```
                  10        20        30        40        50        60        70        80
           ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
JCV  VP1   MAPTKRKGER KDPVQVPKLL IRGGVEVLEV KTGVDSITEV ECFLTPEMGD PDEHLRGFSK SISISDTFES DSPNKDMLPC
SV40 COA1  --PKKPK--- -EPVQVPKLV IKGGIEVLGV KTGVDSFTEV ECFLNPQMGN PDEHQKGLSK SLAAEKQFTD DSPDKEQLPC

                  90        100       110       120       130       140       150       160
           ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
JCV  VP1   YSVARIPLPN LNEDLTCGNI LMWEAVTLKT EVIGVTTLMN VHSNGQATHD NGAAKPVQGT SFHFFSVGGE ALELQGVVFN
SV40 COA1  YSVARIPLPN INEDLTCGNI LMWEAVTVKT EVIGVTAMLN LHSGTQKTHE NGAGKPIQGS NFHFFAVGGE PLELQGVLAN

                  170       180       190       200       210       220       230       240
           ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
JCV  VP1   YRTTYPDGTI FPKNATVQSQ VMNTEHKAYL DKNKAYPVEC WVPDPTRNEN TRYFGTLTGG ENVPPVLHIT NTATTVLLDE
SV40 COA1  YRTKYPAQTV TPKNATVDSQ QMNTDHKAVL DKDNAYPVEC WVPDPSKNEN TRYFGTYTGG ENVPPVLHIT NTATTVLLDE

                  250       260       270       280       290       300       310       320
           ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....| ....|....|
JCV  VP1   FGVGPLCKGD NLYLSAVDVC GMFTNRSGSQ QWRGLSRYFK VQLRKRRVKN PYPISFLLTD LINRRTPRVD GQPMYGMDAQ
SV40 COA1  QGVGPLCKAD SLYVSAVDIC GLFTNTSGTQ QWKGLPRYFK ITLRKRSVKN PYPISFLLSD LINRRTQRVD GQPMIGMSSQ

                  330       340       350
           ....|....| ....|....| ....|....| ....
JCV  VP1   IEEVRVFEGT EQLPGDPDMM RYVDRYGQLQ TKML
SV40 COA1  VEEVRVYEDT EELPGDPDMI RYIDEFGQTT TRMQ
```

Fig. 1



Fig. 2

VP1 from Brain Samples of PML subjects:

>AAB60584 gi|1161319|gb|AAB60584.1| VP1
NVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRSGSQQWRGLSRYFKVQLRKRRVKN
PYPISFLLTDLINRRTPRVDGQPMYGMDAQVEEVRVFEGTEELPGDPDMMRYVDRYGQLQTKML
(SEQ ID NO: 3)

>AAB60586 gi|1161322|gb|AAB60586.1| VP1
NVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRSGSQQWRGLSRYFKVQLRKRRVKN
PYPISFLLTDLINRRTPRVDGQPMYGMDAQVEEVRVFEGTEELPGDPDMMRYVDRYGQLQTKML
(SEQ ID NO: 4)

>AAB62687 gi|2246615|gb|AAB62687.1| VP1 [JC virus]
MAPTKRKGERKDPVQVPKLLIRGGVEVLEVKTGVDSITEVECFLTPEMGDPDEHFRGFSKSISISDTFE
SDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTEVIGVTTLMNVHSNGQAAHDNGAGKPVQ
GTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQVMNTEHKAYLDKNKAYPVECWVPDPTR
NENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRSGSQQWRGLS
RYFKVQLRKRRVKNPYPISFLLTDLINRRTPRVDGQPMYGMDAQVEEVRVFEGTEELPGDPDMMRYVDR
YGQLQTKML
(SEQ ID NO: 5)

