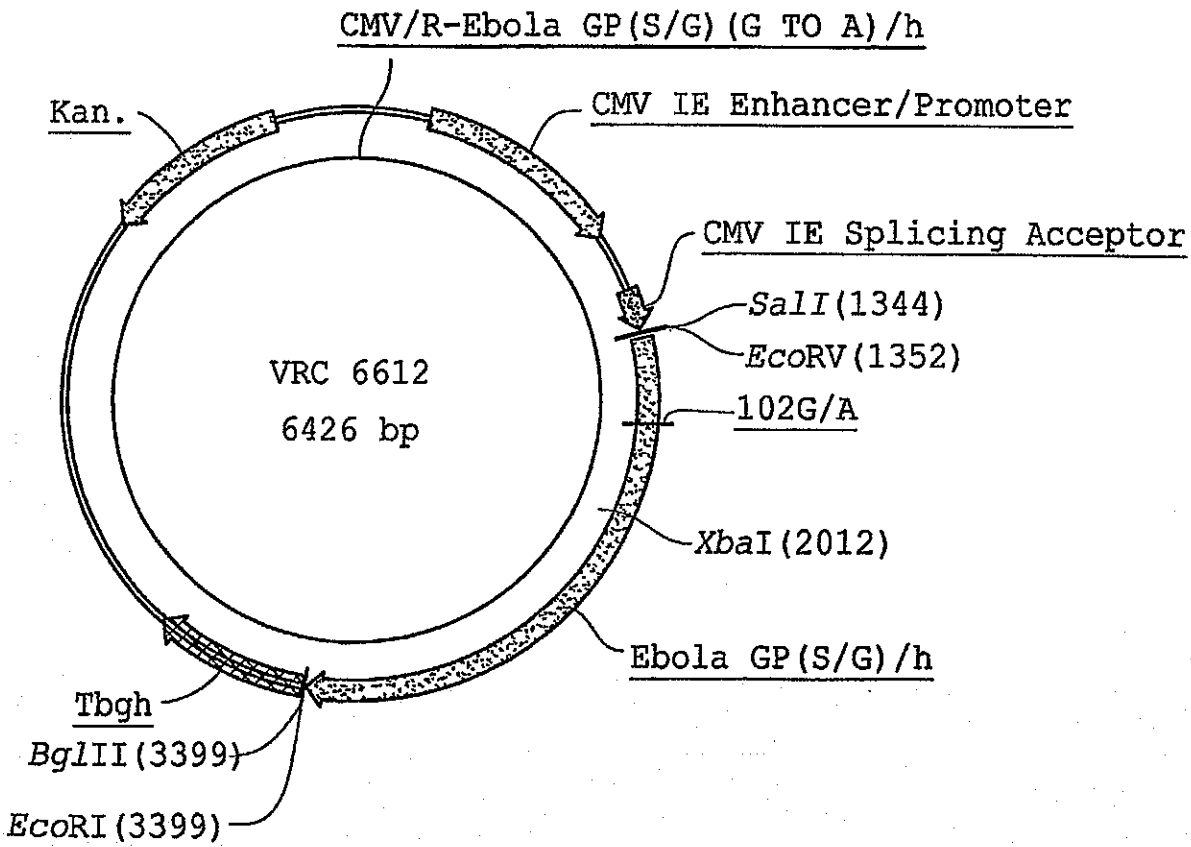

CMV/R-Ebola GP(S/G)(G TO A)/h
Kan.
CMV IE Enhancer/Promoter
CMV IE Splicing Acceptor
SalI(1344)
EcoRV(1352)
102G/A
VRC 6612
6426 bp
XbaI(2012)
Ebola GP(S/G)/h
Tbgh
BglII(3399)
EcoRI(3399)

FIG. 1A

FIG. 1B-1

VRC 6612 (SEQ ID NO: 1)

1 tcgcgcgttt cggtgatgac ggtgaaaacc tctgacacat gcagctcccg gagacggtca
61 cagcttgtct gtaagcggat gccgggagca gacaagcccg tcagggcgcg tcagcgggtg
121 ttggcgggtg tcggggctgg cttaactatg cggcatcaga gcagattgta ctgagagtgc
181 accatatgcg gtgtgaaata ccgcacagat gcgtaaggag aaaataccgc atcagattgg
241 ctattggcca ttgcatacgt tgtatccata tcataatatg tacatttata ttggctcatg
301 tccaacatta ccgccatgtt gacattgatt attgactagt tattaatagt aatcaattac
361 ggggtcatta gttcatagcc catatatgga gttccgcgtt acataactta cggtaaatgg
421 cccgcctggc tgaccgccca acgacccccg cccattgacg tcaataatga cgtatgttcc
481 catagtaacg ccaataggga ctttccattg acgtcaatgg gtggagtatt tacggtaaac
541 tgcccacttg gcagtacatc aagtgtatca tatgccaagt acgcccccta ttgacgtcaa
601 tgacggtaaa tggcccgcct ggcattatgc ccagtacatg accttatggg actttcctac
661 ttggcagtac atctacgtat tagtcatcgc tattaccatg gtgatgcggt tttggcagta
721 catcaatggg cgtggatagc ggtttgactc acggggattt ccaagtctcc accccattga
781 cgtcaatggg agtttgtttt ggcaccaaaa tcaacgggac tttccaaaat gtcgtaacaa
841 ctccgccccа ttgacgcaaa tgggcggtag gcgtgtacgg tgggaggtct atataagcag
901 agctcgttta gtgaaccgtc agatcgcctg gagacgccat ccacgctgtt ttgacctcca
961 tagaagacac cgggaccgat ccagcctcca tcggctcgcá tctctccttc acgcgccccgc
1021 cgccctacct gaggccgcca tccacgccgg ttgagtcgcg ttctgccgcc tcccgcctgt
1081 ggtgcctcct gaactgcgtc cgccgtctag gtaagtttaa agctcaggtc gagaccgggc
1141 ctttgtccgg cgctcccttg gagcctacct agactcagcc ggctctccac gctttgcctg
1201 accctgcttg ctcaactcta gttaacggtg gagggcagtg tagtctgagc agtactcgtt
1261 gctgccgcgc gcgccaccag acataatagc tgacagacta acagactgtt cctttccatg
1321 ggtcttttct gcagtcaccg tcgtcgacga tatcgccgcc atggagggcc tgagcctgct
1381 gcagctgccc agggacaagt tcaggaagag cagcttcttc gtgtgggtga tcatcctgtt
1441 ccagaaggcc ttcagcatgc ccctgggcgt ggtgaccaac agcaccctgg aggtgaccga
1501 gatcgaccag ctggtgtgca aggaccacct ggccagcacc gaccagctga agagcgtggg
1561 cctgaacctg gagggcagcg gcgtgagcac cgacatcccc agcgccacca agaggtgggg
1621 cttcaggagc ggcgtgcctc ccaaggtggt gagctacgag gccgccgagt gggccgagaa
1681 ctgctacaac ctggagatca agaagcccga cggcagcgag tgcctgcctc ctcctcctga
1741 cggcgtgagg ggcttcccca ggtgcaggta cgtgcacaag gcccagggca ccggcccctg
1801 ccccggcgac tacgccttcc acaaggacgg cgccttcttc ctgtacgaca ggctggccag
1861 caccgtgatc tacaggggcg tgaacttcgc cgagggcgtg atcgccttcc tgatcctggc
1921 caagcccaag gagaccttcc tgcagagccc tcccatcagg gaggccgtga actacaccga
1981 gaacaccagc agctactacg ccaccagcta tctagagtac gagatcgaga acttcggcgc
2041 ccagcacagc accaccctgt tcaagatcga caacaacacc ttcgtgaggc tggacaggcc
2101 ccacacccct cagttcctgt tccagctgaa cgacaccatc cacctgcacc agcagctgag
2161 caacaccacc ggcaggctga tctggaccct ggacgccaac atcaacgccg acatcggcga
2221 gtgggccttc tgggagaaca agaagaacct gagcgagcag ctgaggggcg aggagctgag
2281 cttcgaggcc ctgagcctga acgagaccga ggacgacgac gccgccagca gcaggatcac
2341 caagggcagg atcagcgaca gggccaccag gaagtacagc gacctggtgc ccaagaacag
2401 ccccggcatg gtgcccctgc acatccccga gggcgagacc accctgcccа gccagaacag
2461 caccgagggc aggagggtgg gcgtgaacac ccaggagacc atcaccgaga ccgccgccac
2521 catcatcggc accaacggca accacatgca gatcagcacc atcggcatca ggcccagcag
2581 cagccagatc cccagcagca gccccaccac cgcccctagc cccgaggccc agacccccac
2641 cacccacacc agcggaccca gcgtgatggc caccgaggag cccaccaccc ctcccggcag
2701 cagccccgga cccaccaccg aggcccctac cctgaccacc cctgagaaca tcaccaccgc
2761 cgtgaagacc gtgctgcccc aggagagcac cagcaacggc ctgatcacca gcaccgtgac
2821 cggcatcctg ggcagcctgg gcctgaggaa gaggagcagg aggcagacca acaccaaggc
2881 caccggcaag tgcaacccca acctgcacta ctggaccgcc caggagcagc acaacgccgc
2941 cggcatcgcc tggattccct acttcggccc cggcgccgag ggcatctaca ccgagggcct

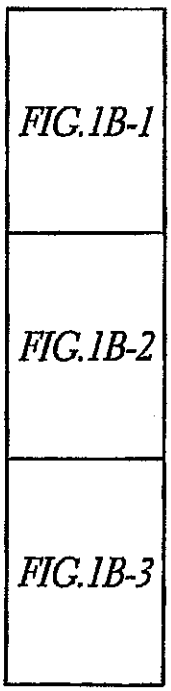
FIG. 1B-2

3001 gatgcacaac cagaacgccc tggtgtgcgg cctgaggcag ctggccaacg agaccaccca
3061 ggccctgcag ctgttcctga gggccaccac cgagctgagg acctacacca tcctgaacag
3121 gaaggccatc gacttcctgc tgaggaggtg gggcggcacc tgcaggattc tgggccccga
3181 ctgctgcatc gagccccacg actggaccaa gaacatcacc gacaagatca accagatcat
3241 ccacgacttc atcgacaacc ctctgcccaa ccaggacaac gacgacaact ggtggaccgg
3301 ctggcggcag tggatacctg ccggcatcgg catcaccggc atcatcatcg ccatcatcgc
3361 tctgctgtgc gtgtgcaagc tgctgtgctg agaattcaga tctacacgat ctgctgtgcc
3421 ttctagttgc cagccatctg ttgtttgccc ctccccccgtg ccttccttga ccctggaagg
3481 tgccactccc actgtccttt cctaataaaa tgaggaaatt gcatcgcatt gtctgagtag
3541 gtgtcattct attctggggg gtggggtggg gcaggacagc aagggggagg attgggaaga
3601 caatagcagg catgctgggg atgcggtggg ctctatgggt acccaggtgc tgaagaattg
3661 acccggttcc tcctgggcca gaaagaagca ggcacatccc cttctctgtg acacaccctg
3721 tccacgcccc tggttcttag ttccagcccc atcatagga cactcatagc tcaggagggc
3781 tccgccttca atcccacccg ctaaagtact tggagcggtc tctccctccc tcatcagccc
3841 accaaaccaa acctagcctc caagagtggg aagaaattaa agcaagatag gctattaagt
3901 gcagagggag agaaaatgcc tccaacatgt gaggaagtaa tgagagaaat catagaattt
3961 taaggccatg atttaaggcc atcatggcct taatcttccg cttcctcgct cactgactcg
4021 ctgcgctcgg tcgttcggct gcggcgagcg gtatcagctc actcaaaggc ggtaatacgg
4081 ttatccacag aatcagggga taacgcagga aagaacatgt gagcaaaagg ccagcaaaag
4141 gccaggaacc gtaaaaaggc cgcgttgctg gcgtttttcc ataggctccg cccccctgac
4201 gagcatcaca aaaatcgacg ctcaagtcag aggtggcgaa acccgacagg actataaaga
4261 taccaggcgt ttcccccctgg aagctccctc gtgcgctctc ctgttccgac cctgccgctt
4321 accggatacc tgtccgcctt tctcccttcg ggaagcgtgg cgctttctca tagctcacgc
4381 tgtaggtatc tcagttcggt gtaggtcgtt cgctccaagc tgggctgtgt gcacgaaccc
4441 cccgttcagc ccgaccgctg cgccttatcc ggtaactatc gtcttgagtc caacccggta
4501 agacacgact tatcgccact ggcagcagcc actggtaaca ggattagcag agcgaggtat
4561 gtaggcggtg ctacagagtt cttgaagtgg tggcctaact acggctacac tagaagaaca
4621 gtatttggta tctgcgctct gctgaagcca gttaccttcg gaaaaagagt tggtagctct
4681 tgatccggca aacaaaccac cgctggtagc ggtggttttt ttgtttgcaa gcagcagatt
4741 acgcgcagaa aaaaaggatc tcaagaagat cctttgatct tttctacggg gtctgacgct
4801 cagtggaacg aaaactcacg ttaagggatt ttggtcatga gattatcaaa aaggatcttc
4861 acctagatcc ttttaaatta aaaatgaagt tttaaatcaa tctaaagtat atatgagtaa
4921 acttggtctg acagttacca atgcttaatc agtgaggcac ctatctcagc gatctgtcta
4981 tttcgttcat ccatagttgc ctgactcggg gggggggggc gctgaggtct gcctcgtgaa
5041 gaaggtgttg ctgactcata ccaggcctga atcgccccat catccagcca gaaagtgagg
5101 gagccacggt tgatgagagc tttgttgtag gtggaccagt tggtgatttt gaacttttgc
5161 tttgccacgg aacggtctgc gttgtcggga agatgcgtga tctgatcctt caactcagca
5221 aaagttcgat ttattcaaca aagccgccgt cccgtcaagt cagcgtaatg ctctgccagt
5281 gttacaacca attaaccaat tctgattaga aaaactcatc gagcatcaaa tgaaactgca
5341 atttattcat atcaggatta tcaataccat atttttgaaa aagccgtttc tgtaatgaag
5401 gagaaaactc accgaggcag ttccatagga tggcaagatc ctggtatcgg tctgcgattc
5461 cgactcgtcc aacatcaata caacctatta atttcccctc gtcaaaaata aggttatcaa
5521 gtgagaaatc accatgagtg acgactgaat ccggtgagaa tggcaaaagc ttatgcattt
5581 ctttccagac ttgttcaaca ggccagccat tacgctcgtc atcaaaatca ctcgcatcaa
5641 ccaaaccgtt attcattcgt gattgcgcct gagcgagacg aaatacgcga tcgctgttaa
5701 aaggacaatt acaaacagga atcgaatgca accggcgcag gaacactgcc agcgcatcaa
5761 caatatttte acctgaatca ggatattctt ctaatacctg gaatgctgtt ttcccgggga
5821 tcgcagtggt gagtaaccat gcatcatcag gagtacggat aaaatgcttg atggtcggaa
5881 gaggcataaa ttccgtcagc cagtttagtc tgaccatctc atctgtaaca tcattggcaa

