
ACTTGTGATTGCTTCTGACAGCAGCTTCTGTGCACCCCTTGTGAATTTACTACAAAGTTTGTCTGGAGTGTCTTATCAATGAT
GGGATCTTTTCTCTTGGAAAGTCACTGATGGATGGAATAAACCCATCTTGTCTTAAACCATCTTAAATGGGAACATTTTCAATCAA
ATTCAACCAGTTAATCTGCTAATGATTGATCATCTTCTCAAGACCGAGGAGGTCTCCAATGAAGAATGGCCTCCTTTTTAT
CTCTGTTAAATAGGTCTAAGAAAAATTTCTTCAATTAATTCACATTTTGTAGCTTATGATGCAGTTTCTTACAGCTTTCTTACA
ACCTTTGTTTCATTAGGACACAGTTCTCTCAATGAGTCTTGTATTCTGTAACCTCTAGAACCCTCCAGCCAATCTTTCATCATCAGT
GTTGGTATTGATAGAAATGGATCCAAAGGGAATTTGGCATACTTTAGGAGGTCCAGTGTTCTCCTTTGGGATACATTTTCAATCAA
AGACTGGGACGCCATTTGCGATGGCTTGATCTGCAATTGTATCTATTGTTTCACAAAGTTGATGTGGCTCTTTACACTTGACATTG
TGTAAGCGCTCGAGATACAACTTTGTGAGAAGAGGAGCTTCTCCCCCATACATAGAACTAGATTTAAATTTGTCAGCGAACCT
CCCAGCCACACTTTTGGGCTGATAAATTTGTTTAAACAGCCGTCAGATGAGATTGGAATTTCAACAGGACACAGGACTTCTCCG
GATCACTTCAACACAGGCTCACTCAGCTCCTATCAATAAAGTCTGATCATCACTTGTATGTGAAGCTTCTTGTGCGCA
AAGATAACCAATGAGTAGTTGATGAACCTCTCGCTAAGCAAAACCATAGAAGTCAGAAGCATTATGCAAGATTCCCTGCCCAT
ATCAATAAGGCTGGATATATGGGATGGCACTATCCCCATTTCAAATATTTGTCTGAAAATTTCTCTCAGTAAACAGTTGTTTCTGAAC
CCCTGAGAAGTTTGTAGCTTGCAGTTGACATGATTTTCAATTCAGATTCACAACAGGAAGGGACCTCGACAGCTTATGCAATG
TGCCAAAGTTAAACAAAGTGCTAACATGATCTTTCCCGAACGCACATCTGGTCACTACCTAGTTTGTAGATTTTGTAGAACATTA
GAACAAAATGGGCACATCAATTGGTCCCCATTTGCTGTGATCCATCTAGTTTAAAGAACCTTCCCGACATTGATAGTCATTG
ACAAGATTGCATTTTCAAATTCCTTATCATTTGTTTAAACAGGAGCCTGAAAAGAACTTGAAAAGACTCAAATAATCTTCTATT
AACCTGTGAACATTTTGTCTCAAATCTCCAATATAGAGTTCTCTATTTCCTCCCAACCTGCTTTTATAAGATAGTGAAATTT
CAGCCTTCCAGAGTCAGGACCTACTGAGGTGATGATGTTGGTGATTCTTCTGAGTAGAAGCACAGATTTTCAAAGCAGCACTCA
TACATTGTGTCAACGACAGAGCTTTACTAAGGGACTCAGAAATTTCTTCCCTCTCACTGATTCTCACGTCTTCTCCAGTTTGTCC
CAGTCAAATTTGAAATTCAGGCTTGCCTTTGCATATGCCTGTATTTCCCTGAGTACGCATTGTCATTCTATTGCAACAGAATCAT
CTTCATGCAAGAAAACCAATCATTCTCAGAAAAGAACTTTCTACAAAGGTTTGTGCACTCTCATCGAGGCCACACTGATCTTTAA
TGACTGAGGTGAAATACAAAGGTGACAGCTCTGTGGAACCTCAACAGCCTCACAGATAAATTTTATGTCATCATTTGGTTAGACAT
GATGGGTCAAAGTCTTCTACTAAATGGAAAGATATTTCTGACAAGATAACTTTTCTTAAGTGAGGCATCTTCCCTGTTAGAATAAG
CTGTAATGATGTAGTCTTTTGTATTTGTAAGTTTCTCCATCTCCTTTGTGATTTGGCCCTCTACCTCTTGTACCGTGCTA
TTGTGGTGTTGACCTTTTCTCGAGACTTTTGAAGAAGCTGTCTCTTCTTCCATCAAACATATTTCTGCCAGGTTGTCTTCC
GATCTCCCTGTCTTCTTCTCCCTTGGAACCGATGACCAATCTAGAGACTAAGTGGAACTTTATATTATAGTCTGAGTGGCTCAA
CTTATACTTTTGTCTTCTTACGAACTCTCCGTAATTTGACTCACAGCACTAACAGCAATTTGTTAAAGTCATATTCCAGAAGTC
GTTCTCCATTTAGATGCTTATTAACCAACACACTTTTGTACTAGCAAGATCTAATGCTGTGCGCACATCCAGAGTTAGTCATGGGA
TCTAGGCTGTTTAGCTTCTTCTCTCTTGTAAATTAAGTGCAGCTTGTAAATGAAGACACCATTAGGCTAAAGGCTTCCAGATT
AACACCTGGAGTTGATGCTGACAGTCAATTTCTTACTAGTGAATCTTTCATTTGCTCATAGAACACACATTTCTTCTCAGGAG
TGATTGCTTCTTGGGGTTGACAAAAAACCAAAATGACTTTTGGGCTCAAAGAACTTTTCAAACATTTTATCTGATCTGTTAGC
CTGTGAGGGTCTCCTTTGTGATCAAAATGACACAGGTATGACACATTAACATAAATTTAAATTTTGTACTCAACACACCTTCTC
ACCAGTACCAAAATAGTTTATAGGAATCTAAGCAGCTATATACACACCTTCTCAGCAGGTGTGATCAGATCCTTCCCTCAACT
TATCCATTAATGATGTAGATGAAAATCTGACACTATTGCCATCACCATAATCTGACACTCTGTACCTGCTTTTGTATTTCTCTTT