>AAB94036 gi|2735983|gb|AAB94036.1| VP1 [JC virus]
MAPTKRKGERKDPVQVPKLLIRGGVEVLEVKTGVDSITEVECFLTPEMGDPDEHFRGFSKSISISDTFE
SDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTEVIGVTTLMNVHSNGQATHDNGAGKPVQ
GTSFHFFSVGGEALELQGVVFNYRTTYPDGTIFPKNATVQSQVMNTEHKAYLDKNKAYPVECWVPDPTR
NENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRSGSQQWRGLS
RYFKVQLRKRRVKNPYPISFLLTDLINRRTPRVDGQPMYGMDAQVEEVRVFEGTEELPGDPDMMRYVDR
YGQLQTKML
(SEQ ID NO: 6)

>BAA01965 gi|425206|dbj|BAA01965.1| VP1 [JC polyomavirus]
MAPTKRKGERKDPVQVPKLLIRGGVEVLEVKTGVDSITEVECFLTPEMGDPDEHLRGFSKSISISDTFE
SDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTEVIGVTTLMNVHSNGQAAHDNGAGKPVQ
GTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQVMNTEHKAYLDKNKAYPVECWVPDPTR
NENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRSGFQQWRGLS
RYFKVQLRKRRVKNPYPISFLLTDLINRRTPRVDGQPMYGMDAQVEEVRVFEGTEELPGDPDMMRYVDR
YGQLQTKML
(SEQ ID NO: 7)

>BAA01966 gi|425207|dbj|BAA01966.1| VP1 [JC polyomavirus]
MAPTKRKGERKDPVQVPKLLIRGGVEVLEVKTGVDSITEVECFLTPEMGDPDEHLRGFSKSISISHTFE
SDSPNRDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTEVIGVTSLMNVHSNGQATHDNGAGKPVQ
GTSFHFFSVGGEALELQGVLFNYRTKYPDGTIFPKNATVQSQVMNTEHKAYLDKNKAYPVECWVPDPTR
NENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRSGSQQWRGLS
RYFKVQLRKRRVKNPYPISFLLTDLINRRTPRVDGQPMYGMDAQVEEVRVFEGTEELPGDPDMMRYVDK
YGQLQTKML
(SEQ ID NO: 8)

>BAA01967 gi|425208|dbj|BAA01967.1| VP1 [JC polyomavirus]
MAPTKRKGERKDPVQVPKLLIRGGVEVLEVKTGVDSITEVECFLTPEMGDPDEHLRGFSKSISISDTFE
SDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTEVIGVTSLMNVHSNGQATHDNGAGKPVQ
GTSFHFFSVGGEALELQGVLFNYRTKYPDGTIFPKNATVQSQVMNTEHKAYLDKNKAYPVECWVPDPTR
NENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRLGSQQWRGLS
RYFKVQLRKRRVKNPYPISFLLTDLINRRTPRVDGQPMYGMDAQVEEVRVFEGTEELPGDPDMMRYVDK
YGQLQTKML
(SEQ ID NO: 9)

Fig. 3-1

>BAA01968 gi|425209|dbj|BAA01968.1| VP1 [JC polyomavirus]
MAPTKRKGERKDPVQVPKLLIRGGVEVLEVKTGVDSITEVECFLTPEMGDPDEHLRGFSKSISISDTFE
SDSPSKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTEVIGVTSLMNVHSNGQAAHDNGAGKPVQ
GTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQVMNTEHKAYLDKNKAYPVECWVPDPTR
NENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRSGSQQWRGLS
RYFKVQLRKRRVKNPYPISFLLTDLINRRTPRVDGQPMYGMDAQVEEVRVFEGTEELPGDPDMMRYVDK
YGQLQTKML
(SEQ ID NO: 10)

>BAA01969 gi|425210|dbj|BAA01969.1| VP1 [JC polyomavirus]
MAPTKRKGERKDPVQVPKLLIRGGVEVLEVKTGVDSITEVECFLTPEMGDPDEHLRGFSKSISISDTFE
SDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTEVLGVTTLMNVHSNGQATHDNGAGKPVQ
GTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQVMNTEHKAYLDKNKAYPVECWVPDPTR
NENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRSGFQQWRGLS
RYFKVQLRKRRVKNPYPISFLLTDLINRRTPRVDGQPMYGMDAQVEEVRVFEGTEELPGDPDMMRYVDR
YGQLQTKML
(SEQ ID NO: 11)