FIG. 1B-3

5941 cgctaccttt gccatgtttc agaaacaact ctggcgcatc gggcttccca tacaatcgat
6001 agattgtcgc acctgattgc ccgacattat cgcgagccca tttataccca tataaatcag
6061 catccatgtt ggaatttaat cgcggcctcg agcaagacgt ttcccgttga atatggctca
6121 taacacccct tgtattactg tttatgtaag cagacagttt tattgttcat gatgatatat
6181 ttttatcttg tgcaatgtaa catcagagat tttgagacac aacgtggctt tccccccccc
6241 cccattattg aagcatttat cagggttatt gtctcatgag cggatacata tttgaatgta
6301 tttagaaaaa taaacaaata ggggttccgc gcacatttcc ccgaaaagtg ccacctgacg
6361 tctaagaaac cattattatc atgacattaa cctataaaaa taggcgtatc acgaggccct
6421 ttcgtc

FIG. 1B



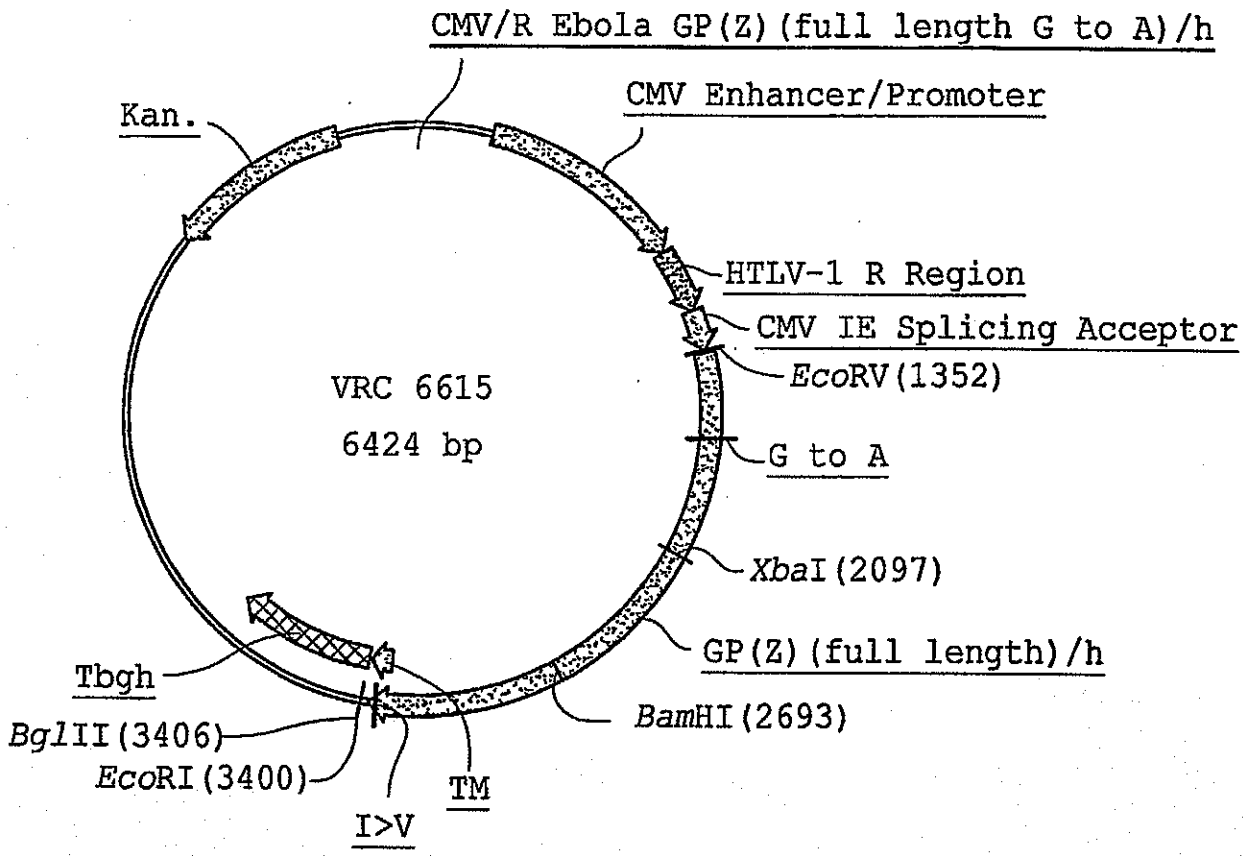

CMV/R Ebola GP(Z)(full length G to A)/h
CMV Enhancer/Promoter
Kan.
HTLV-1 R Region
CMV IE Splicing Acceptor
EcoRV(1352)
VRC 6615
6424 bp
G to A
XbaI(2097)
GP(Z)(full length)/h
Tbgh
BamHI(2693)
BglII(3406)
EcoRI(3400)
TM
I>V

FIG. 2A

FIG. 2B-1

VRC 6615 (SEQ ID NO: 2)

1 tcgcgcgttt cggtgatgac ggtgaaaacc tctgacacat gcagctcccg gagacggtca
61 cagcttgtct gtaagcggat gccgggagca gacaagcccg tcagggcgcg tcagcgggtg
121 ttggcgggtg tcggggctgg cttaactatg cggcatcaga gcagattgta ctgagagtgc
181 accatatgcg gtgtgaaata ccgcacagat gcgtaaggag aaaataccgc atcagattgg
241 ctattggcca ttgcatacgt tgtatccata tcataatatg tacatttata ttggctcatg
301 tccaacatta ccgccatgtt gacattgatt attgactagt tattaatagt aatcaattac
361 ggggtcatta gttcatagcc catatatgga gttccgcgtt acataactta cggtaaatgg
421 cccgcctggc tgaccgccca acgacccccg cccattgacg tcaataatga cgtatgttcc
481 catagtaacg ccaataggga ctttccattg acgtcaatgg gtggagtatt tacggtaaac
541 tgcccacttg gcagtacatc aagtgtatca tatgccaagt acgcccccta ttgacgtcaa
601 tgacggtaaa tggcccgcct ggcattatgc ccagtacatg accttatggg actttcctac
661 ttggcagtac atctacgtat tagtcatcgc tattaccatg gtgatgcggt tttggcagta
721 catcaatggg cgtggatagc ggtttgactc acggggattt ccaagtctcc accccattga
781 cgtcaatggg agtttgtttt ggcaccaaaa tcaacgggac tttccaaaat gtcgtaacaa
841 ctccgcccca ttgacgcaaa tgggcggtag gcgtgtacgg tgggaggtct atataagcag
901 agctcgttta gtgaaccgtc agatcgcctg gagacgccat ccacgctgtt ttgacctcca
961 tagaagacac cgggaccgat ccagcctcca tcggctcgca tctctccttc acgcgcccgc
1021 cgccctacct gaggccgcca tccacgccgg ttgagtcgcg ttctgccgcc tcccgcctgt
1081 ggtgcctcct gaactgcgtc cgccgtctag gtaagtttaa agctcaggtc gagaccgggc
1141 ctttgtccgg cgctcccttg gagcctacct agactcagcc ggctctccac gctttgcctg
1201 accctgcttg ctcaactcta gttaacggtg gagggcagtg tagtctgagc agtactcgtt
1261 gctgccgcgc gcgccaccag acataatagc tgacagacta acagactgtt cctttccatg
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1501 cgtggacaag ctggtgtgca gggacaagct gagcagcacc aaccagctga ggagcgtggg
1561 cctgaacctg gagggcaacg gcgtggccac cgacgtgccc agcgccacca agaggtgggg
1621 cttcaggagc ggcgtgcctc ccaaggtggt gaactacgag gccgccgagt gggccgagaa
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1801 cgccggcgac ttcgccttcc acaaggaggg cgccttcttc ctgtacgaca ggctggccag
1861 caccgtgatc tacaggggca ccaccttcgc cgagggcgtg gtggccttcc tgatcctgcc
1921 ccaggccaag aaggacttct tcagcagcca ccctctgagg gagcccgtga acgccaccga
1981 ggaccccagc agcggctact acagcaccac catcaggtac caggccaccg gcttcggcac
2041 caacgagacc gagtacctgt tcgaggtgga caacctgacc tacgtgcagc tggagtctag
2101 attcaccccc cagttcctgc tgcagctgaa cgagaccatc tacaccagcg gcaagaggag
2161 caacaccacc ggcaagctga tctggaaggt gaaccccgag atcgacacca ccatcggcga
2221 gtgggccttc tgggagacca agaagaacct gaccaggaag atcaggagcg aggagctgag
2281 cttcaccgtc gtgagcaacg gggccaagaa catcagcggc cagagccccg ccaggaccag
2341 cagcgacccc ggcaccaaca ccaccaccga ggaccacaag atcatggcca gcgagaacag
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2461 cctggccacc atcagcacca gccctcagtc tttaaccacc aagcccggcc ccgacaacag
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2761 ggacaccggc gaggagagcg ccagcagcgg caagctgggc ctgatcacca acaccatcgc
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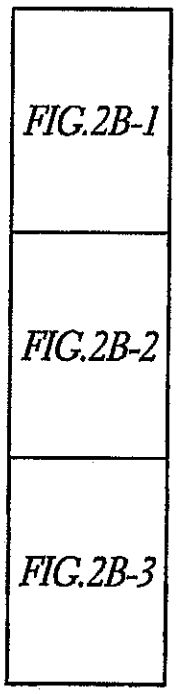
FIG. 2B-2

3001 gatgcacaac caggacggcc tgatctgcgg cctgaggcag ctggccaacg agaccaccca
3061 ggccctgcag ctgttcctga gggccaccac cgagctgagg accttcagca tcctgaacag
3121 gaaggccatc gacttcctgc tgcagaggtg gggcggcacc tgccacatcc tgggccccga
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3241 ccacgacttc gtggacaaga ccctgccaga ccagggcgac aacgacaact ggtggaccgg
3301 ctggcggcag tggatacctg ccggcatcgg cgtgaccggc gtggtgatcg ccgtgatcgc
3361 tctgttctgc atctgcaagt tcgtgttctg aacacgtgga attcagatct gctgtgcctt
3421 ctagttgcca gccatctgtt gtttgcccct cccccgtgcc ttccttgacc ctggaaggtg
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3841 caaaccaaac ctagcctcca agagtgggaa gaaattaaag caagataggc tattaagtgc
3901 agagggagag aaaatgcctc caacatgtga ggaagtaatg agagaaatca tagaatttta
3961 aggccatgat ttaaggccat catggcctta atcttccgct tcctcgctca ctgactcgct
4021 gcgctcggtc gttcggctgc ggcgagcggt atcagctcac tcaaaggcgg taatacggtt
4081 atccacagaa tcaggggata acgcaggaaa gaacatgtga gcaaaaggcc agcaaaaggc
4141 caggaaccgt aaaaaggccg cgttgctggc gtttttccat aggctccgcc cccctgacga
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4321 cggatacctg tccgcctttc tcccttcggg aagcgtggcg ctttctcata gctcacgctg
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4621 atttggtatc tgcgctctgc tgaagccagt taccttcgga aaaagagttg gtagctcttg
4681 atccggcaaa caaaccaccg ctggtagcgg tggttttttt gtttgcaagc agcagattac
4741 gcgcagaaaa aaaggatctc aagaagatcc tttgatcttt tctacggggt ctgacgctca
4801 gtggaacgaa aactcacgtt aagggatttt ggtcatgaga ttatcaaaaa ggatcttcac
4861 ctagatcctt ttaaattaaa aatgaagttt taaatcaatc taaagtatat atgagtaaac
4921 ttggtctgac agttaccaat gcttaatcag tgaggcacct atctcagcga tctgtctatt
4981 tcgttcatcc atagttgcct gactcggggg gggggggcgc tgaggtctgc ctcgtgaaga
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5101 gccacggttg atgagagctt tgttgtaggt ggaccagttg gtgattttga acttttgctt
5161 tgccacggaa cggtctgcgt tgtcgggaag atgcgtgatc tgatccttca actcagcaaa
5221 agttcgattt attcaacaaa gccgccgtcc cgtcaagtca gcgtaatgct ctgccagtgt
5281 tacaaccaat taaccaattc tgattagaaa aactcatcga gcatcaaatg aaactgcaat
5341 ttattcatat caggattatc aataccatat ttttgaaaaa gccgtttctg taatgaagga
5401 gaaaactcac cgaggcagtt ccataggatg gcaagatcct ggtatcggtc tgcgattccg
5461 actcgtccaa catcaataca acctattaat ttcccctcgt caaaaataag gttatcaagt
5521 gagaaatcac catgagtgac gactgaatcc ggtgagaatg gcaaaagctt atgcatttct
5581 ttccagactt gttcaacagg ccagccatta cgctcgtcat caaaatcact cgcatcaacc
5641 aaaccgttat tcattcgtga ttgcgcctga gcgagacgaa atacgcgatc gctgttaaaa
5701 ggacaattac aaacaggaat cgaatgcaac cggcgcagga acactgccag cgcatcaaca
5761 atattttcac ctgaatcagg atattcttct aatacctgga atgctgtttt cccggggatc
5821 gcagtggtga gtaaccatgc atcatcagga gtacggataa aatgcttgat ggtccggaaga
5881 ggcataaatt ccgtcagcca gtttagtctg accatctcat ctgtaacatc attggcaacg
5941 ctacctttgc catgtttcag aaacaactct ggcgcatcgg gcttcccata caatcgatag
6001 attgtcgcac ctgattgccc gacattatcg cgagcccatt tatacccata taaatcagca

FIG. 2B-3

6061 tccatgttgg aatttaatcg cggcctcgag caagacgttt cccgttgaat atggctcata
6121 acacccctttg tattactgtt tatgtaagca gacagtttta ttgttcatga tgatatattt
6181 ttatcttgtg caatgtaaca tcagagattt tgagacacaa cgtggctttc ccccccccc
6241 cattattgaa gcatttatca gggttattgt ctcatgagcg gatacatatt tgaatgtatt
6301 tagaaaaata aacaaatagg ggttccgcgc acatttcccc gaaaagtgcc acctgacgtc
6361 taagaaacca ttattatcat gacattaacc tataaaaata ggcgtatcac gaggcccttt
6421 cgtc