Figure 38 (cont'd)

GTTGGGTTGGTGAGCATTAGCAACAATAGGGTCCTCAGTGCAACCTCAATGTCGGTGAGACAGTCTTTCAAATCAGGACATGATCT
AATCCATGAAATCATGATGTCTATCATATTGTATAAGACCTCATCTGAAAAAATTGGTAAAAAGAACCCTTTAGGATCTGCATAGA
AGGAAATTAAATGACCATCCGGGCCCTTGATGGAGTAGCACCTTGAAGATTCTCCAGTCTTCTGGTATAATAGGTGGTATTCTTCA
GAGTCCAGTTTTATTACTTGGCAAAACACTTCTTTGCATTCTACCACTTGATATCTCACAGACCCTATTTGATTTTGCCTTAGTCT
AGCAACTGAGCTAGTTTTTCATACTGTTTGTTAAGGCCAGACAAAACAGATGATAATCTTCTCAGGCTCTGTATGTTCTTCAGCTGCT
CTGTGCTGGGTTGGAATTGTAATCTTCAAACCTTCGTATAATACATTATCGGGTGAGCTCCAATTTTCATAAAGTTCTCAAATTCA
GTGAATGGTATGTGGCATTCTTGCTCAAGGTGTTCAGACAGTCCGTAATGCTCGAAACTCAGTCCCACCCTAACAGGCATTTTGTG
AATTTTTCGAATGAACCTCACTAATAGATGCCCTAAACAATTCCTCAAAAGACACCTTTCTAAACACCTTTGACTTTTTTCTATTCC
TCAAAGTCTAATGAACCTCTCTTTAGTGCTGTGAAAGCTTACCAGCCTATCATTCACACTACTATAGCAACAACCCACCCAGTGT
TTATCATTTTTTAACCCCTTTGAATTTGACTGTTTATCAATGAGGAAAGACACAAAACATCCAGATTTAACAACGTCTCCTTCT
AGTATTCAACAGTTTCAAACCTTCTGACTTTGTTTAAACATAGAGAGGAGCCTCTCATATTCAGTGCTAGTCTCACTTCCCCTTTCTGT
GCCCATGGGTCTCTGCAGTTATGAATCTCATCAAAGGACAGGATTCGACTGCCTCCCTGCTTAATGTTAAGATATCATCACTATCA
GCAAGTTTTTCATAGAGCTCAGAGAATTCCTTGATCAAGCCTTCAGGGTTTACTTTCTGAAAGTTCTCTTTAATTTCCCACTTTC
TAAATCTCTTCTAAACCTGCTGAAAGAGAGTTTATTCCAAAAACCACATCATCACAGCTCATGTTGGGGTTGATGCCTTCGTGGC
ACATCCTCATAATTTATCATTTGTGAGTTGACCTCGCATCTTTCAGAATTTTCATAGAGTCCATACCGGAGCGCTTGTCGATAGTA
GTCTTCAGGGACTCACAGAGTCTAAATATTGAGACTCTTCAAAGACTTTCTCATTTTGGTTAGAATACTCCAAAAGTTTGAATAA
AAGGTCTCTAAATTTGAAGTTTGCCCACTCTGGCATAAACTATTATCATATCACAACGACCATCTACTATTGGAACCTAATGTGA
CACCCGCAACAGCAAGGTCTTCCCTGATGCATGCCAATTTGTAGTGTCTCTATAAATTTCTTCTCAAACCTGGCTGGAGTGCTC
CTAACAAAACACTCAAGAAGAATGAGAGAATTGTCTATCAGCTTGTAAACCATCAGGAATGATAAGTGGTAGTCTGGGCATACAAT
TCCAGACTCCACCAAAATTTGTTCCACAGACTTATCGTCGTGGTTGTGTGTCAGCCACTCTTGTCTGCACTGTCTATTTCAATGC
AGCGTGACAGCAACTTGAGTCCCTCAATCAGAACCATTCTGGGTTCCCTTTGTCCCAGAAAGTTGAGTTTCTGCCTTGACAACCTC
TCATCCTGTTCTATATAGTTTAAACATAACTCTCTCAATTCTGAGATGATTTATCCATTGCGCATCAAAAAGCCTAGGATCCTCG
GTGCG
(SEQ ID NO: 32)