>BAA01970 gi|425211|dbj|BAA01970.1| VP1 [JC polyomavirus]
MAPTKRKGERKDPVQVPKLLIRGGVEVLEVKTGVDSITEVECFLTPEMGDPDEHLRGFSKSISISDTFE
SDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTEVLGVTTLMNVHSNGQATHDNGAGKPVQ
GTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQVMNTEHKAYLDKNKAYPVECWVPDPTR
NENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRSGSQQWRGLS
RYFKVQLRKRRVKNPYPISFLLTDLINRRTPRVDGQPMYGMDAQVEEVRVFEGTEELPGDPDMMRYVDR
YGQLQTKML
(SEQ ID NO: 12)

>BAA05636 gi|538231|dbj|BAA05636.1| VP1 (capsid protein) [JC polyomavirus]
MAPTKRKGERKDPVQVPKLLIRGGVEVLEVKTGVDSITEVECFLTPEMGDPDEHLRGFSKSISISDTFE
SDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTEVLGVTTLMNVHSNGQATHDNGAGKPVQ
GTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQVMNTEHKAYLDKNKAYPVECWVPDPTR
NENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRSGSQQWRGLS
RYFKVQLRKRRVKNPYPISFLLTDLINRRTPRVDGQPMYGMDAQVEEVRVFEGTEELPGDPDMMRYVDR
YGQLQTKML
(SEQ ID NO: 13)

>BAA05637 gi|538234|dbj|BAA05637.1| VP1 (capsid protein) [JC polyomavirus]
MAPTKRKGERKDPVQVPKLLIRGGVEVLEVKTGVDSITEVECFLTPEMGDPDEHLRGFSKSISISDTFE
SDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTEVLGVTTLMNVHSNGQATHDNGAGKPVQ
GTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQVMNTEHKAYLDKNKAYPVECWVPDPTR
NENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRSGFQQWRGLS
RYFKVQLRKRRVKNPYPISFLLTDLINRRTPRVDGQPMYGMDAQVEEVRVFEGTEELPGDPDMMRYVDR
YGQLQTKML
(SEQ ID NO: 14)

>BAA05638 gi|538238|dbj|BAA05638.1| VP1 (capsid protein) [JC polyomavirus]
MAPTKRKGERKDPVQVPKLLIRGGVEVLEVKTGVDSITEVECFLTPEMGDPDEHLRGFSKSISISDTFE
SDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTEVIGVTTLMNVHSNGQATHDNGAGKPVQ
GTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQVMNTEHKAYLDKNKAYPVECWVPDPTR
NENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRSGYQQWRGLS
RYFKVQLRKRRVKNPYPISFLLTDLINRRTPRVDGQPMYGMDAQVEEVRVFEGTEELPGDPDMMRYVDR
YGQLQTKML
(SEQ ID NO: 15)

Fig. 3-2

>BAB11728 gi|9796436|dbj|BAB11728.1| VP1 capsid protein [JC polyomavirus]
MAPTKRKGERKDPVQVPKLLIRGGVEVLEVKTGVDSITEVECFLTPEMGDPDEHLRGFSKSISISDTFE
SDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTEVLGVTTLMNVHSNGQATHDNGAGKPVQ
GTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQVMNTEHKAYLDKNKAYPVECWVPDPTR
NENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRSGFQQWRGLS
RYFKVQLRKRRVKNPYPISFLLTDLINRRTPRVDGQPMYGMDAQVEEVRVFEGTEELPGDPDMMRYVDR
YGQLQTKML
(SEQ ID NO: 16)