FIG. 2B



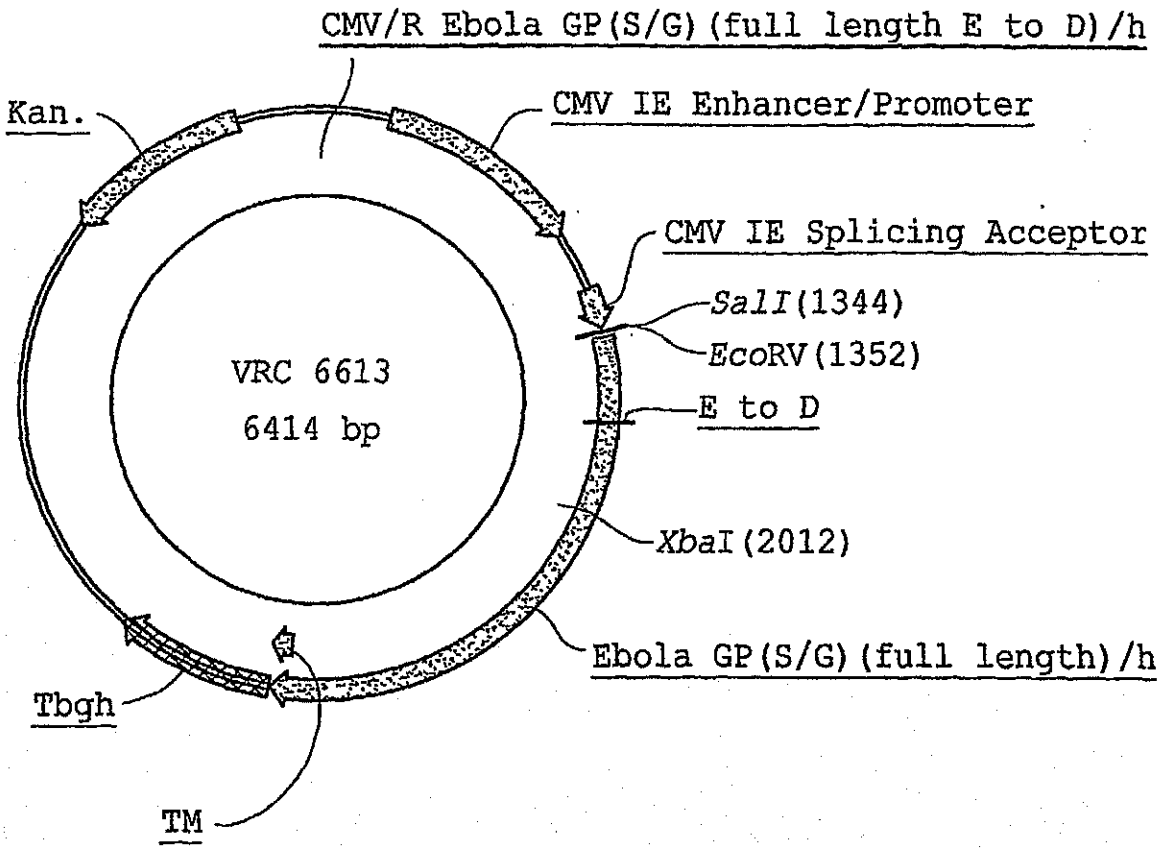

CMV/R Ebola GP(S/G)(full length E to D)/h
Kan.
CMV IE Enhancer/Promoter
CMV IE Splicing Acceptor
SalI(1344)
EcoRV(1352)
E to D
VRC 6613
6414 bp
XbaI(2012)
Ebola GP(S/G)(full length)/h
Tbgh
TM

FIG. 3A

FIG. 3B-1

VRC 6613 sequence (SEQ ID NO: 3)

1 tcgcgcgttt cggtgatgac ggtgaaaacc tctgacacat gcagctcccg gagacggtca
61 cagcttgtct gtaagcggat gccgggagca gacaagcccg tcagggcgcg tcagcgggtg
121 ttggcgggtg tcggggctgg cttaactatg cggcatcaga gcagattgta ctgagagtgc
181 accatatgcg gtgtgaaata ccgcacagat gcgtaaggag aaaataccgc atcagattgg
241 ctattggcca ttgcatacgt tgtatccata tcataatatg tacatttata ttggctcatg
301 tccaacatta ccgccatgtt gacattgatt attgactagt tattaatagt aatcaattac
361 ggggtcatta gttcatagcc catatatgga gttccgcgtt acataactta cggtaaatgg
421 cccgcctggc tgaccgccca acgacccccg cccattgacg tcaataatga cgtatgttcc
481 catagtaacg ccaataggga ctttccattg acgtcaatgg gtggagtatt tacggtaaac
541 tgcccacttg gcagtacatc aagtgtatca tatgccaagt acgcccccta ttgacgtcaa
601 tgacggtaaa tggcccgcct ggcattatgc ccagtacatg accttatggg actttcctac
661 ttggcagtac atctacgtat tagtcatcgc tattaccatg gtgatgcggt tttggcagta
721 catcaatggg cgtggatagc ggtttgactc acggggattt ccaagtctcc accccattga
781 cgtcaatggg agtttgtttt ggcaccaaaa tcaacgggac tttccaaaat gtcgtaacaa
841 ctccgcccca ttgacgcaaa tgggcggtag gcgtgtacgg tgggaggtct atataagcag
901 agctcgttta gtgaaccgtc agatcgcctg gagacgccat ccacgctgtt ttgacctcca
961 tagaagacac cgggaccgat ccagcctcca tcggctcgca tctctccttc acgcgcccgc
1021 cgccctacct gaggccgcca tccacgccgg ttgagtcgcg ttctgccgcc tcccgcctgt
1081 ggtgcctcct gaactgcgtc cgccgtctag gtaagtttaa agctcaggtc gagaccgggc
1141 ctttgtccgg cgctcccttg gagcctacct agactcagcc ggctctccac gctttgcctg
1201 accctgcttg ctcaactcta gttaacggtg gagggcagtg tagtctgagc agtactcgtt
1261 gctgccgcgc gcgccaccag acataatagc tgacagacta acagactgtt cctttccatg
1321 ggtcttttct gcagtcaccg tcgtcgacga tatcgccgcc atggagggcc tgagcctgct
1381 gcagctgccc agggacaagt tcaggaagag cagcttcttc gtgtgggtga tcatcctgtt
1441 ccagaaggcc ttcagcatgc ccctgggcgt ggtgaccaac agcaccctgg aggtgaccga
1501 gatcgaccag ctggtgtgca aggaccacct ggccagcacc gaccagctga agagcgtggg
1561 cctgaacctg gacggcagcg gcgtgagcac cgacatcccc agcgccacca agaggtgggg
1621 cttcaggagc ggcgtgcctc ccaaggtggt gagctacgag gccggcgagt gggccgagaa
1681 ctgctacaac ctggagatca agaagcccga cggcagcgag tgcctgcctc ctcctcctga
1741 cggcgtgagg ggcttcccca ggtgcaggta cgtgcacaag gcccagggca ccggcccctg
1801 ccccggcgac tacgccttcc acaaggacgg cgccttcttc ctgtacgaca ggctggccag
1861 caccgtgatc tacaggggcg tgaacttcgc cgagggcgtg atcgccttcc tgatcctggc
1921 caagcccaag gagaccttcc tgcagagccc tcccatcagg gaggccgtga actacaccga
1981 gaacaccagc agctactacg ccaccagcta tctagagtac gagatcgaga acttcggcgc
2041 ccagcacagc accaccctgt tcaagatcga caacaacacc ttcgtgaggc tggacaggcc
2101 ccacaccccc cagttcctgt tccagctgaa cgacaccatc cacctgcacc agcagctgag
2161 caacaccacc ggcaggctga tctggaccct ggacgccaac atcaacgccg acatcggcga
2221 gtgggccttc tgggagaaca agaagaacct gagcgagcag ctgaggggcg aggagctgag
2281 cttcgaggcc ctgagcctga acgagaccga ggacgacgac gccgccagca gcaggatcac
2341 caagggcagg atcagcgaca gggccaccag gaagtacagc gacctggtgc ccaagaacag
2401 ccccggcatg gtgccccttc acatccccga gggcgagacc accctgccca gccagaacag
2461 caccgagggc aggagggtgg gcgtgaacac ccaggagacc atcaccgaga ccgccgccac
2521 catcatcggc accaacggca accacatgca gatcagcacc atcggcatca ggcccagcag
2581 cagccagatc cccagcagca gccccaccac cgcccctagc cccgaggccc agacccccac
2641 cacccacacc agcggaccca gcgtgatggc caccgaggag cccaccaccc ctcccggcag
2701 cagccccgga cccaccaccg aggccctac cctgaccacc cctgagaaca tcaccaccgc
2761 cgtgaagacc gtgctgcccc aggagagcac cagcaacggc ctgatcacca gcaccgtgac
2821 cggcatcctg ggcagcctgg gcctgaggaa gaggagcagg aggcagacca acaccaaggc
2881 caccggcaag tgcaacccca acctgcacta ctggaccgcc caggagcagc acaacgccgc
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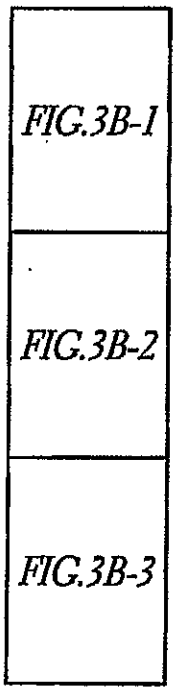
FIG. 3B-2

3001 gatgcacaac cagaacgccc tggtgtgcgg cctgaggcag ctggccaacg agaccaccca
3061 ggccctgcag ctgttcctga gggccaccac cgagctgagg acctacacca tcctgaacag
3121 gaaggccatc gacttcctgc tgaggaggtg gggcggcacc tgcaggattc tgggccccga
3181 ctgctgcatc gagccccacg actggaccaa gaacatcacc gacaagatca accagatcat
3241 ccacgacttc atcgacaacc ctctgcccaa ccaggacaac gacgacaact ggtggaccgg
3301 ctggcggcag tggatacctg ccggcatcgg catcaccggc atcatcatcg ccatcatcgc
3361 tctgctgtgc gtgtgcaagc tgctgtgctg aacacgatct gctgtgcctt ctagttgcca
3421 gccatctgtt gtttgccccc ccccctgtcc ttccttgacc ctggaaggtg ccactcccac
3481 tgtcctttcc taataaaatg aggaaattgc atcgcattgt ctgagtaggt gtcattctat
3541 tctgggggggt ggggtggggc aggacagcaa gggggaggat tgggaagaca atagcaggca
3601 tgctggggat gcggtgggct ctatgggtac ccaggtgctg aagaattgac ccggttcctc
3661 ctgggccaga aagaagcagg cacatccccc tctctgtgac acaccctgtc cacgcccctg
3721 gttcttagtt ccagccccac tcataggaca ctcatagctc aggagggctc cgccttcaat
3781 cccacccgct aaagtacttg gagcggtctc tccctccctc atcagcccac caaaccaaac
3841 ctagcctcca agagtgggaa gaaattaaag caagataggc tattaagtgc agagggagag
3901 aaaatgcctc caacatgtga ggaagtaatg agagaaatca tagaatttta aggccatgat
3961 ttaaggccat catggcctta atcttccgct tcctcgctca ctgactcgct gcgctcggtc
4021 gttcggctgc ggcgagcggt atcagctcac tcaaaggcgg taatacggtt atccacagaa
4081 tcaggggata acgcaggaaa gaacatgtga gcaaaaggcc agcaaaaggc caggaaccgt
4141 aaaaaggccg cgttgctggc gtttttccat aggctccgcc cccctgacga gcatcacaaa
4201 aatcgacgct caagtcagag gtggcgaaac ccgacaggac tataaagata ccaggcgttt
4261 cccccctggaa gctccctcgt gcgctctcct gttccgaccc tgccgcttac cggatacctg
4321 tccgcctttc tcccttcggg aagcgtggcg ctttctcata gctcacgctg taggtatctc
4381 agttcggtgt aggtcgttcg ctccaagctg ggctgtgtgc acgaaccccc cgttcagccc
4441 gaccgctgcg ccttatccgg taactatcgt cttgagtcca acccggtaag acacgactta
4501 tcgccactgg cagcagccac tggtaacagg attagcagag cgaggtatgt aggcggtgct
4561 acagagttct tgaagtggtg gcctaactac ggctacacta gaagaacagt atttggtatc
4621 tgcgctctgc tgaagccagt taccttcgga aaaagagttg gtagctcttg atccggcaaa
4681 caaaccaccg ctggtagcgg tggttttttt gtttgcaagc agcagattac gcgcagaaaa
4741 aaaggatctc aagaagatcc tttgatcttt tctacggggt ctgacgctca gtggaacgaa
4801 aactcacgtt aagggatttt ggtcatgaga ttatcaaaaa ggatcttcac ctagatcctt
4861 ttaaattaaa aatgaagttt taaatcaatc taaagtatat atgagtaaac ttggtctgac
4921 agttaccaat gcttaatcag tgaggcacct atctcagcga tctgtctatt tcgttcatcc
4981 atagttgcct gactcggggg gggggggcgc tgaggtctgc ctcgtgaaga aggtgttgct
5041 gactcatacc aggcctgaat cgccccatca tccagccaga aagtgaggga gccacggttg
5101 atgagagctt tgttgtaggt ggaccagttg gtgattttga actttgctt tgccacggaa
5161 cggtctgcgt tgtcgggaag atgcgtgatc tgatccttca actcagcaaa agttcgattt
5221 attcaacaaa gccgccgtcc cgtcaagtca gcgtaatgct ctgccagtgt tacaaccaat
5281 taaccaattc tgattagaaa aactcatcga gcatcaaatg aaactgcaat ttattcatat
5341 caggattatc aataccatat tttgaaaaa gccgtttctg taatgaagga gaaaactcac
5401 cgaggcagtt ccataggatg gcaagatcct ggtatcggtc tgcgattccg actcgtccaa
5461 catcaataca acctattaat ttcccctcgt caaaaataag gttatcaagt gagaaatcac
5521 catgagtgac gactgaatcc ggtgagaatg gcaaaagctt atgcatttct ttccagactt
5581 gttcaacagg ccagccatta cgctcgtcat caaaatcact cgcatcaacc aaaccgttat
5641 tcattcgtga ttgcgcctga gcgagacgaa atacgcgatc gctgttaaaa ggacaattac
5701 aaacaggaat cgaatgcaac cggcgcagga acactgccag cgcatcaaca atattttcac
5761 ctgaatcagg atattcttct aatacctgga atgctgtttt cccggggatc gcagtggtga
5821 gtaaccatgc atcatcagga gtacggataa aatgcttgat ggtcggaaga ggcataaatt
5881 ccgtcagcca gtttagtctg accatctcat ctgtaacatc attggcaacg ctacctttgc
5941 catgtttcag aaacaactct ggcgcatcgg gcttcccata caatcgatag attgtcgcac
6001 ctgattgccc gacattatcg cgagcccatt tatacccata taaatcagca tccatgttgg

FIG. 3B-3

6061 aatttaatcg cggcctcgag caagacgttt cccgttgaat atggctcata acacccctg
6121 tattactgtt tatgtaagca gacagtttta ttgttcatga tgatatattt ttatcttgtg
6181 caatgtaaca tcagagattt tgagacacaa cgtggctttc ccccccccc cattattgaa
6241 gcatttatca gggttattgt ctcatgagcg gatacatatt tgaatgtatt tagaaaaata
6301 aacaaatagg ggttccgcgc acatttcccc gaaaagtgcc acctgacgtc taagaaacca
6361 ttattatcat gacattaacc tataaaaata ggcgtatcac gaggcccttt cgtc