Figure 38 (cont'd)**Lymphocytic choriomeningitis virus (LCMV) strain Clone13****Source: 1-3377 Segment = S****Protein: Pre-glycoprotein polyprotein GP complex****Gene: GPC****LCMV Clone13 GPC**

ATGGGTCAGATTGTGACAATGTTTGAGGCTCTGCCTCACATCATCGATGAGGTGATCAACATTGTCATTATTGTGCTTATCGTGAT
CACGGGTATCAAGGCTGTCTACAATTTTGCCACCTGTGGGATATTCGCATTGATCAGTTTCCTACTTCTGGCTGGCAGGTCCTGTG
GCATGTACGGTCTTAAGGGACCCGACATTTACAAAGGAGTTTACCAATTTAAGTCAGTGGAGTTTGATATGTCACATCTGAACCTG
ACCATGCCCAACGCATGTTTCAAGCAACAACCTCCACCATTACATCAGTATGGGGACTTCTGGACTAGAATTGACCTTCACCAATGA
TTCCATCATCAGTCACAACCTTTTGAATCTGACCTCTGCCTTCAACAAAAAGACCTTTGACCACACACTCATGAGTATAGTTTCGA
GCCTACACCTCAGTATCAGAGGGAACTCCAACATAAGGCAGTATCCTGCGACTTCAACAATGGCATAAACCATCCAATACAACCTG
ACATTCTCAGATGCACAAAGTGCTCAGAGCCAGTGTAGAACCCTTCAGAGGTAGAGTCCTAGATATGTTTAGAACTGCCTTCGGGGG
GAAATACATGAGGAGTGGCTGGGGCTGGACAGGCTCAGATGGCAAGACCCTGGTGTAGCCAGACGAGTTACCAATACCTGATTA
TACAAAATAGAACCTGGGAAAACCACTGCACATATGCAGGTCTTTTGGGATGTCCAGGATTCTCCTTTCCCAAGAGAAGACTAAG
TTCCTCACTAGGAGACTAGCGGGCACATTACCTGGACTTTGTCAGACTCTTCAGGGGTGGAGAATCCAGGTGGTTATTGCCTGAC
CAAATGGATGATTCTTGCTGCAGAGCTTAAGTGTTCGGGAACACAGCAGTTGCGAAATGCAATGTAATCATGATGAAGAATTCT
GTGACATGCTGCGACTAATTGACTACAACAAGGCTGCTTTGAGTAAGTTCAAAGAGGACGTAGAATCTGCCTTGCACTTATTCAAA
ACAACAGTGAATCTTTGATTTAGATCAACTACTGATGAGGAACCACTTGAGAGATCTGATGGGGGTGCCATATTGCAATTACTC
AAAGTTTGTGACCTAGAACATGCAAAGACCGGCGAAACTAGTGTCCCAAGTGCTGGCTTGTCCCAATGGTTCTTACTTAAATG
AGACCCACTTCAGTGACCAAATCGAACAGGAAGCCGATAACATGATTACAGAGATGTTGAGGAAGGATTACATAAAGAGGCAGGGG
AGTACCCCCCTAGCATTGATGGACCTTCTGATGTTTCCACATCTGCATATCTAGTCAGCATCTTCCTGCACCTTGTCAAAATACC
AACACACAGGCACATAAAAGGTGGCTCATGTCCAAAGCCACACCGATTAAACCAACAAAGGAATTTGTAGTTGTGGTGCATTTAAGG
TGCCTGGTGTAAAAACCGTCTGGAAAAGACGCTGA
(SEQ ID NO: 33)

Translation =**LCMV Clone13 GPC**

MGQIVTMFEALPHIIDEVINIVIIVLIVITGIIKAVYNFATCGIFALISFLLLAGRSCGMYGLKGPDIYKGVYQFQSVEFDMSHLNL
TMPNACSAANSHHYISMGTSGLLELFTNDSII SHNFCNLTSAFNKKTFDHTLMSIVSSLHLSIRGNSNYKAVSCDFNNGITIQYNL
TFSDAQSAQSCRTFRGRVLD MFRTAFGGKYMRSWGWTGSDGKTTWCSQTSYQYLI IQNRTWENHCTYAGPFGMSRILLSQEKTK
FLTRRLAGTFTWTLSDSGVENPGGYCLTKWMILAAELKCFGN TAVAKCNVNHDEEFC DMLRLI DYNKAALS KFKEDVESALHLFK
TTVNSLISDQLLMRNLRLDLMGVPCNYSKFWYLEHAKTGETSVPKCVLVTNGSYLNETHFSDQIEQEADNMITEMLRKDYIKRQG
STPLALMDLLMFST SAYLVSI FLHLVKI PTHRHIKGGSCPKPHRLTNKGICSCGAFKVPGVKTVWKR
(SEQ ID NO: 34)

Figure 38 (cont'd)**Lymphocytic choriomeningitis virus (LCMV) strain Clone13****Source:** 1-3377 Segment = S**Protein:** Nucleoprotein**Gene:** NP**LCMV Clone13 NP**