>BAB11734 gi|9796443|dbj|BAB11734.1| VP1 capsid protein [JC polyomavirus]
MAPTKRKGERKDPVQVPKLLIRGGVEVLEVKTGVDSITEVECFLTPEMGDPDEHLRGFSKSISISDTFE
SDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTEVIGVTTLMNVHSNGQATHDNGAGKPVQ
GTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQVMNTEHKAYLDKNKAYPVECWVPDPTR
NENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRSGYQQWRGLS
RYFKVQLRKRRVKNPYPISFLLTDLINRRTPRVDGQPMYGMDAQVEEVRVFEGTEELPGDPDMMRYVDR
YGQLQTKML
(SEQ ID NO: 17)

>BAE00111 gi|67968154|dbj|BAE00111.1| VP1 [JC polyomavirus]
MAPTKRKGERKDPVQVPKLLIRGGVEVLEVKTGVDSITEVECFLTPEMGDPDEHLRGFSKSISISDTFE
SDSPSKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTEVIGVTSLMNVHSNGQAAHDNGAGKPVQ
GTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQVMNTEHKAYLDKNKAYPVECWVPDPTR
NENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRSGSQQWRGLS
RYFKVQLRKRRVKNPYPISFLLTDLINRRTPRVDGQPMYGMDAQVEEVRVFEGTEELPGDPDMMRYVDK
YGQLQTKML
(SEQ ID NO: 18)

>BAE00117 gi|67968161|dbj|BAE00117.1| VP1 [JC polyomavirus]
MAPTKRKGERKDPVQVPKLLIRGGVEVLEVKTGVDSITEVECFLTPEMGDPDEHLRGFSKSISISDTFE
SDSPSKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTEVIGVTSLMNVHSNGQAAHDNGAGKPVQ
GTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQVMNTEHKAYLDKNKAYPVECWVPDPTR
NENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRSGFQQWRGLS
RYFKVQLRKRRVKNPYPISFLLTDLINRRTPRVDGQPMYGMDAQVEEVRVFEGTEELPGDPDMMRYVDK
YGQLQTKML
(SEQ ID NO: 19)

>BAE00123 gi|67968168|dbj|BAE00123.1| VP1 [JC polyomavirus]
MAPTKRKGERKDPVQVPKLLIRGGVEVLEVKTGVDSITEVECFLTPEMGDPDEHLRGFSKSISISDTFE
SDSPSKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTEVIGVTSLMNVHSNGQAAHDNGAGKPVQ
GTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQVMNTEHKAYLDKNKAYPVECWVPDPTR
NENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRSGFQQWRGLS
RYFKVQLRKRRVKNPYPISFLLTDLINRRTPRVDGQPMYGMDAQVEEVRVFEGTEELPGDPDMMRYVDK
YGQLQTKML
(SEQ ID NO: 20)

>BAE00127 gi|67968173|dbj|BAE00127.1| VP2 [JC polyomavirus]
MGAALALLGDLVATVSEAAAATGFSVAEIAAGEAAATIEVEIASLATVEGITSTSEAIAAIGLTPETYA
VITGAPGAVAGFAALVQTVTGGSAIAQLGYRFFADWDHKVSTVGLFQQPAMALQLFNPEDYYDILFPGV
NAFVNNIHYLDPRHWGPSLFSTISQAFWNLVRDDLPSLTSQEIQRRTQKLFVESLARFLEETTWAIVNS
PVNLYNYISDYYSRLSPVRPSMVRQVAQREGTYISFGHSYTQSIDDADSIQEVTQRLDLKTPNVQSGEF
IEKSIAPGGANQRSAPQWMLPLLLGLYGTVTPALEAYEDGPNKKKRRKEGPRASSKTSYKRRSRSSRS
(SEQ ID NO: 21)

Fig. 3-3

>BAE00129 gi|67968175|dbj|BAE00129.1| VP1 [JC polyomavirus]
MAPTKRKGERKDPVQVPKLLIRGGVEVLEVKTGVDSITEVECFLTPEMGDPDEHLRGFSKSISISDTFE
SDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTEVIGVTTLMNVHSNGQATHDNGAGKPVQ
GTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQVMNTEHKAYLDKNKAYPVECWVPDPTR
NENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRSGSQQWRGLS
RYFKVQLRKRRVKNPYPISFLLTDLINRRTPRVDGQPMYGMDAQVEEVRVFEGTEELPGDPDMMRYVDR
YGQLQTKML
(SEQ ID NO: 22)