FIG. 3B



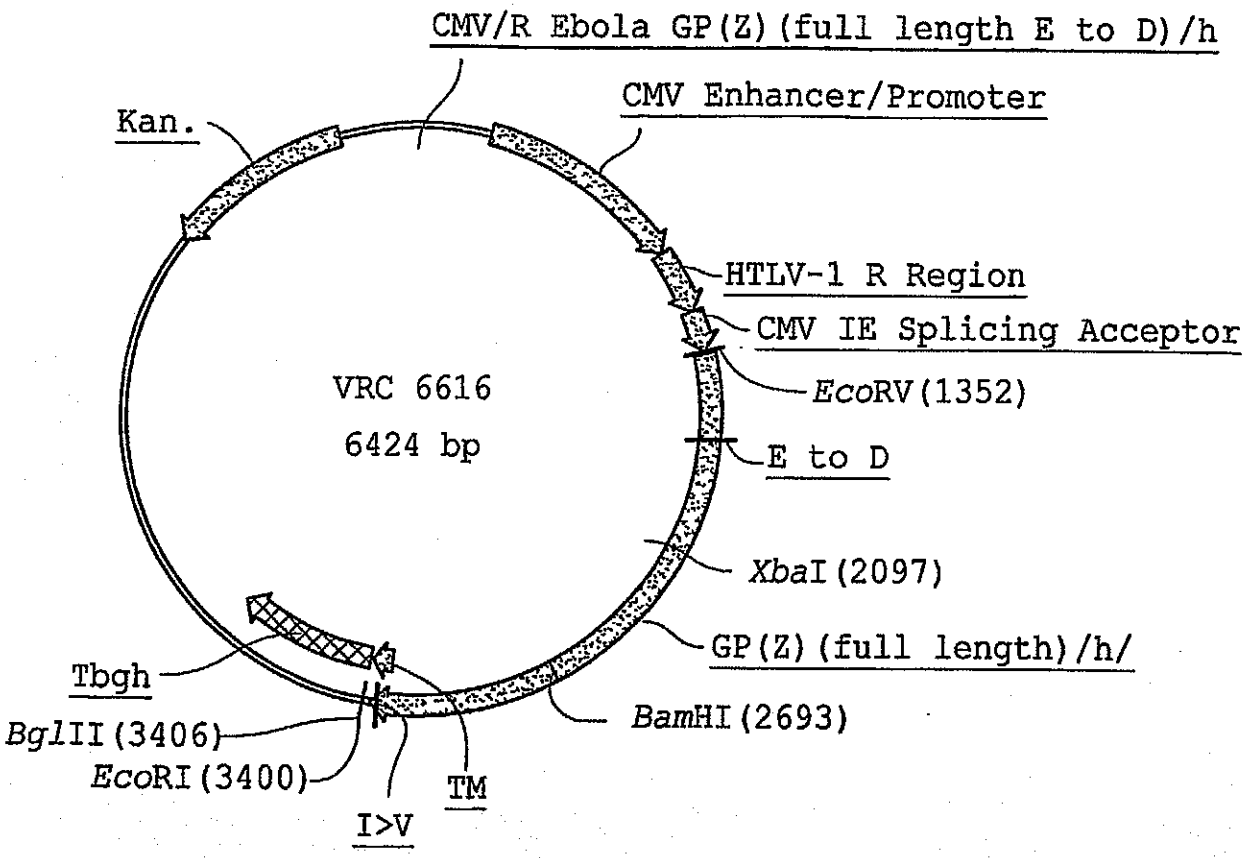

CMV/R Ebola GP(Z)(full length E to D)/h
CMV Enhancer/Promoter
Kan.
HTLV-1 R Region
CMV IE Splicing Acceptor
VRC 6616
6424 bp
EcoRV(1352)
E to D
XbaI(2097)
GP(Z)(full length)/h/
Tbgh
BamHI(2693)
BglII(3406)
EcoRI(3400)
TM
I>V

FIG. 4A

FIG. 4B-1

VRC 6616 (SEQ ID NO: 4)

1 tcgcgcgttt cggtgatgac ggtgaaaacc tctgacacat gcagctcccg gagacggtca
61 cagcttgtct gtaagcggat gccgggagca gacaagcccg tcagggcgcg tcagcgggtg
121 ttggcgggtg tcggggctgg cttaactatg cggcatcaga gcagattgta ctgagagtgc
181 accatatgcg gtgtgaaata ccgcacagat gcgtaaggag aaaataccgc atcagattgg
241 ctattggcca ttgcatacgt tgtatccata tcataatatg tacatttata ttggctcatg
301 tccaacatta ccgccatgtt gacattgatt attgactagt tattaatagt aatcaattac
361 ggggtcatta gttcatagcc catatatgga gttccgcgtt acataactta cggtaaatgg
421 cccgcctggc tgaccgccca acgacccccg cccattgacg tcaataatga cgtatgttcc
481 catagtaacg ccaataggga ctttccattg acgtcaatgg gtggagtatt tacggtaaac
541 tgcccacttg gcagtacatc aagtgtatca tatgccaagt acgcccccta ttgacgtcaa
601 tgacggtaaa tggcccgcct ggcattatgc ccagtacatg accttatggg actttcctac
661 ttggcagtac atctacgtat tagtcatcgc tattaccatg gtgatgcggt tttggcagta
721 catcaatggg cgtggatagc ggtttgactc acggggattt ccaagtctcc accccattga
781 cgtcaatggg agtttgtttt ggcaccaaaa tcaacgggac tttccaaaat gtcgtaacaa
841 ctccgccccа ttgacgcaaa tgggcggtag gcgtgtacgg tgggaggtct atataagcag
901 agctcgttta gtgaaccgtc agatcgcctg gagacgccat ccacgctgtt ttgacctcca
961 tagaagacac cgggaccgat ccagcctcca tcggctcgca tctctccttc acgcgcccgc
1021 cgccctacct gaggccgcca tccacgccgg ttgagtcgcg ttctgccgcc tcccgcctgt
1081 ggtgcctcct gaactgcgtc cgccgtctag gtaagtttaa agctcaggtc gagaccgggc
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1201 accctgcttg ctcaactcta gttaacggtg gagggcagtg tagtctgagc agtactcgtt
1261 gctgccgcgc gcgccaccag acataatagc tgacagacta acagactgtt cctttccatg
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1441 ccagaggacc ttcagcatcc ccctgggcgt gatccacaac agcaccctgc aggtgagcga
1501 cgtggacaag ctggtgtgca gggacaagct gagcagcacc aaccagctga ggagcgtggg
1561 cctgaacctg gacggcaacg gcgtggccac cgacgtgccc agcgccacca agaggtgggg
1621 cttcaggagc ggcgtgcctc ccaaggtggt gaactacgag gccggcgagt gggccgagaa
1681 ctgctacaac ctggagatca agaagcccga cggcagcgag tgcctgcccg ccgccctga
1741 cggcatcagg ggcttcccca ggtgcaggta cgtgcacaag gtgagcggca ccggccctg
1801 cgccggcgac ttcgccttcc acaaggaggg cgccttcttc ctgtacgaca ggctggccag
1861 caccgtgatc tacaggggca ccaccttcgc cgagggcgtg gtggccttcc tgatcctgcc
1921 ccaggccaag aaggacttct tcagcagcca ccctctgagg gagcccgtga acgccaccga
1981 ggaccccagc agcggctact acagcaccac catcaggtac caggccaccg gcttcggcac
2041 caacgagacc gagtacctgt tcgaggtgga caacctgacc tacgtgcagc tggagtctag
2101 attcaccccт cagttcctgc tgcagctgaa cgagaccatc tacaccagcg gcaagaggag
2161 caacaccacc ggcaagctga tctggaaggt gaaccccgag atcgacacca ccatcggcga
2221 gtgggccttc tgggagacca agaagaacct gaccaggaag atcaggagcg aggagctgag
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2401 cagcgccatg gtgcaggtgc acagccaggg cagggaggcc gccgtgagcc acctgaccac
2461 cctggccacc atcagcacca gccctcagtc tttaaccacc aagcccggcc ccgacaacag
2521 cacccacaac accccctgtgt acaagctgga catcagcgag gccacccagg tggagcagca
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2641 cggccctccg aaggccgaga acaccaacac cagcaagagc accgactttc tggatcccgc
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2761 ggacaccggc gaggagagcg ccagcagcgg caagctgggc ctgatcacca acaccatcgc
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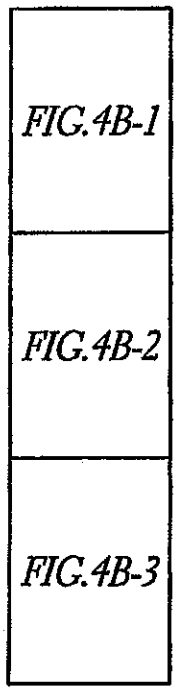
FIG. 4B-2

3001 gatgcacaac caggacggcc tgatctgcgg cctgaggcag ctggccaacg agaccaccca
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3241 ccacgacttc gtggacaaga ccctgccaga ccagggcgac aacgacaact ggtggaccgg
3301 ctggcggcag tggatacctg ccggcatcgg cgtgaccggc gtggtgatcg ccgtgatcgc
3361 tctgttctgc atctgcaagt tcgtgttctg aacacgtgga attcagatct gctgtgcctt
3421 ctagttgcca gccatctgtt gtttgccccc cccccgtgcc ttccttgacc ctggaaggtg
3481 ccactcccac tgtcctttcc taataaaatg aggaaattgc atcgcattgt ctgagtaggt
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4021 gcgctcggtc gttcggctgc ggcgagcggt atcagctcac tcaaaggcgg taatacggtt
4081 atccacagaa tcaggggata acgcaggaaa gaacatgtga gcaaaaggcc agcaaaaggc
4141 caggaaccgt aaaaaggccg cgttgctggc gtttttccat aggctccgcc cccctgacga
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4561 aggcggtgct acagagttct tgaagtggtg gcctaactac ggctacacta gaagaacagt
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4681 atccggcaaa caaaccaccg ctggtagcgg tggttttttt gtttgcaagc agcagattac
4741 gcgcagaaaa aaaggatctc aagaagatcc tttgatcttt tctacggggt ctgacgctca
4801 gtggaacgaa aactcacgtt aagggatttt ggtcatgaga ttatcaaaaa ggatcttcac
4861 ctagatcctt ttaaattaaa aatgaagttt taaatcaatc taaagtatat atgagtaaac
4921 ttggtctgac agttaccaat gcttaatcag tgaggcacct atctcagcga tctgtctatt
4981 tcgttcatcc atagttgcct gactcggggg gggggggcgc tgaggtctgc ctcgtgaaga
5041 aggtgttgct gactcatacc aggcctgaat cgccccatca tccagccaga aagtgaggga
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5161 tgccacggaa cggtctgcgt tgtcgggaag atgcgtgatc tgatccttca actcagcaaa
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5401 gaaaactcac cgaggcagtt ccataggatg gcaagatcct ggtatcggtc tgcgattccg
5461 actcgtccaa catcaataca acctattaat ttcccctcgt caaaaataag gttatcaagt
5521 gagaaatcac catgagtgac gactgaatcc ggtgagaatg gcaaaagctt atgcatttct
5581 ttccagactt gttcaacagg ccagccatta cgctcgtcat caaaatcact cgcatcaacc
5641 aaaccgttat tcattcgtga ttgcgcctga gcgagacgaa atacgcgatc gctgttaaaa
5701 ggacaattac aaacaggaat cgaatgcaac cggcgcagga acactgccag cgcatcaaca
5761 atattttcac ctgaatcagg atattcttct aatacctgga atgctgtttt cccggggatc
5821 gcagtggtga gtaaccatgc atcatcagga gtacggataa aatgcttgat ggtcggaaga
5881 ggcataaatt ccgtcagcca gtttagtctg accatctcat ctgtaacatc attggcaacg
5941 ctacctttgc catgtttcag aaacaactct ggcgcatcgg gcttcccata caatcgatag
6001 attgtcgcac ctgattgccc gacattatcg cgagcccatt tatacccata taaatcagca

FIG. 4B-3

6061 tccatgttgg aatttaatcg cggcctcgag caagacgttt cccgttgaat atggctcata
6121 acacccctg tattactgtt tatgtaagca gacagtttta ttgttcatga tgatatattt
6181 ttatcttgtg caatgtaaca tcagagattt tgagacacaa cgtggctttc cccccccccc
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6301 tagaaaaata aacaaatagg ggttccgcgc acatttcccc gaaaagtgcc acctgacgtc
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6421 cgtc

FIG. 4B



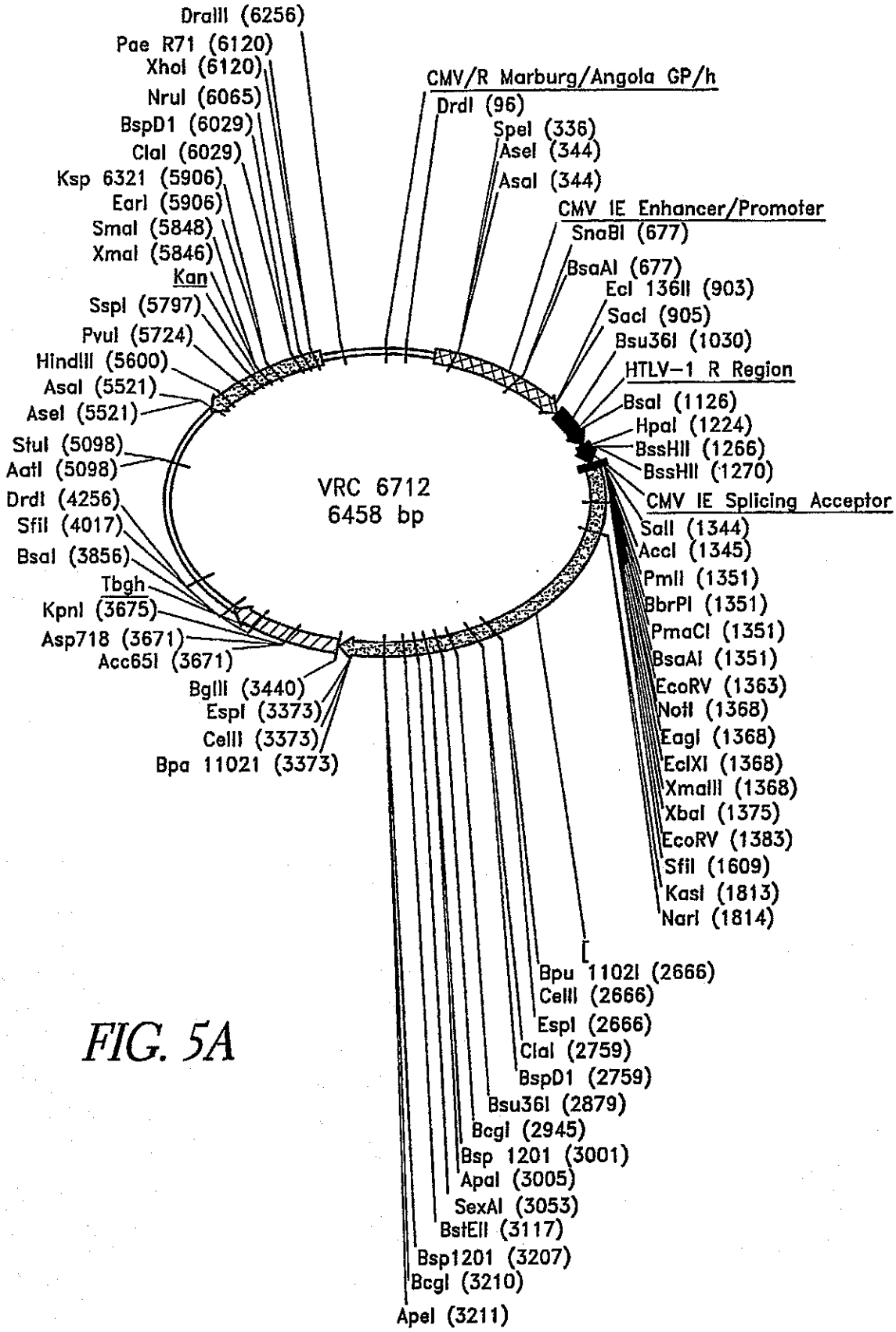

VRC 6712
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DraIII (6256)
Pae R71 (6120)
XhoI (6120)
NruI (6065)
BspD1 (6029)
ClaI (6029)
Ksp 6321 (5906)
EarI (5906)
SmaI (5848)
XmaI (5846)
Kan
SspI (5797)
PvuI (5724)
HindIII (5600)
AsaI (5521)
AseI (5521)
StuI (5098)
AatI (5098)
DrdI (4256)
SfiI (4017)
BsaI (3856)
Tbgh
KpnI (3675)
Asp718 (3671)
Acc65I (3671)
BglII (3440)
EspI (3373)
CelII (3373)
Bpa 11021 (3373)
CMV/R Marburg/Angola GP/h
DrdI (96)
SpeI (336)
AseI (344)
AsaI (344)
CMV IE Enhancer/Promoter
SnaBI (677)
BsaAI (677)
Ecl 136II (903)
SacI (905)
Bsu36I (1030)
HTLV-1 R Region
BsaI (1126)
HpaI (1224)
BssHII (1266)
BssHII (1270)
CMV IE Splicing Acceptor
SalI (1344)
AccI (1345)
PmlI (1351)
BbrPI (1351)
PmaCI (1351)
BsaAI (1351)
EcoRV (1363)
NotI (1368)
EagI (1368)
EclXI (1368)
XmaIII (1368)
XbaI (1375)
EcoRV (1383)
SfiI (1609)
KasI (1813)
NarI (1814)
Bpu 1102I (2666)
CelII (2666)
EspI (2666)
ClaI (2759)
BspD1 (2759)
Bsu36I (2879)
BcgI (2945)
Bsp 1201 (3001)
ApaI (3005)
SexAI (3053)
BstEII (3117)
Bsp1201 (3207)
BcgI (3210)
ApeI (3211)