ATGTCCTTGCTCTAAGGAAGTTAAGAGCTTCCAATGGACGCAAGCATTGAGAAGAGAATTGCAGAGCTTCACATCAGATGTGAAGGC
TGCTGTCATTAAGGATGCAACCAACCTTCTGAATGGGTTGGACTTCTCTGAGGTCAGCAATGTTGAGAGGATCATGAGGAAGGAAA
AGAGAGATGACAAAGACCTACAGAGACTCAGAAGTCTCAACCAGACTGTACATTCTTTGTGGATTTAAGTCAACATCAAAGAAG
AATGTTTGAAGTGGGGAGGCTCAGTGCAGAAGAACTGATGTCCTTGGCGCTGACCTTGAGAAGCTGAAGGCCAAGATCATGAG
GTCTGAAAGGCCCGAGGCTTCAGGGGTATATATGGGGAACCTTAACAACACAGCAACTAGACCAAAGATCTCAGATCCTACAGATAG
TTGGGATGAGAAAGCCTCAGCAGGGTGCAAGTGGTGTGGTAAGAGTTTGGGATGTGAAAGACTCATCACTTTTGAACAATCAATTT
GGCACAATGCCAAGTCTAATATGGCTTGTATGGCCAAACAGTCACAGACTCCGCTCAATGACGTTGTACAAGCGCTCACAGACCT
TGGCTTGTCTTACACAGTCAAGTATCCAAATCTTAATGATCTTGAAAGGCTGAAAGACAAGCACCCAGTCTGGGGGTCACTCATG
AACAGCAGTCCAGCATCAACATTTCTGGCTATACTTTAGTCTTGGTGTGCGGTGAAGGCAGGGGCAGCCCTGTTGGATGGGGGT
AACATGTTAGAGTCAATTTTGATCAAGCCAAGCAACAGCGAGGACCTCTTGAAGGCAGTCTCGGGGCCAAGAGAAAACCTCAACAT
GTTTGTTCAGACCAAGTTGGGGACAGGAACCCCTTATGAAAACATCCTCTATAAAGTTTGCCCTTCAGGTGAAGGATGGCCATACA
TAGCTTGTAGAACATCGATTGTGGGGAGAGCATGGGAAAACACAACAATTGATCTCACAGCGAGAAACCTGCAGTCAATTCAACCC
AGGCCAGCGCTGGAGCAGCAGGTCCACCTCAGGTGGGCTTAAGTACAGCCAGACAATGCTTTTAAAGACCTCATGGGAGGAAT
TGACCCCAACGCTCCTACATGGATTGACATTGAGGGTAGATTTAATGATCCAGTGGAAATAGCAATTTTCAACCCACAGAACGGGC
AGTTCATACACTTTTACAGGGAACCCGTTGATCAAAAACAATTCAAGCAAGATTCCAAGTACTCACACGGCATGGATCTTGCCGAC
CTCTCAATGCGCAACCCGGGTTGACCTCGTCAGTTATAGTGTCTTCCGCGAGGGGATGGTTCTAAGCTGTCAAGGCTCCGATGA
CATCAGAAAGCTTCTGGACTCACAGAATAGGAAGGACATTAAGCTTATCGATGTTGAAATGACCAGGGAAGCTTCGAGGGAGTATG
AAGACAAAGTGTGGGACAAATATGGCTGGTGTGTAAAGATGCATACTGGAATAGTAAGGGACAAAAGAGAAAGAGATCACCCCG
CACTGTGCACTCATGGACTGCATCATTTTTGAAAGCGCCTCCAAAGCAAGGCTCCAGATCTGAAAACCTGTTCAACATTTCTGCC
ACATGACCTAATTTTGTAGAGGCCCAATGTTGTGACACTCTAA
(SEQ ID NO: 35)

Translation =**LCMV Armstrong NP**

MSLSKEVKSFWQTQALRRELQSFTSDVKAIVKIDATNLLNGLDFSEVSNVQIRMRKEKRDDKDLQRLRLSNQTVHSLVDLKSTSKK
NVLKVGRLSAEELMSLAADLEKLKAKIMRSERPQASGVYMGNLTTQQLDQRSQILQIVGMRKPQQGASGVVRVWDVKDSLLNNQF
GTMPSLTMACMAKQSQTPLNDVVQALDGLLYTVKYPNLNDLERLKDHPVLGVITEQQSSINISGYNFSLGAAVKAGAAALLDGG
NMLESILIKPSNSEDLLKAVLGAKRKLNMFVSDQVGDRNPYENILYKVCLSGEGWPYIACRTSIVGRAWENTTIDLTSEKPAVNSP
RPAPGAAGPPQVGLSYSQTMMLKDLMGGIDPNAPTWIDIEGRFNDPVEIAIFQPQNGQFIHFYREFVDQKQFKQDSKYSHGMDLAD
LFNAQPGLTSSVIGALPQGMVLSQCGSDDIRKLLDSQNRKDIKLIDVEMTREASREYEDKVWDKYGWLCKRMHTGIVRDKKKKEITP
HCAIMDCIIFESASKARLPDLKTVHNLPHDLIFRGNPVVTL
(SEQ ID NO: 36)

Lymphocytic choriomeningitis virus (LCMV) strain Clone13**Source:** 1-7229 Segment = L**Protein:** RING finger protein Z**Gene:** ZP**LCMV Clone13 ZP**