>BAE00135 gi|67968182|dbj|BAE00135.1| VP1 [JC polyomavirus]
MAPTKRKGERKDPVQVPKLLIRGGVEVLEVKTGVDSITEVECFLTPEMGDPDEHLRGFSKLISISDTFE
SDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTEVIGVTTLMNVHSNGQATHDNGAGKPVQ
GTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQVMNTEHKAYLDKNKAYPVECWVPDPTR
NENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRSGSQQWRGLS
RYFKVQLRKRRVKNPYPISFLLTDLINRRTPRVDGQPMYGMDAQVEEVRVFEGTEELPGDPDMMRYVDR
YGQLQTKML
(SEQ ID NO: 23)

>BAE00141 gi|67968189|dbj|BAE00141.1| VP1 [JC polyomavirus]
MAPTKRKGERKDPVQVPKLLIRGGVEVLEVKTGVDSITEVECFLTPEMGDPDEHLRGFSKSISISDTFE
SDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTEVIGVTTLMNVHSNGQATHDNGAGKPVQ
GTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQVMNTEHKAYLDKNKAYPVECWVPDPTR
NENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRSGSQQWRGLS
RYFKVQLRKRRVKNPYPISFLLTDLINRRTPRVDGQPMYGMDAQVEEVRVFEGTEELPGDPDMMRYVDR
YGQLQTKML
(SEQ ID NO: 24)

>BAE00147 gi|67968204|dbj|BAE00147.1| VP1 [JC polyomavirus]
MAPTKRKGERKDPVQVPKLLIRGGVEVLEVKTGVDSITEVECFLTPEMGDPDEHLRGFSKSISISDTFE
SDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTEVLGVTTLMNVHSNGQATHDNGAGKPVQ
GTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQVMNTEHKAYLDKNKAYPVECWVPDPTR
NENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRSGSQQWRGLS
RYFKVQLRKRRVKNPYPISFLLTDLINRRTPRVDGQPMYGMDAQVEEVRVFEGTEELPGDPDMMRYVDR
YGQLQTKML
(SEQ ID NO: 25)

>BAE00153 gi|67968211|dbj|BAE00153.1| VP1 [JC polyomavirus]
MAPTKRKGERKDPVQVPKLLIRGGVEVLEVKTGVDSITEVECFLTPEMGDPDEHLRGFSKSISISDTFE
SDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTEVLGVTTLMNVHSNGQATHDNGAGKPVQ
GTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQVMNTEHKAYLDKNKAYPVECWVPDPTR
NENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRSGYQQWRGLS
RYFKVQLRKRRVKNPYPISFLLTDLINRRTPRVDGQPMYGMDAQVEEVRVFEGTEELPGDPDMMRYVDR
YGQLQTKML
(SEQ ID NO: 26)

>BAE00159 gi|67968218|dbj|BAE00159.1| VP1 [JC polyomavirus]
MAPTKRKGERKDPVQVPKLLIRGGVEVLEVKTGVDSITEVECFLTPEMGDPDEHLRGFSMSISISDTFE
SDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTEVLGVTTLMNVHSNGQATHDNGAGKPVQ
GTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQVMNTEHKAYLDKNKAYPVECWVPDPTR
NENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRSGSQQWRGLS
RYFKVQLRKRRVKNPYPISFLLTDLINRRTPRVDGQPMYGMDAQVEEVRVFEGTEELPGDPDMMRYVDR
YGQLQTKML
(SEQ ID NO: 27)