FIG. 5A

FIG. 5B-1

VRC 6712 (SEQ ID NO: 5)

```
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 121 ttggcgggtg tcggggctgg cttaactatg cggcatcaga gcagattgta ctgagagtgc
 181 accatatgcg gtgtgaaata ccgcacagat gcgtaaggag aaaataccgc atcagattgg
 241 ctattggcca ttgcatacgt tgtatccata tcataatatg tacatttata ttggctcatg
 301 tccaacatta ccgccatgtt gacattgatt attgactagt tattaatagt aatcaattac
 361 ggggtcatta gttcatagcc catatatgga gttccgcgtt acataactta cggtaaatgg
 421 cccgcctggc tgaccgccca acgacccccg cccattgacg tcaataatga cgtatgttcc
 481 catagtaacg ccaataggga ctttccattg acgtcaatgg gtggagtatt tacggtaaac
 541 tgcccacttg gcagtacatc aagtgtatca tatgccaagt acgcccccta ttgacgtcaa
 601 tgacggtaaa tggcccgcct ggcattatgc ccagtacatg accttatggg actttcctac
 661 ttggcagtac atctacgtat tagtcatcgc tattaccatg gtgatgcggt tttggcagta
 721 catcaatggg cgtggatagc ggtttgactc acggggattt ccaagtctcc accccattga
 781 cgtcaatggg agtttgtttt ggcaccaaaa tcaacgggac tttccaaaat gtcgtaacaa
 841 ctccgccccа ttgacgcaaa tgggcggtag gcgtgtacgg tgggaggtct atataagcag
 901 agctcgttta gtgaaccgtc agatcgcctg gagacgccat ccacgctgtt ttgacctcca
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1201 accctgcttg ctcaactcta gttaacggtg gagggcagtg tagtctgagc agtactcgtt
1261 gctgccgcgc gcgccaccag acataatagc tgacagacta acagactgtt cctttccatg
1321 ggtcttttct gcagtcaccg tcgtcgacac gtgtgatcag atatcgcggc cgctctagag
1381 atatcgccgc catgaagacc acctgcctgc tgatcagcct gatcctgatc cagggcgtga
1441 agaccctgcc catcctggag atcgccagca acatccagcc ccagaacgtg gacagcgtgt
1501 gcagcggcac cctgcagaag accgaggacg tgcacctgat gggcttcacc ctgagcggcc
1561 agaaggtggc cgacagccct ctggaggcca gcaagaggtg ggccttcagg gccggcgtgc
1621 cccccaagaa cgtggagtac accgagggcg aggaggccaa gacctgctac aacatcagcg
1681 tgaccgaccc cagcggcaag agcctgctgc tggaccctcc caccaacatc agggactacc
1741 ctaagtgcaa gaccatccac cacatccagg gccagaaccc tcacgcccag ggcatcgccc
1801 tgcacctgtg gggcgccttc ttcctgtacg acaggatcgc cagcaccacc atgtacagag
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2161 cagatcctaa tagcgacgac gaggatctga caacaagcgg atccggatcc ggagaacagg