ATGGGTCAAGGCAAGTCCAGAGAGGAGAAAGGCACCAATAGTACAACAGGGCCGAAATCCTACCAGATACCACCTATCTTGGCCC
TTTAAGCTGCAAATCTTGCTGGCAGAAATTTGACAGCTTGGTAAGATGCCATGACCACTACCTTTGCAGGCACTGTTTAAACCTTC
TGCTGTCAGTATCCGACAGGTGTCTCTTTGTAAATATCCATTACCAACCAGATTGAAGATATCAACAGCCCCAAGCTCTCCACCT
CCCTACGAAGAGTAA
(SEQ ID NO: 37)

Translation =**LCMV Clone13 ZP**

MGQGSREEKGTNSTNRAEILPDTTYLGPLSCKSCWQKFDLSVRCHDHYLCRHCLNLLLSVSDRCPLCKYPLPTRLKISTAPSSPP
PYEE
(SEQ ID NO: 38)

Figure 38 (cont'd)

Lymphocytic choriomeningitis virus (LCMV) strain Clone13

Source: 1-7229 Segment = L

Protein: RNA-directed RNA polymerase L

Gene: LP

LCMV Clone13 LP

ATGGATGAAATCATCTCAGAATTGAGAGAGTTATGTTTAACTATATAGAACAGGATGAGAGGTTGTCAAGGCAGAACTCAACTT
TCTGGGACAAAGGGAAACCCAGAATGGTTCTGATTGAGGGACTCAAGTTGCTGTCACGCTGCATTGAAATAGACAGTGCAGACAAGA
GTGGCTGCACACACAACCACGACGATAAGTCTGTGGAAACAATTTTGGTGGAGTCTGGAATTGTATGCCAGGACTACCACTTATC
ATTCTGTAGAGGTTACAAGCTGATAGACAATCTCTCATTCTTCTGGAGTGTGTTGTAGGAGCACTCCAGCCAGTTTGGAGAAGAA
ATTTATAGAGGACACTAACAAATTTGGCATGCATCAGGGAAGACCTTGCTGTTGCGGGTGTACATTAGTTCAAATAGTAGATGGTC
GTTGTGATTATGATAATAGTTTATGCCAGAGTGGGCAAACTTCAAATTTAGAGACCTTTTATTCAAACCTTTTGGAGTATTCTAAC
CAAAATGAGAAAGTCTTTGAAGAGTCTGAATATTTTAGACTCTGTGAGTCCCTGAAGACTACTATCGACAAGCGCTCCGGTATGGA
CTCTATGAGAGGCTCCTCTCTATGTTAAACAAAGTCAAGTCAAAATGATGAAATTTAGAGGATGTGCCACGAAGGCATCAACCCCAACATGA
GCTGTGATGATGTGGTTTTTGAATAAACTCTCTTTTCAGCAGGTTTAGAAGAGATTTAGAAAGTGGGAAATTAAGAGAAACTTT
CAGAAAGTAAACCTTGAAGGCTTGATCAAGGAATCTCTGAGCTCTATGAAAACCTTGCTGATAGTGATGATATCTTAACATTAAAG
CAGGGAGGCAGTCAATCCTGTCTTTGATGAGATTCACTAAGTGCAGAGACCCATGGGCACGAAAGGGGAAGTGAAGTACGACTG
AATATGAGAGGCTCCTCTCTATGTTAAACAAAGTCAAGTCAAAATGATGAAATTTAGAGGATGTGCCACGAAGGCATCAACCCCAACATGA
GTTTTGTGTCTTTCTCATTGATAAAACAGTCAAAATCAAAGGGTTAAAAATGATAAACACTGGGTGGGTTGTTGCTATAGTAG
TGTGAATGATAGGCTGGTAAGCTTTACAGCACTAAAGAGGAGTTCATTAGACTTTTGGGAATAGAAAAAGTCAAAGTGTGTTA
GAAAGGTGTCTTTGAGGAATGTTTAGGGCATCTATTAGTGAGTTCATTGCAAAATTCAAAAATGCCTGTAGTGGTGGGACTG
AGTTTCGAGAAATCTTCAAGGTGCTACTCCATACAAGGCCCGGATGGTCATTAAATTTCTTCTATGCAGAGCTCTAAAAGGTTCTTTT
AGCTCACCCGATAATGTATTATACGAAGTTTGAAGATTACAATTTCAACCCAGCACAGAGCAGTGAAGAATACAGAGCCTGA
GAAGATTATCATCTGTTGTCTGGCTTAACAAACAGTATGAAAACCTAGCTCAGTTGCTAGACTAAGGCAAAATCAAATAGGGTCT
GTGAGATATCAAGTGGTAGAATGCAAGAAGTGTGTTGCCAAGTAATAAACTGGACTCTGAAGAATACCACTATTATACCAGAA
GACTGGAGAATCTTCAAGGTGCTACTCCATACAAGGCCCGGATGGTCATTAAATTTCTTCTATGCAGAGCTCTAAAAGGTTCTTTT
TACCAATTTTTTCAGATGAGGTCTTATACAATATGATAGACATCATGATTTTATGGATTAGATCATGTCCTGATTGAAAGACTGT
CTCACCGACATTGAGGTTGCACTGAGGACCTATTGTTGCTAATGCTCACCACCCCAACAAAGAGAAATCAAAGCAGGTACAGAG
TGTCAGATATTTGGTGATGGCAATAGTGTGAGATTTTTCATCTACATCATTAATGGATAAGTTGAGGGAGGATCTGATCACACCTG
CTGAGAAGGTGGTGATAAGCTGCTTAGATTCTTAATAAAACCTATTTTGGTACTGGTGAGAAGGTGTTGTTGAGTGCAAAATTT
AAATTTATGTTGAATGTGTACATCTGTGTCATTTGATCACAAGGAGACCCCTGACAGGCTAACAGATCAGATAAAATGTTTTGA
AAAGTCTTTGAGCCCAAAAGTCAATTTGGTTTTTTTGTCAACCCCAAGGAAGCAATCACTCCTGAGGAAGAATGTGTGTTCTATG