Fig. 3-4

>BAE00165 gi|67968225|dbj|BAE00165.1| VP1 [JC polyomavirus]
MAPTKRKGERKDPVQVPKLLIRGGVEVLEVKTGVDSITEVECFLTPEMGDPDEHLRGFSKSISISDTFE
SDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTEVLGVTTLMNVHCNGQATHDNGAGKPVQ
GTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQVMNTEHKAYLDKNKAYPVECWVPDPTR
NENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRSGSQQWRGLS
RYFKVQLRKRRVKNPYPISFLLTDLINRRTPRVDGQPMYGMDAQVEEVRVFEGTEELPGDPDMMRYVDR
YGQLQTKML
(SEQ ID NO: 28)

>BAE00171 gi|67968232|dbj|BAE00171.1| VP1 [JC polyomavirus]
MAPTKRKGERKDPVQVPKLLIRGGVEVLEVKTGVDSITEVECFLTPEMGDPDEHLRGFSKSISISDTFE
SDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTEVLGVTTLMNVHCNGQATHDNGAGKPVQ
GTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQVMNTEHKAYLDKNKAYPVECWVPDPTR
NENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRSGSQQWRGLS
RYFKVQLRKRRVKNPYPISFLLTDLINRRTPRVDGQPMYGMDAQVEEVRVFEGTEELPGDPDMMRYVDR
YGQLQTKML
(SEQ ID NO: 29)

>BAE02837 gi|68445619|dbj|BAE02837.1| VP1 protein [JC polyomavirus]
FLTPEMGDPDEHLRGFSKSISISDTFESDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTE
VIGVTTLMNVHSNGQATHDNGAGKPVQGTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQ
VMNTEHKAYLDKNKAYPVECWVPDPTRNENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKG
DNLYLSAVDVCGMFTNRSGSQQWRGLSRYFKVQLRKRR
(SEQ ID NO: 30)

>BAE02838 gi|68445621|dbj|BAE02838.1| VP1 protein [JC polyomavirus]
FLTPEMGDPDEHLRGFSKSISISHTFESDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTE
VIGVTTLMNVHSNGQATHDNGAGKPVQGTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQ
VMNTEHKAYLDKNKAYPVECWVPDPTRNENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKG
DNLYLSAVDVCGMFTNRSGSQQWRGLSRYFKVQLRKRR
(SEQ ID NO: 31)

>BAE02839 gi|68445623|dbj|BAE02839.1| VP1 protein [JC polyomavirus]
FLTPEMGDPDEHLRGFSKSISISNTFESDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTE
VIGVTTLMNVHSNGQATHDNGAGKPVQGTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQ
VMNTEHKAYLDKNKAYPVECWVPDPTRNENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKG
DNLYLSAVDVCGMFTNRSGSQQWRGLSRYFKVQLRKRR
(SEQ ID NO: 32)

>BAE02840 gi|68445625|dbj|BAE02840.1| VP1 protein [JC polyomavirus]
FLTPEMGDPDEHLRGFSESISISHTFESDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTE
VIGVTTLMNVHSNGQATHDNGAGKPVQGTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQ
VMNTEHKAYLDKNKAYPVECWVPDPTRNENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKG
DNLYLSAVDVCGMFTNRSGSQQWRGLSRYFKVQLRKRR
(SEQ ID NO: 33)

>BAE02841 gi|68445627|dbj|BAE02841.1| VP1 protein [JC polyomavirus]
FLTPEMGDPDEHLRGFSKSISISDTFESDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTE
VLGVTTLMNVHSNGQATHDNGAGKPVQGTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQ
VMNTEHKAYLDKNKAYPVECWVPDPTRNENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKG
DNLYLSAVDVCGMFTNRFGSQQWRGLSRYFKVQLRKRR
(SEQ ID NO: 34)

Fig. 3-5

>BAE02842 gi|68445629|dbj|BAE02842.1| VP1 protein [JC polyomavirus]
FLTPEMGDPDEHLRGFSMSISISDTFESDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTE
VIGVTTLMNVHSNGQATHDNGAGKPVQGTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQ
VMNTEHKAYLDKNKAYPVECWVPDPTRNENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKG
DNLYLSAVDVCGMFTNRSGSQHWRGLSRYFKVQLRKRR
(SEQ ID NO: 35)