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2881 aggtgaacga aaacacagcc cattccggag aaaacgaaaa cgattgtgat gccgaactga
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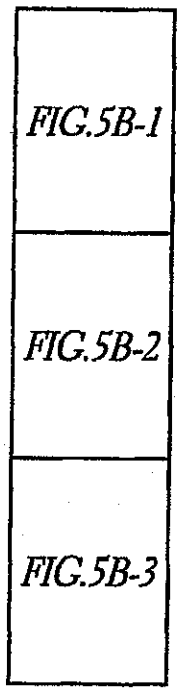
FIG. 5B-2

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3121 ccaccgagga gaggaccttc agcctgatca acaggcacgc catcgacttc ctgctggcta
3181 ggtggggcgg cacctgcaag gtgctgggcc ccgactgctg catcggcatc gaggacctga
3241 gcaggaacat cagcgagcag atcgaccaga tcaagaagga cgagcagaag gagggcaccg
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4681 cagttacctt cggaaaaaga gttggtagct cttgatccgg caaacaaacc accgctggta
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4801 atcctttgat cttttctacg gggtctgacg ctcagtggaa cgaaaactca cgttaaggga
4861 ttttggtcat gagattatca aaaaggatct tcacctagat cctttaaat taaaaatgaa
4921 gttttaaatc aatctaaagt atatatgagt aaacttggtc tgacagttac caatgcttaa
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5761 caaccggcgc aggaacactg ccagcgcatc aacaatattt tcacctgaat caggatattc
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5941 tctgaccatc tcatctgtaa catcattggc aacgctacct ttgccatgtt tcagaaacaa
6001 ctctggcgca tcgggcttcc catacaatcg atagattgtc gcacctgatt gcccgacatt

FIG. 5B-3

6061 atcgcgagcc catttatacc catataaatc agcatccatg ttggaattta atcgcggcct
6121 cgagcaagac gtttcccgtt gaatatggct cataacaccc cttgtattac tgtttatgta
6181 agcagacagt tttattgttc atgatgatat atttttatct tgtgcaatgt aacatcagag
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6301 ttgtctcatg agcggataca tatttgaatg tatttagaaa aataaacaaa taggggttcc
6361 gcgcacattt ccccgaaaag tgccacctga cgtctaagaa accattatta tcatgacatt
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FIG. 5B



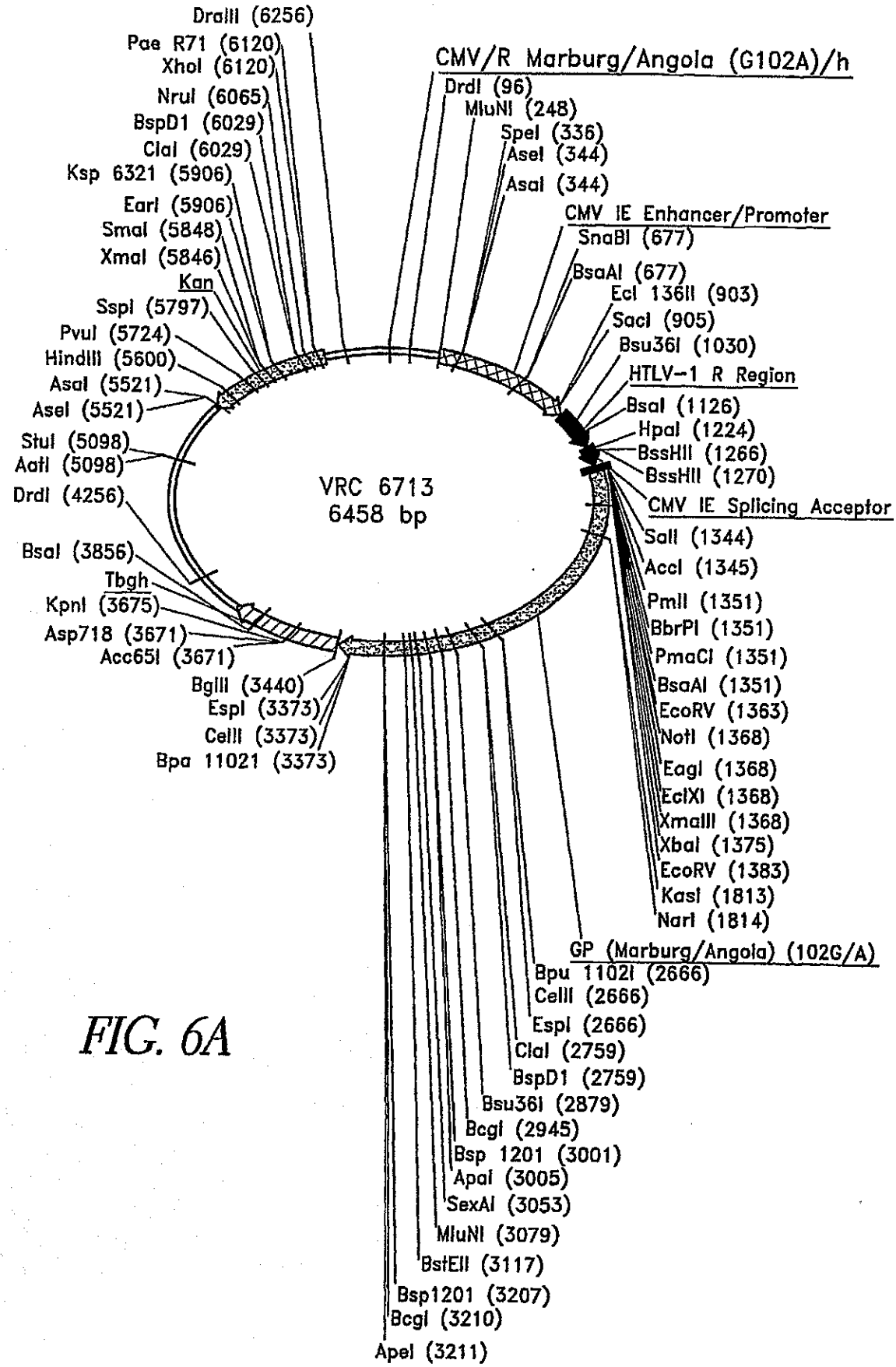

VRC 6713
6458 bp
CMV/R Marburg/Angola (G102A)/h
CMV IE Enhancer/Promoter
HTLV-1 R Region
CMV IE Splicing Acceptor
GP (Marburg/Angola) (102G/A)
DraIII (6256)
Pae R71 (6120)
XhoI (6120)
NruI (6065)
BspD1 (6029)
ClaI (6029)
Ksp 6321 (5906)