AGCAATGAAGAGATTCACTAGTAAAGAAATGACTGTGAGCATACACTCCAGGTGTTAATCTGGAAGCCTTTAGCCTAATGGTG
TCTTCATTTTAAACACGGCACTTTAATTTTCAAAGGAGAGAGAAAGGCTCAACACCAATAGCAGGTTACAGAGGTTAGGAGGG
AGCATTAGATCTTGCTAGTAACAAAAGTGTGGTGGTTAATAAGCATCTAAATGGAGAACGACTTCTGGAATATGACTTTAACAAAT
TGCTTGTTAGTGCTGTGAGTCAAAATACGGAGAGTTTCGTAAGAAAACAAAAGTATAAGTTGAGCCACTCAGACTATGAATATAAA
GTTTCCAAGTTAGTCTCTAGATTGGTCATCGGTTCCAAGGAGAGAGACAGGGAGATCGGAAGCAACCTGGCAGAAATATGTTT
TGATGAGAGAAGAGAGACAGGCTTCTTCAAAGTCTCGAAGAAAAGGCTCAACACCAATAGCAGGTTACAGAGGTTAGGAGGG
CCAATGACAAAGGAGATGGAGAAAACTTACAAATACAAAAGGACTACATCATTTACAGCTTATTCTAACAGGGAAGATGGCTCAC
TTAAGAAAAGTTATCTTGTGAGAAATATCTTTCCATTTAGTAGAAGACTTTGACCCATCATGTCTAACCAATGATGACATGAAAT
TATCTGTGAGGCTGTTGAGGGTTCCACAGAGCTGTCACCTTTGTATTTTACCTCAGTCATTAAAGATCAGTGTGGCTCGATGAGA
TGGCAAAAACCTTTGTAGAAAGTTCTTTTCTGAGAAATGATGGTTTCTGATGAGAGATGATTTCTGTTGCAATGAATGCAAT
GCGTACTCAGGGAATACAGGCATATGCAAGGCAAGGCTTGAATTTCAAATTTGACTGGGACAACTGGAAGAGAGCTGAGAAAT
CAGTGAGAGGGAAGTAATCTGAGTCCCTTAGTAAAGCTCTGTGCTGTGACACAAATGATGAGTGTGCTTTGAAAAATCTGTGCT
TCTACTCAGAAAGATCACAACATCATACACCTCAGTAGGCTCTGACTCTGGAAGGCTGAAATTTGCACTATCTTATAAAGAGCAG
GTTGGGGGAAATAGAGAATCTATATTGGAGATTGAGGACAAAAATGTTTCAAGGTTAATAGAAGATTATTTTGAGTCTTTTTC
AAGTTTCTTTTCAGGCTCCTGTTTAAACAATGATAAGGAATTTGAAAATGCAATCTTGTCAATGACTATCAATGTGCGGGAGGGT
TCTTAACTATAGTATGGATCACAGCAAAATGGGGACCAATGATGTGCCCATTTTGTCTTAAATGTTTCTACAAAATCTCAAACTA
GGTGATGACCAGTATGTGCTTCCGGGAAAGATCATGTTAGCACTTTGTTAACTTGGCACATGCATAAGCTTGTGAGGTCCTCTT
TCCTGTTGTGAATGCAATGATGAAATCATATGTCAAGTCGAAGCTAAACTTCTCAGGGGTTGAGAAACAACTGTTACTGAGAGAA
TTTTGAGACAATATTTTGAATGGGGATAGTGCCATCCCATATATCCAGCCTTATGATATGGGGCAGGGAATCTTGCAATATGCT
TCTGACTTCTATGGTTTCTTAGCGAGAGGTTTATCAACTACTGCATTGGTGTATCTTTGGCGAAAGACCAGAGGCTTACACATC
AAGTGATGATCAGATCACTTTATTTGATAGGAGGCTGAGTGACCTGGTTGTAAGTGATCCGGAGGAAGTCTTGTCTGTTGGAAT
TCCAATCTCATCTGAGCGGCTTGTAAACAAATTTATCAGCCAAAAAGTGTGGCTGGGAGGTTGCTGCAAGATTTAAATCTAGA
TTCTATGTATGGGGGAGGAAGTCCCTCTTCTCAGAAAGTTGTATCTGCAGCGCTACACAATGTCAAGTGTAAGAGGCCACATCA
ACTTTGTGAAACAATAGATACAATTCAGATCAAGCCATCGCAATGGCGTCCAGTCTCCCTAGTTAATAGTATCCAAGGAGAA
CACTGGACCTCTAAAGTATGCCAATTTCCCTTTGGATCCATTTCTACTGAATACCAACACTGATGTGAAAGATTGGCTGGATGGT
TCTAGAGGTTACAGAATACAAAGACTCATTGAGGAAGTGTGCTTAATGAAACAAAGGTTGTAAGAAAGCTTGAAGGAACTGCA
TCATAAGCTCAAAAATGGTGAATTTAATGAAGAAATTTTCTTAGACCTATTTAAGAGAGATAAAAGGAGGCCATCTTCAATTGG
GAGACCTCCTCGGTCTTGAAGAAGATCTGAATCAGTTAGCAGATGTTAACTGGTTGAATTTGAATGAAATGTTCCCATTAAGGATG
GTTTTAAGACAAAAGGTGGTTTATCCATCAGTGATGACTTTCAGAGGAAAGAAATCCCATCATGATCAAGACACTCCAGAACAA
ACTTTGTAGTAAATTCACAAGGGGTGCACAGAAGCTGCTGTGAGAAGCAATCAACAAGTCAGCTTTCCAGAGTTGTATCTCATCTG
GCTTTATAGGCTTTGCAAACTCTAGGAAGCAGGTGTGTGAGAAACAAAATAGGGAAAATCTGTATATCAAAAAGCTGCTTGAG
GATCTAACACAGATGATCATGTGACAAGAGTTTGAATCGGGATGGTATAACGCTGTACATTTGTGACAAACAGTCTCATCCAGA
AGCCACCGCTGATCATATATGCTTTTAAAGCCTCTTCTTGGGACTACATTTGTATTTTATTGAGCACTCTTTTGGTGGGTG
TTTGGGTCTAGCAGAACCGACCAAGGGAAGAATAACAGTGAGAACCTAACTCTTAAGCACTTAAACCCATGTGATTATGTAGCA