>BAE02843 gi|68445631|dbj|BAE02843.1| VP1 protein [JC polyomavirus]
FLTPEMGDPDEHLRGFSKSISISHTFESDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTE
VIGVTTLMNVHSNGQATHDNGAGKPVQGTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQ
VMNTEHKAYLDKNKAYPVECWVPDPTRNENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKG
DNLYLSAVDVCGMFTNRSGSQQWRGLSRYFKVQLRKRR
(SEQ ID NO: 36)

>BAE02844 gi|68445633|dbj|BAE02844.1| VP1 protein [JC polyomavirus]
FLTPEMGDPDEHLRGFSKSISISDTFESDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTE
VLGVTTLMNVHSNGQATHDNGAGKPVQGTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQ
VMNTEHKAYLDKNKAYPVECWVPDPTRNENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKG
DNLYLSAVDVCGMFTNRSGFQQWRGLSRYFKVQLRKRR
(SEQ ID NO: 37)

>BAE02845 gi|68445635|dbj|BAE02845.1| VP1 protein [JC polyomavirus]
FLTPEMGDPDEHLRGFSKSISISDTFESDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTE
VLGVTTLMNVHSNGQATHDNGAGKPVQGTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQ
VMNTEHKAYLDKNKAYPVECWVPDPTRNENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKG
DNLYLSAVDVCGMFTNRFGSQQWRGLSRYFKVQLRKRR
(SEQ ID NO: 38)

>BAE02846 gi|68445637|dbj|BAE02846.1| VP1 protein [JC polyomavirus]
FLTPEMGDPDEHLRGFSKSISISDTFESDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTE
VIGVTTLMNVHSNGQATHDNGAGKPVQGTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQ
VMNTEHKAYLDKNKAYPVECWVPDPTRNENTRYFGTLTGGENAPPVLHITNTATTVLLDEFGVGPLCKG
DNLYLSAVDVCGMFTNRSGSQQWRGLSRYFKVQLRKRR
(SEQ ID NO: 39)

>BAE02847 gi|68445639|dbj|BAE02847.1| VP1 protein [JC polyomavirus]
FLTPEMGDPDEHLRGFSKSISISDTFDSDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTE
VIGVTTLMNVHSNGQATHDNGAGKPVQGTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQ
VMNTEHKAYLDKNKAYPVECWVPDPTRNENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKG
DNLYLSAVDVCGMFTNRSGFQQWRGLSRYFKVQLRKRR
(SEQ ID NO: 40)

VP1 from Non-brain Samples of PML subjects:
>AAB62680 gi|2246607|gb|AAB62680.1| VP1 [JC virus]
MAPTKRKGERKDPVQVPKLLIRGGVEVLEVKTGVDSITEVECFLTPEMGDPDEHLRGFSKSISISDTFE
SDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTEVIGVTTLMNVHSNGQAAHDNGAGKPVQ
GTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQVMNTEHKAYLDKNKAYPVECWVPDPTR
NENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRSGSQQWRGLS
RYFKVQLRKRRVKNPYPISFLLTDLINRRTPRVDGQPMYGMDAQVEEVRVFEGTEELPGDPDMMRYVDR
YGQLQTKML
(SEQ ID NO: 41)

Fig. 3-6

>AAT09819 gi|47078338|gb|AAT09819.1| VP1 [JC virus]
MAPTKRKGERKDPVQVPKLLIRGGVEVLEVKTGVDSITEVECFLTPEMGDPDEHLRGFSKSISISDTFE
SDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTEVLGVTTLMNVHSNGQATHDNGAGKPVQ
GTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQVMNTEHKAYLDKNKAYPVECWVPDPTR
NENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTTRSGSQQWRGLS
RYFKVQLRKRRVKNPYPISFLLTDLINRRTPRVDGQPMYGMDAQIEEVRVFEGTEELPGDPDMMRYVDR
YGQLQTKML
(SEQ ID NO: 42)