EarI (5906)
SmaI (5848)
XmaI (5846)
Kan
SspI (5797)
PvuI (5724)
HindIII (5600)
AsaI (5521)
AseI (5521)
StuI (5098)
AatII (5098)
DrdI (4256)
BsaI (3856)
Tbgh
KpnI (3675)
Asp718 (3671)
Acc65I (3671)
BglII (3440)
EspI (3373)
CelII (3373)
Bpa 11021 (3373)
DrdI (96)
MluNI (248)
SpeI (336)
AseI (344)
AsaI (344)
SnaBI (677)
BsaAI (677)
Ecl 136II (903)
SacI (905)
Bsu36I (1030)
BsaI (1126)
HpaI (1224)
BssHII (1266)
BssHII (1270)
SalI (1344)
AccI (1345)
PmlI (1351)
BbrPI (1351)
PmaCI (1351)
BsaAI (1351)
EcoRV (1363)
NotI (1368)
EagI (1368)
EclXI (1368)
XmaIII (1368)
XbaI (1375)
EcoRV (1383)
KasI (1813)
NarI (1814)
Bpu 1102I (2666)
CelII (2666)
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BcgI (2945)
Bsp 1201 (3001)
ApaI (3005)
SexAI (3053)
MluNI (3079)
BstEII (3117)
Bsp1201 (3207)
BcgI (3210)
ApeI (3211)

FIG. 6A

FIG. 6B-1

VRC 6713 (SEQ ID NO: 6)

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 421 cccgcctggc tgaccgccca acgacccccg cccattgacg tcaataatga cgtatgttcc
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1561 agaaggtggc cgacagccct ctggaggcca gcaagaggtg ggccttcagg gccggcgtgc
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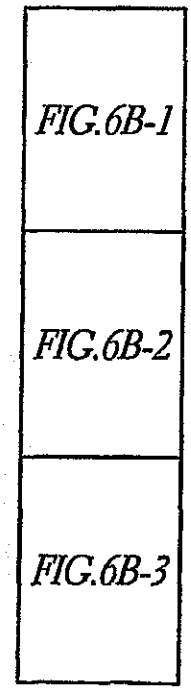
FIG. 6B-2

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FIG. 6B-3

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FIG. 6B



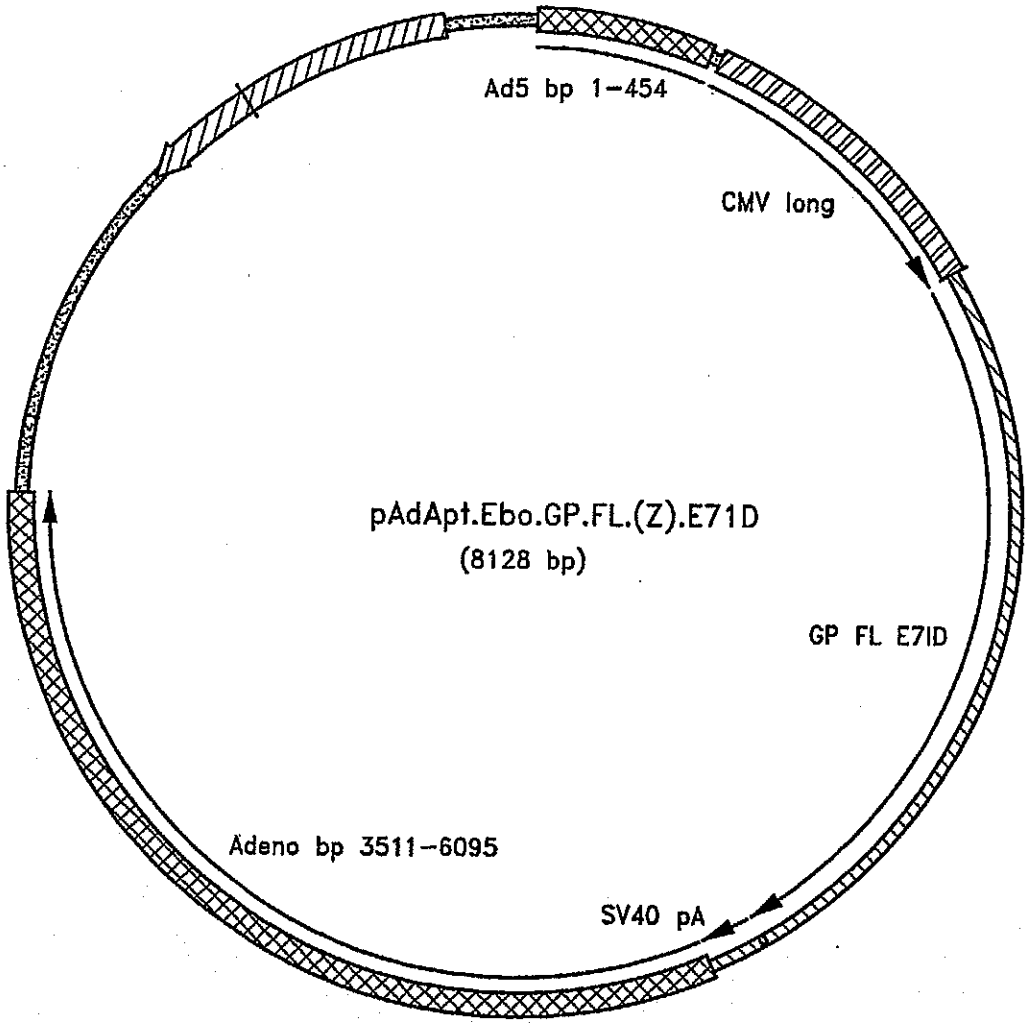

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FIG. 7A

FIG. 7B

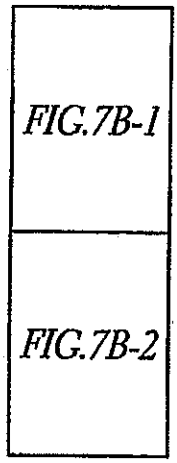


FIG. 7B-1

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FIG. 7B-2

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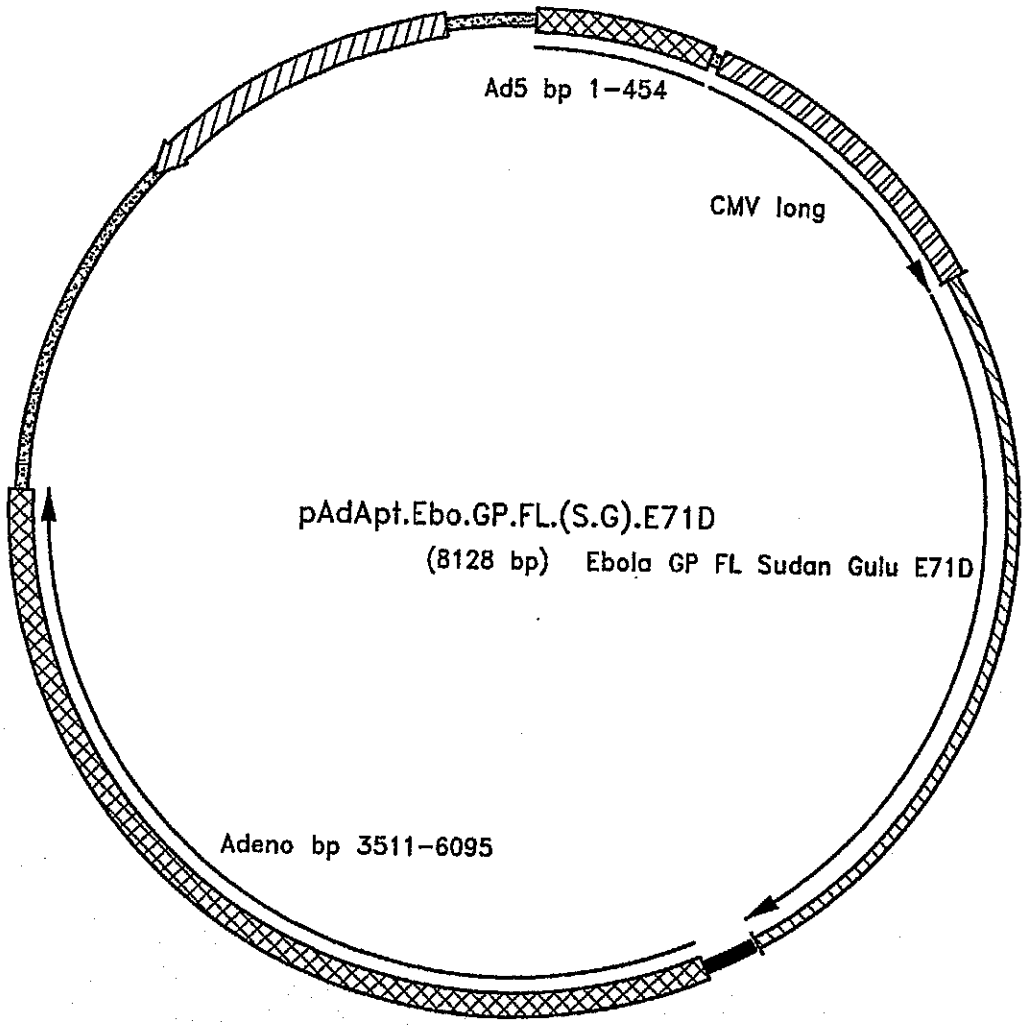

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FIG. 8A

FIG. 8B

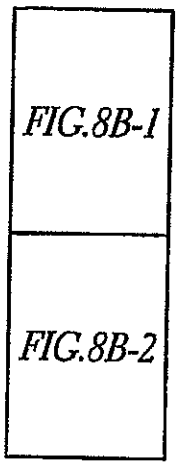


FIG. 8B-1

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FIG. 8B-2

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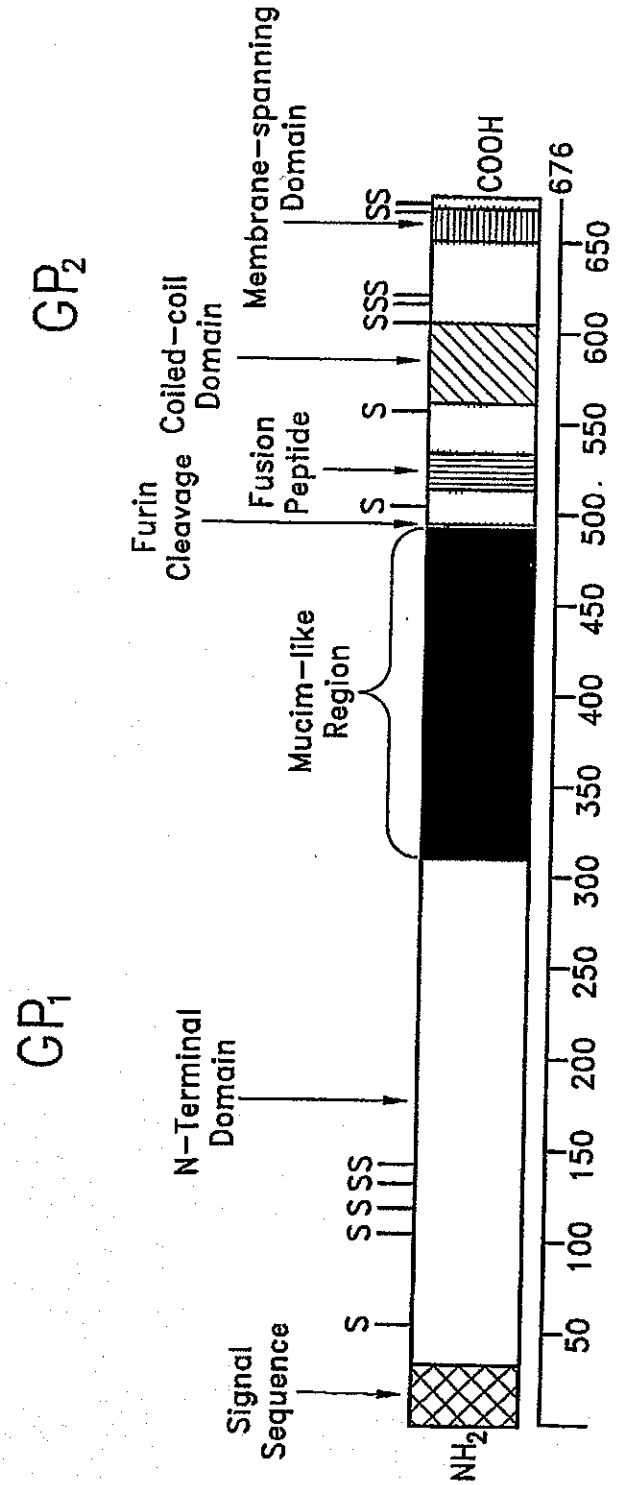

GP2
GP1
Membrane-spanning Domain
Coiled-coil Domain