Figure 38 (cont'd)

AGAAAGCCTGAGAGCTCAAGGCTACTGGAGGACAAAGTGAATTTGAACCAAGTGATTCAATCTGTGAGGCGGCTATATCCCAAGAT
CTTTGAGGATCAGCTTCTTCCATTTATGTCTGACATGAGCTCAAAAAACATGAGGTGGAGTCCCAGAATTAATTCCTTGACCTCT
GTGTTTAAATGATATTAACCTCAGAATCCTTGTCACCTCATTTCTCATGTTGTTAAGTGGAAAAGGGATGAACATTACACTGTTCTG
TTTTCTGACCTTGCCAAATCTCATCAGCGATCTGACTCCAGTCTGGTGTATGAATTTGTTGTTAGCACGAGGGATGTCTGCAAGAA
CTTCTTAAACAGGTGATTTTGAATCATTGTTTCGAGAATTTGTTGCAACAACAGGACATTAGGCAATTTTTCATGGTTCCTTC
ATAAAGAAATGATGCCATCTGAAGATGGTGTGAGGCACTGGGCCCTTTCAATCATTGTCTCAAAGGTGGTGAACAAAAATGTG
GAGAGGCCTATGTTTAGGAATGATTGTCAGTTTGGTGGTGGTGGTCTTACCGAATGGGAGATGTTGTGTGAATGCTGCCAT
GTTGATTAGGCAGGGCTGACAAACCCAAAGGCATTTAAATCCTTAAAGGATCTGTGGGACTACATGCTCAACTACACAAAAGGGG
TATTGGAGTTTTCATTTTCACTGGACTTTACGCACAATCAGAATAATACTGACTGTTTAAAGGAAATTTTCATTGATATTCTTGGTT
AGGTGCCAATTACAGAATCCAGGTGTGGCTGAACTTTTATCATGCTCTCACCTCTTTAAGGGTGAGATAGATAGAAGAATGTTGGA
TGAATGCCTCCACTTACTGAGGACAGACTCTGTCTTCAAGGTGAACGATGGTGTCTTGTATATCAGATCTGAAGAGTTTGGAGATT
ACATGGAAGATCCCTTGATACTTGGTGATTCTCTTGAGCTTGAGTTGTTGGGCTCCAAAAGAATACTGGATGGGATTAGATCTATT
GACTTTGAGAGAGTTGGACCTGAGTGGGAGCCTGTGCCACTGACTGTAAAGATGGGTGCCCTTTTGAAGGAAGAAACCTTGCCA
AAATATCATTTGTGAAGCTGGAGACCAAGGACATGAAAGTCTTTCTAGCAGGACTTGAGGGCTATGAAAAGATTAGTGATGTCCTTG
GGAACCTCTTCTGTCATCGATTGAGAACTGGTGAACATTTGTTGGGTTCAGAGATAAGTGAATCCTCCAGGAATATGTATAGAC
AGATCTATTCTGCTGATTCCACTGTCGCTTTTGCCAGACTGGTTCGCCTTTAAGGATTGCAGACTTTGTTTTAGCAAATCTAGGAG
CACTTTGATGTATGAAACAGTGGGGGGCAGGTTTAGACTCAAGGGGAGGTCTGCGACGATTGGCTGGGCGGGTCCGTTGGCCGAGG
ACATCGACTGA
(SEQ ID NO: 39)

**Translation =
LCMV Clone13 LP**

MDEIISELRELCLNIYEQDERLSRQKLNFLGQREPRMVLIEGLKLLSRCIEIDSAADKSGCTHNHDDKSVETILVESGIVCPGLPLI
IPDGYKLIDNSLILLECFVRSTPASFEKKFIEDTNKLACIREDLAVAGVTLVPIVDGRCDYDNSFMPWEANFKFRDLLFKLEYSN
QNEKVFEESEYFRLCESLKTIDKRSMDSMKILKDARSTHNDIMRMCHEGINPNMSCDDVVFGINSLSFRFRDLESGLKLRNF
QKVNPEGLIKEFSELYENLADSDILTLREAVESCLPMRFITAEHGHGSETSTEYERLLSMLNKVSKLKLNTRRRQLNLND
VLCLSSLIKQSKFKGLKNDKHVWGCCYSSVNDRLVSFHSSTKEEFIRLLRNRRKSKVFRKVSFEELFRASISEFIAKIQKCLLVVGL
SFEHYGLSEHLEQECHIPFTEFENFMKIGAHPIMYTTFEDYNFQFSTEQLKNIQSLRRLSSVCLALTNMKTSSVARLRQNIQS
VRYQVVECKEVFCQVIKLDSEEHLLYQKTGESSRCYSIQGPDGHLISFYADPKRFFLPISFDEVLYNMIDIMISWIRSCPDLKDC
LTDIEVALRLLLLMLTNPTKRNQKQVQSVRYLVMAIVSDFSSTSLMDKLREDLITPAEKVVYKLLRFLIKTIFGTGEKVLLSAKF
KFMLNVSYLCHLITKETPDRLTQIKCFEKFEPKSFQFGFFVNPKEAITPEEECVFYEQMKRFTSKEIDCQHTTTPGVNLEAFSLMV
SSFNNGTLIFKGEKLNLSLDPMTNSGCATALDLASNSKSVVNKHLNGERLLEYDFNKLLVSAVSQITESFVRKQKYKLSHSDYEYK
VSKLVSRLVIGSKGEETGRSEDNLAEICFDGEEETSFFKSLEEKVNTTIARYRRGRRANDKGDGEKLTNTKGLHHLQLILTGKMAH
LRKVILSEISFHLVEDFDPSCLTNDMDKFICEAVEGSTELSPLYFTSVIKDQCGLDEMAKNLCRKFSENDWFSCMKMILLQMNAN
AYSGKYRHMQRQGLNFKFDWDKLEEDVRIERESNSSESLSKALSITQCMSAALKNLCFYSEESPTSYTSVGPDSGRLLKFAFSYKEQ
VGGNRELYIGDLRTKMFTRLIEDYFESFSFFSGSCLNNDKEFENAILSMTINVREGFLNYSMDHSHKWGPMMCPFLFLMFLQNLKL
GDDQYVRSGKDHVSTLLTWHMHKLVEVFPFVNNAMKSYVSKLKLRLRGSETTVTERIFRQYFEMGIVPSSHISLIDMGQGIHNA
SDFYGLLSERFINYCI GVI FGERPEAYTSSDDQITLFDRLSDLVSDPEEVLVLEFQSHLSGLLNKFISPKSVAGRFEEFKSR
FYVWGEVPLLTKFVSAALHNKCKEPHQLCETIDTADQAIANGVPVSLVNSIQRRTLDDLKYANFPLDFLLNTNTDVKDWDLG
SRGYRIQRLIEELCPNETKVVVRKLVKRLHHKLKNGEFNEEFFLDLFNRDKKEAILQLGDLGLLEEDLNQLADVNWNLNEMFPLRM
VLRQKVVPVPMVTQEERIPSLIKTLQNKLCCKFTRGAQKLLSEAINKSAFQSCISSGFIGLCKTLGSRVNRKNRENLYIKKLE
DLTTDDHVTRVCNRDITLYICDKQSHPEAHRDHICLLRPLLDWDYICISLSNSFELGVVWLAEPKKGKNSSENLTCLKHLPNCDYVA
RKPESSRLLEDKVNLNQVIQSVRRLYPKIFEDQLLPFMSDMSKMNRRSPRIKFLDLCLVIDINSESLSHIVVKWKRDEHYTVL
FSDLANSHQSDSSLVDEFVSTRDVCKNFLKQVYFESFVREFVATRTTLGNFSWFFPKEMMPSEDGAELGPFQSFVSKVNNKNV
ERPMPFRNDLQFGFWFSYRMGDVVCNAAMLIRQGLTNPKAFKSLKDLWDYMLNNTKGVLEFSISVDFTHNQNNTDCLRKFSLI FLV
RCQLQNPVGAELLSCSHLFKEIDRRMLDECLHLLRTDSVFKVNDGVFDIRSEEFEDYMEDPLILGDSLELELLGSKRILDGIRSI
DFERVGPWEVPVPLTVKMALFEGRNLVQNIIVKLETKDMKVFLAGLEGYEKISDVLGNLFLHRFRTGEHLLGSEISVILQELCID
RSILLIPLSLPLPDWFAFKDCRLCFKSRSTLMYETVGGFRFLKGRSCDDWLGGSAVEDID
(SEQ ID NO: 40)