Fusion Peptide
Furin Cleavage
Mucim-like Region
N-Terminal Domain
Signal Sequence
SS
SSS
S
S
S
SSSS
S
NH2
COOH
676
650
600
550
500
450
400
350
300
250
200
150
100
50

FIG. 9

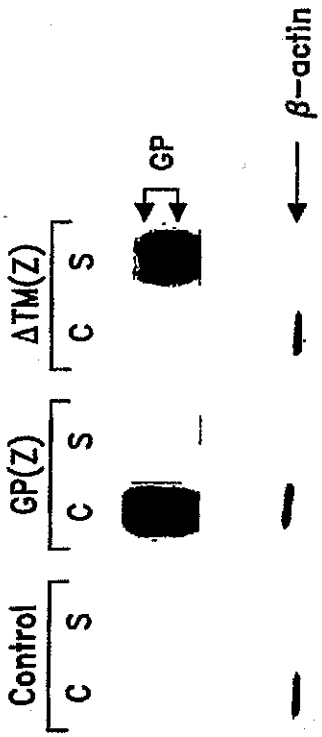


FIG. 10A

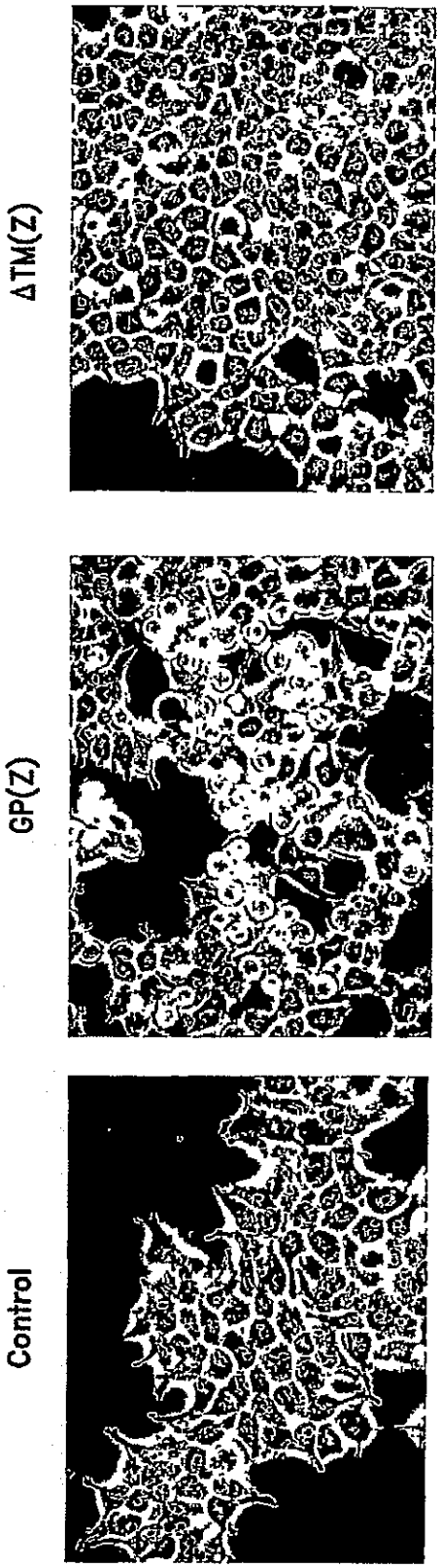


FIG. 10B

FIG. 11A

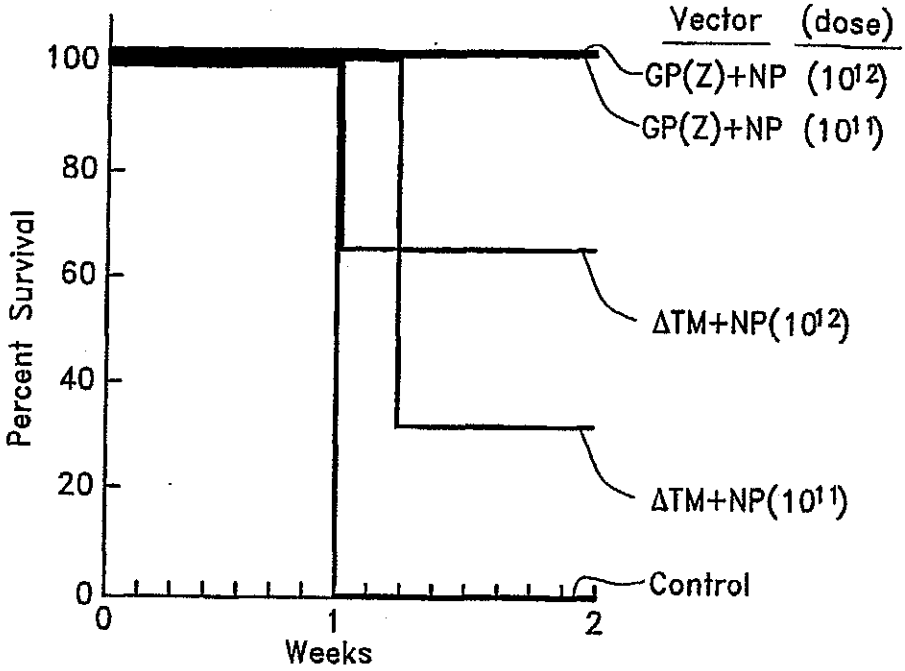


FIG. 11B

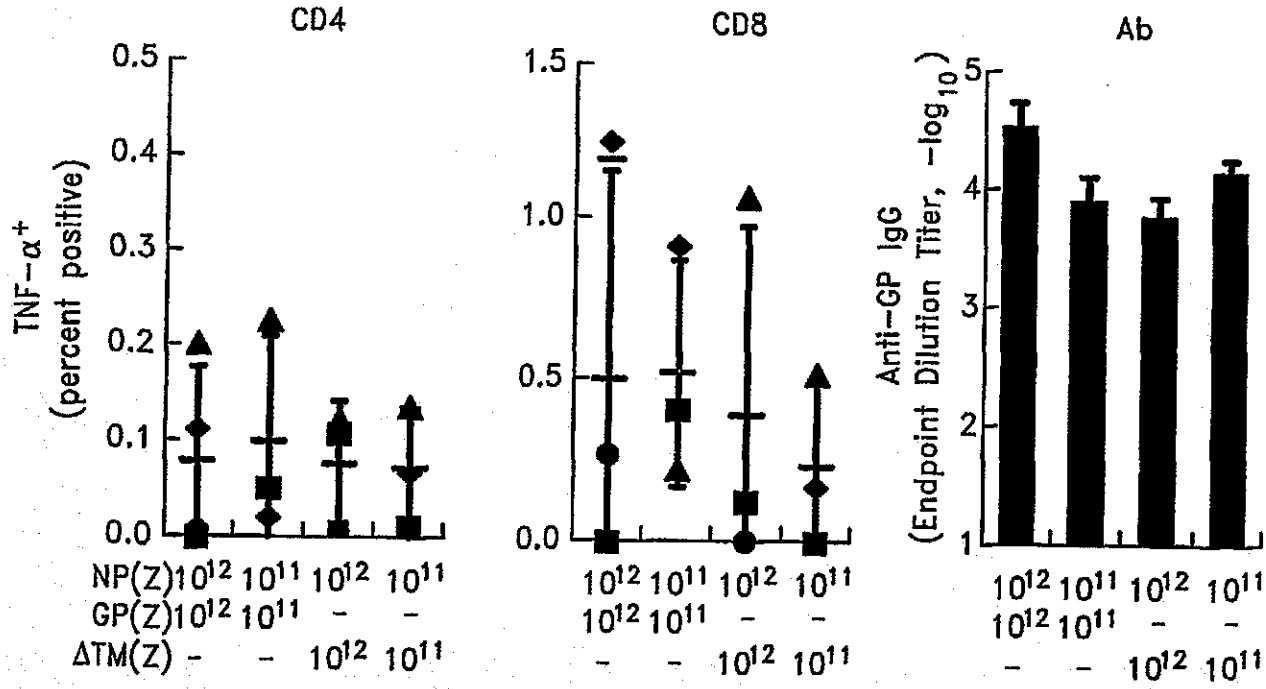


FIG. 12A

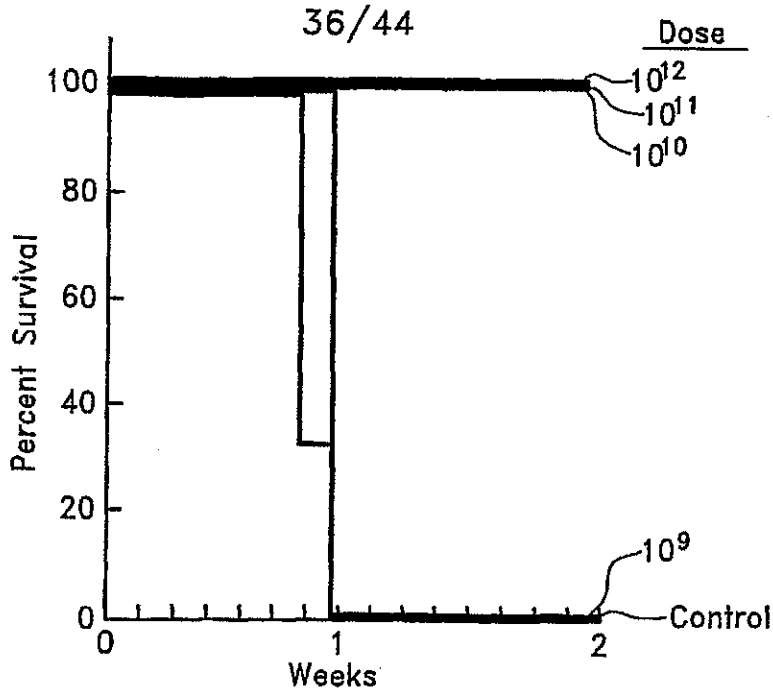


FIG. 12B

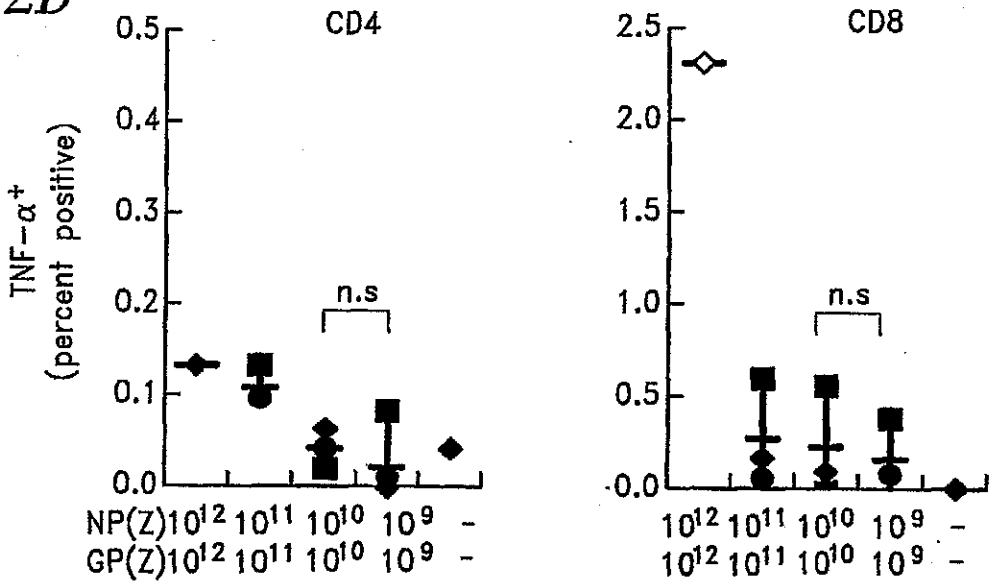


FIG. 12C

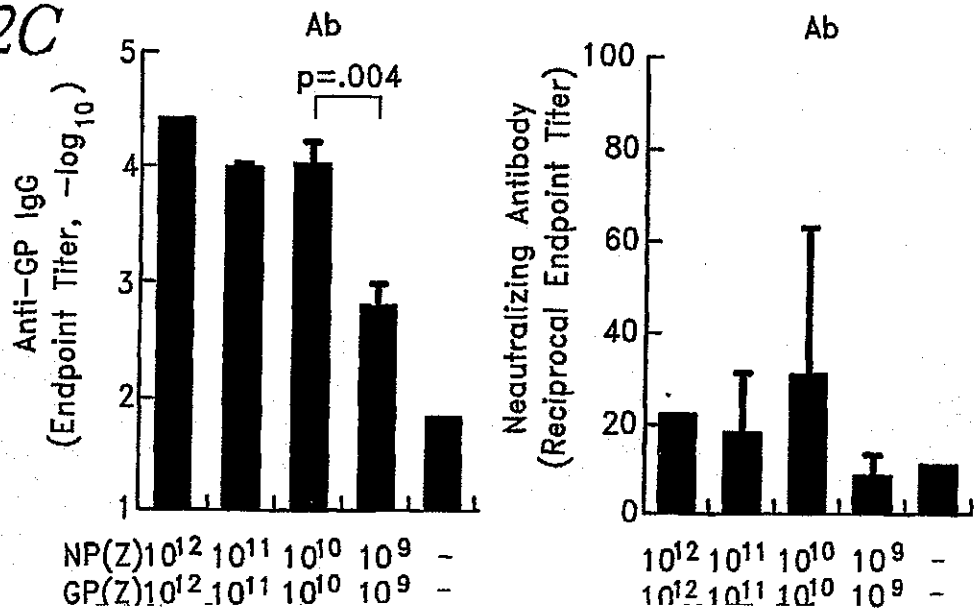


FIG. 13A

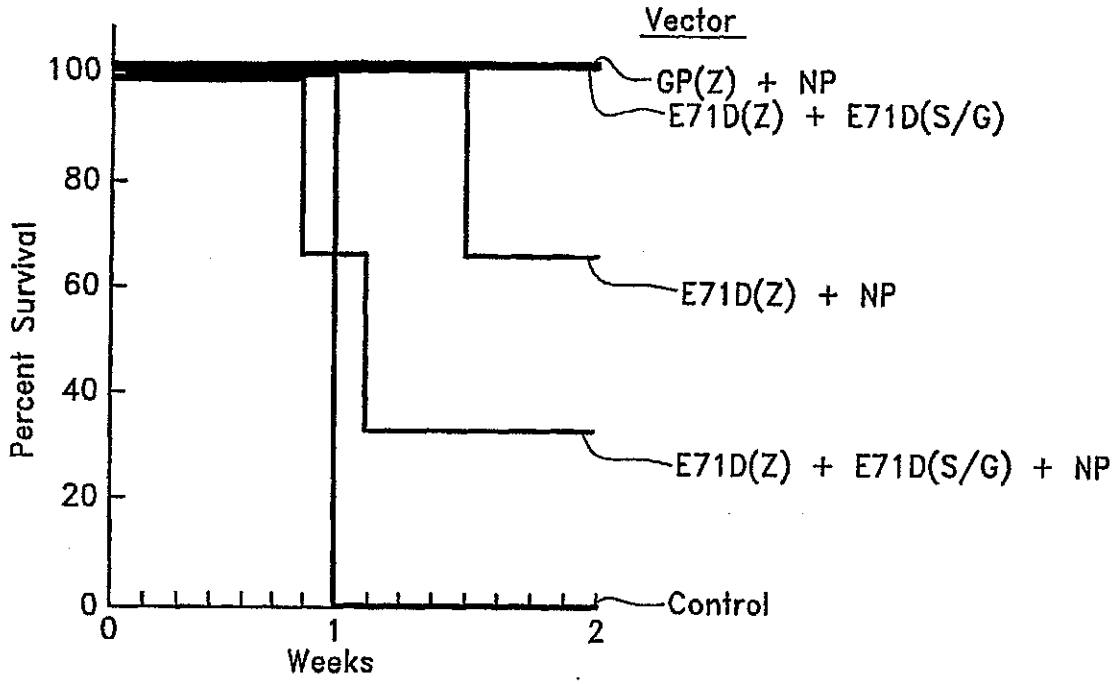


FIG. 13B

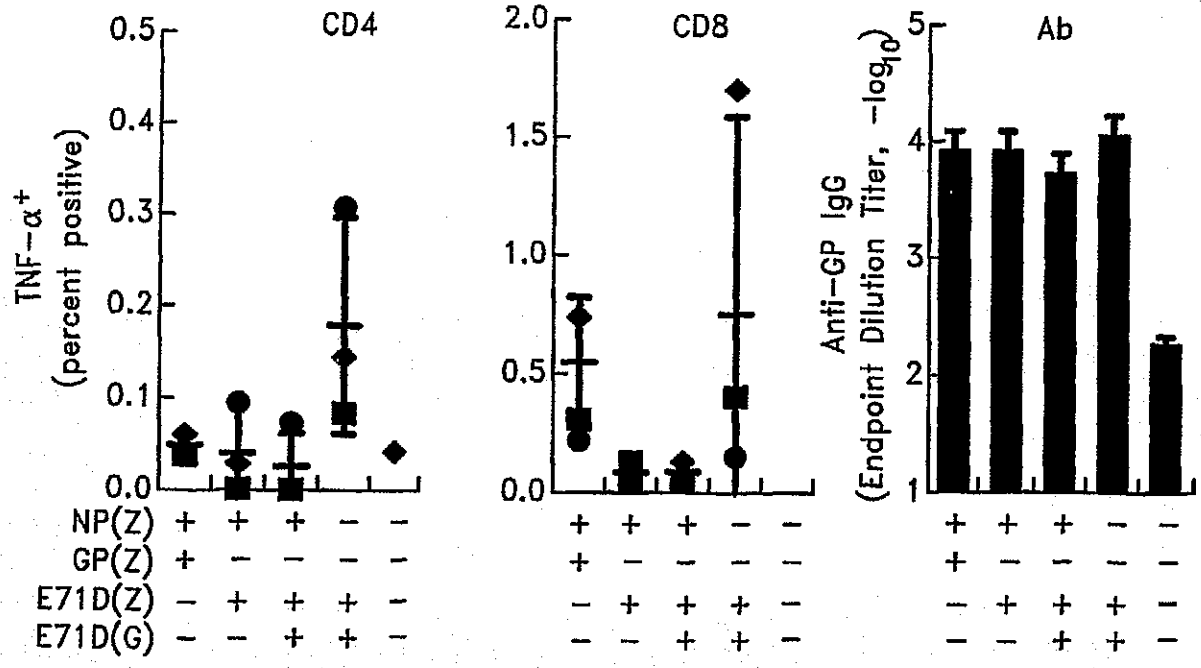


FIG. 14A

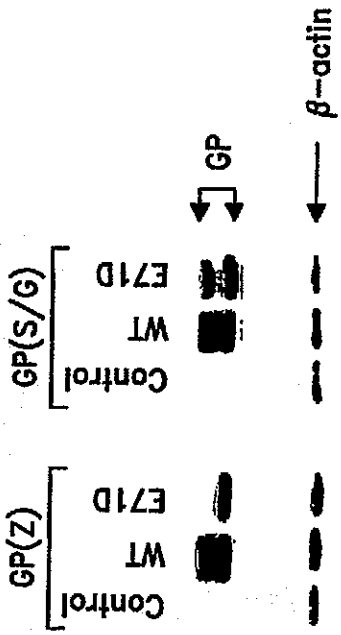


FIG. 14B

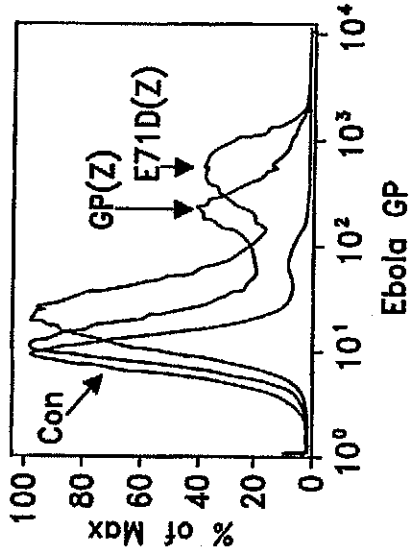
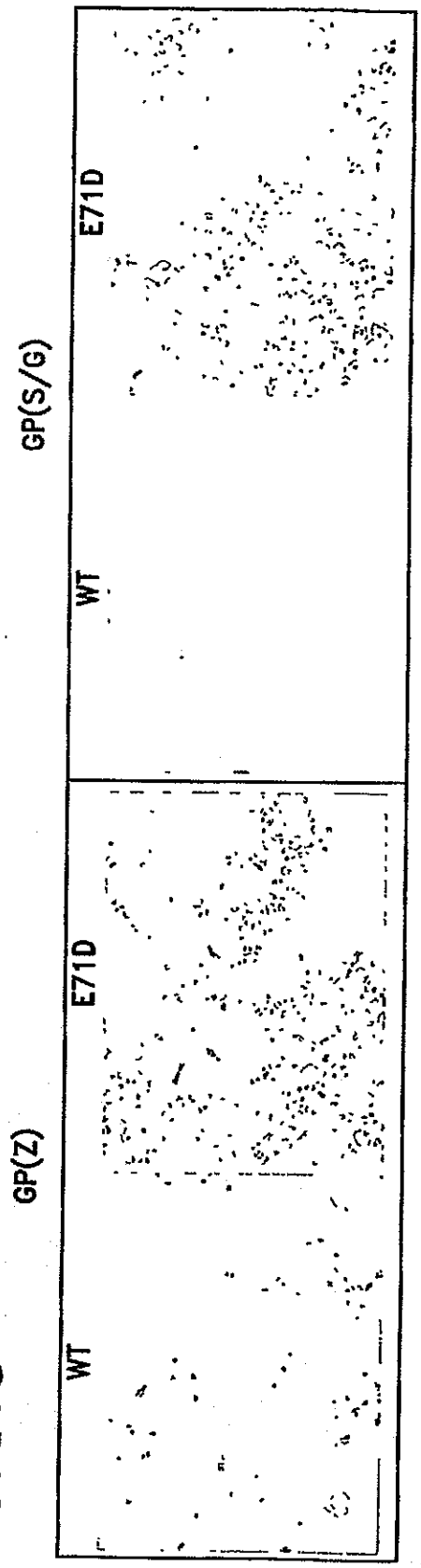


FIG. 14C



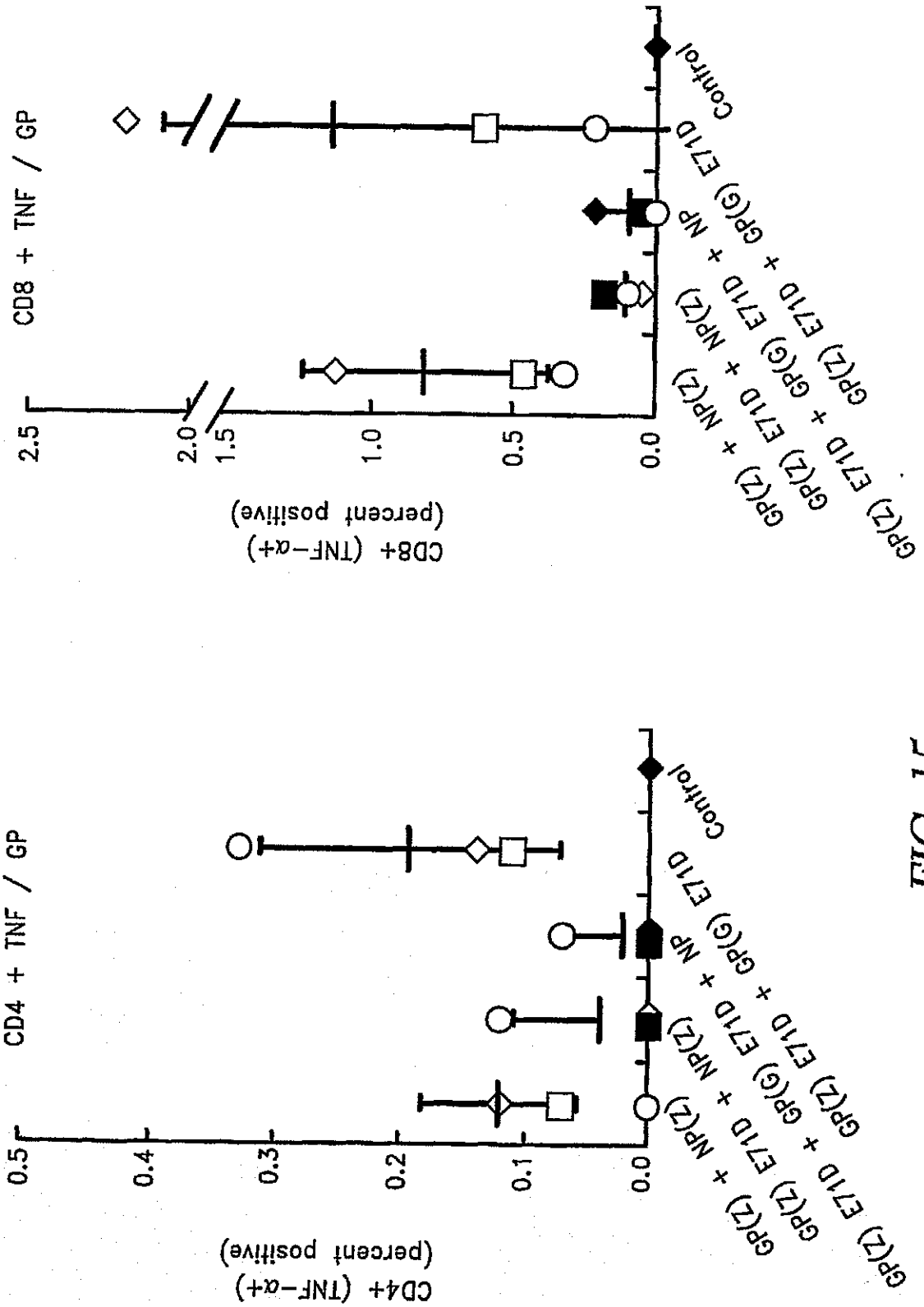

CD8 + TNF / GP
CD8+ (TNF-α+)
(percent positive)
2.5
2.0
1.5
1.0
0.5
0.0
Control
GP(Z) + NP(Z)
GP(Z) E71D + GP(G) E71D + NP
GP(Z) E71D + GP(G) E71D
CD4 + TNF / GP
CD4+ (TNF-α+)
(percent positive)
0.5
0.4
0.3
0.2
0.1
0.0
Control
GP(Z) + NP(Z)
GP(Z) E71D + GP(G) E71D + NP
GP(Z) E71D + GP(G) E71D

FIG. 15

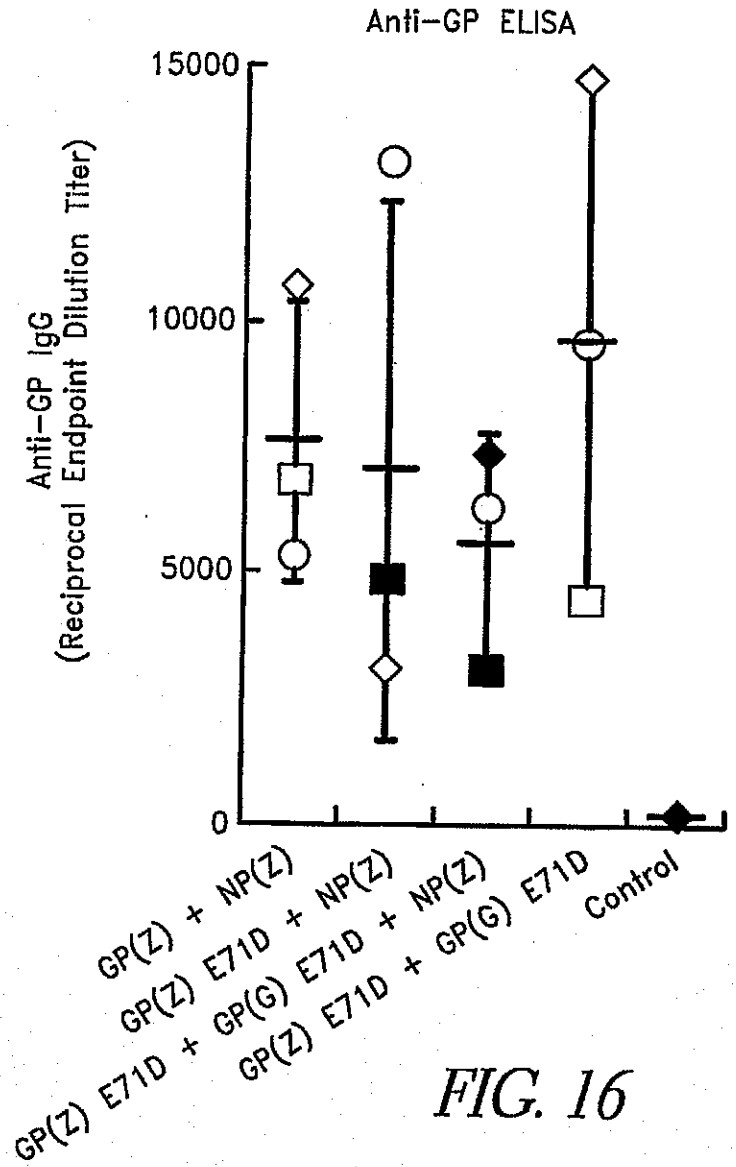

Anti-GP ELISA
Anti-GP IgG
(Reciprocal Endpoint Dilution Titer)
15000
10000
5000
0
GP(Z) + NP(Z)
GP(Z) E71D + NP(Z)
GP(Z) E71D + GP(G) E71D + NP(Z)
GP(Z) E71D + GP(G) E71D
Control

FIG. 16

Group	Immunogen	Dose (PU)	Survival
1	GP(Z) + NP(Z)	10^{10} each	3/3
2	GP(Z) E71D + NP(Z)	10^{10} each	2/3
3	GP(Z) E71D + GP(G) E71D + NP(Z)	10^{10} each	1/3
4	GP(Z) E71D + GP(G) E71D	10^{10} each	3/3
5	Control	0	0/1

FIG. 17

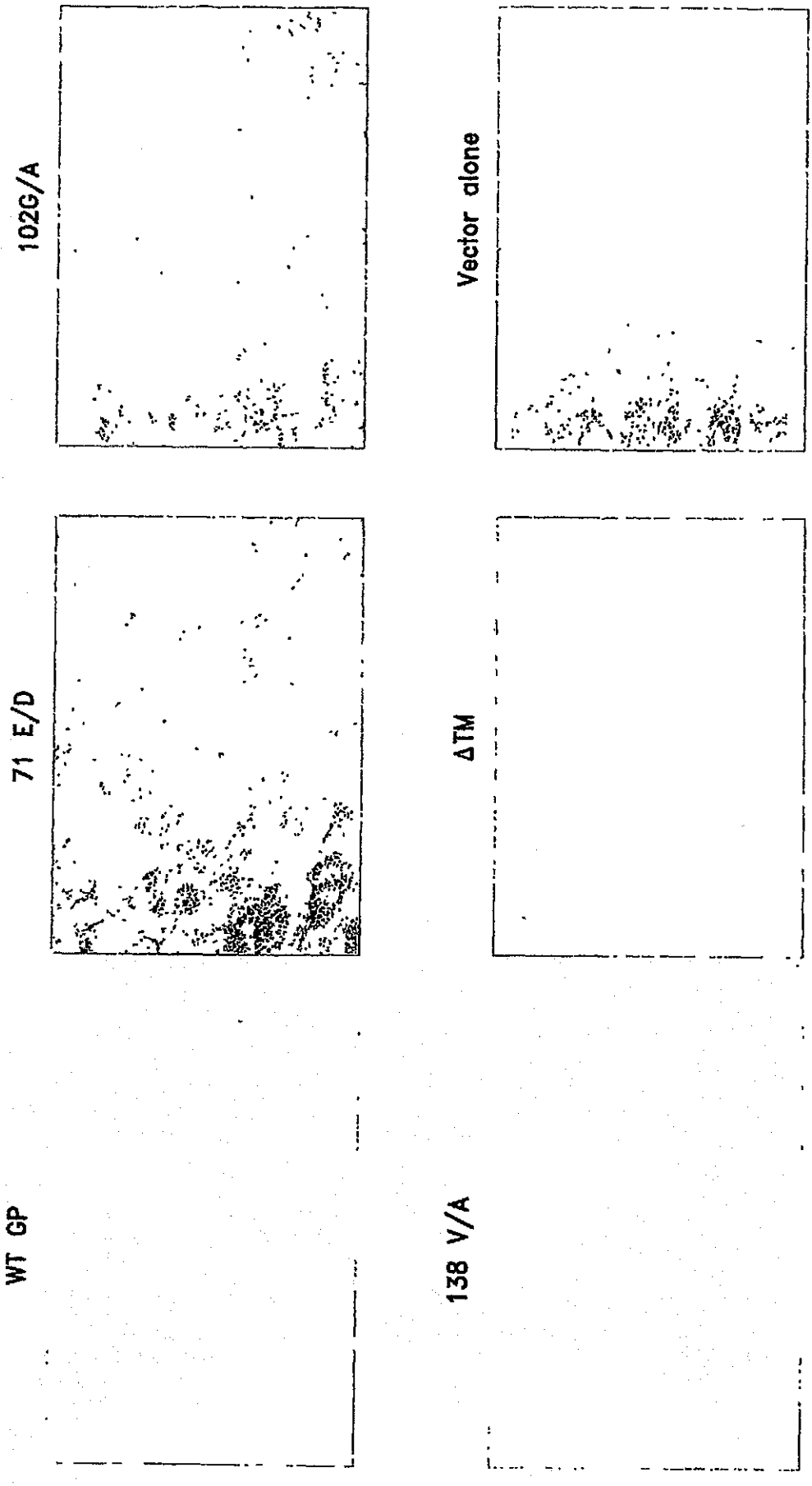


FIG. 18

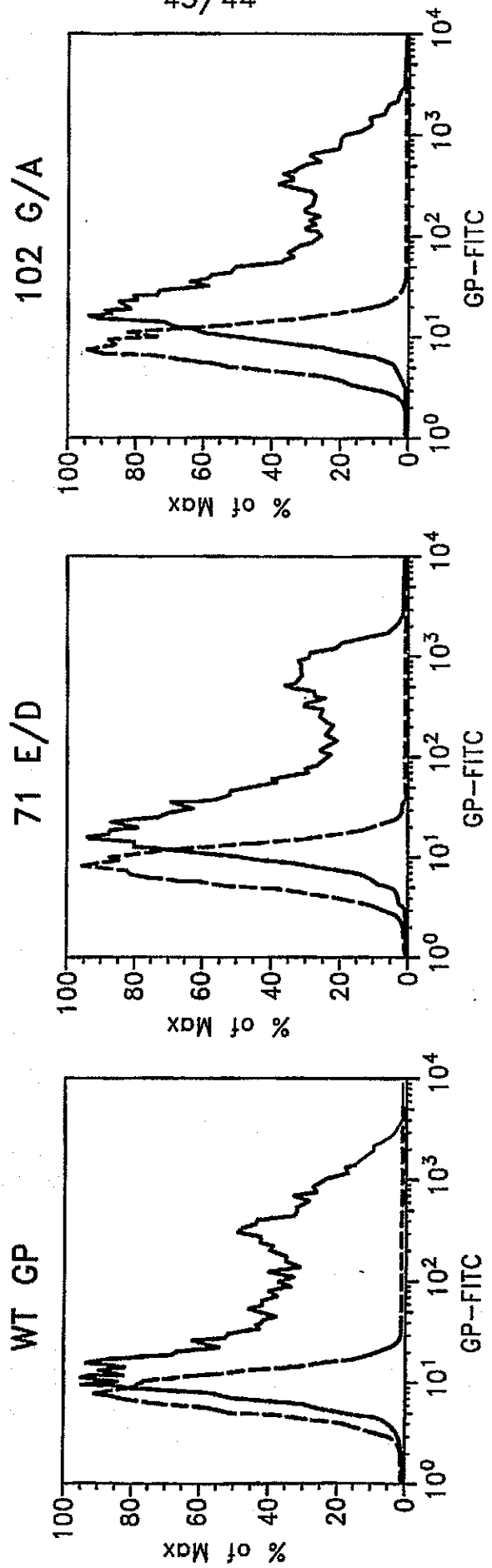

WT GP
71 E/D
102 G/A
% of Max
GP-FITC
0
20
40
60
80
100
10^0
10^1
10^2
10^3
10^4

FIG. 19

FIG. 20

Ebola Zaire Glycoprotein (SEQ ID NO: 9)

MGVTGILQLPRDRFKRTSFFLWVIILFQRTFSIPLGVIHNSTLQVSDVDKLVCRDKLS
STNQLRSVGLNLEGNGVATDVPSATKRWGFRSGVPPKVVNYEAGEWAENCYNLE
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