>AAT09825 gi|47078345|gb|AAT09825.1| VP1 [JC virus]
MAPTKRKGERKDPVQVPKLLIRGGVEVLEVKTGVDSITEVECFLTPEMGDPDEHLRGFSKSISISDTFE
SDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTEVIGVTTLMNVHSNGQATHDNGAAKPVQ
GTSFHFFSVGGEALELQGVVFNYRTTYPDGTIFPKNATVQSQVMNTEHKAYLDKNKAYPVECWVPDPTR
NENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRFGSQQWRGLS
RYFKVQLRKRRVKNPYPISFLLTDLINRRTPRVDGQPMYGMDAQIEEVRVFEGTEQLPGDPDMMRYVDR
YGQLQTKML
(SEQ ID NO: 43)

>AAT09831 gi|47078352|gb|AAT09831.1| VP1 [JC virus]
MAPTKRKGERKDPVQVPKLLIRGGVEVLEVKTGVDSITEVECFLTPEMGDPDEHFRGFSKSISISDTFE
SDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTEVIGVTTLMNVHSNGQATHDNGAAKPVQ
GTSFHFFSVGGEALELQGVVFNYRTTYPDGTIFPKNATVQSQVMNTEHKAYLDKNKAYPVECWVPDPTR
NENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRSGSQQWRGLS
RYFKVQLRKRRVKNPYPISFLLTDLINRRTPRVDGQPMYGMDAQIEEVRVFEGTEQLPGDPDMMRYVDR
YGQLQTKML
(SEQ ID NO: 44)

>AAT09837 gi|47078359|gb|AAT09837.1| VP1 [JC virus]
MAPTKRKGERKDPVQVPKLLIRGGVEVLEVKTGVDSITEVECFLTPEMGDPDEHLRGFSNSISISDTFE
SDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTEVIGVTTLMNVHSNGQATHDNGAAKPVQ
GTSFHFFSVGGEALELQGVVFNYRTTYPDGTIFPKNATVQSQVMNTEHKAYLDKNKAYPVECWVPDPTR
NENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKGDNLYLSAVDVCGMFTNRSGSQQWRGLS
RYFKVQLRKRRVKNPYPISFLLTDLINRRTPRVDGQPMYGMDAQIEEVRVFEGTEQLPGDPDMMRYVDR
YGQLQTKML
(SEQ ID NO: 45)

>BAE02848 gi|68445641|dbj|BAE02848.1| VP1 protein [JC polyomavirus]
FLTPEMGDPDEHLRGFSKSISISDTFESDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTE
VLGVTTLMNVHSNGQATHDNGAGKPVQGTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQ
VMNTEHKAYLDKNKAYPVECWVPDPTRNENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKG
DNLYLSAVDVCGMFTDRSGSQQWRGLSRYFKVQLRKRR
(SEQ ID NO: 46)

>BAE02849 gi|68445643|dbj|BAE02849.1| VP1 protein [JC polyomavirus]
FLTPEMGDPDEHFRGFSKSISISDTFESDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTE
VIGVTTLMNVHSNGQATHDNGAGKPVQGTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQ
VMNTEHKAYLDKNKAYPVECWVPDPTRNENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKG
DNLYLSAVDVCGMFTNRSGSQQWRGLSRYFKVQLRKRR
(SEQ ID NO: 47)

Fig. 3-7

>BAE02850 gi|68445645|dbj|BAE02850.1| VP1 protein [JC polyomavirus]
FLTPEMGDPDEHLRGFSKSISISDTFESDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTE
VLGVTTLMNVHSNGQATHDNGAGKPVQGTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQ
VMNTEHKAYLDKNKAYPVECWVPDPTRNENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKG
DNLYLSAVDVCGMFTDRSGSQQWRGLSRYFKVQLRKRR
(SEQ ID NO: 48)

>BAE02851 gi|68445647|dbj|BAE02851.1| VP1 protein [JC polyomavirus]
FLTPEMGDPDEHLRGFSKSISISDTFESDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTE
VLGVTTLMNVHCNGQATHDNGAGKPVQGTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQ
VMNTEHKAYLDKNKAYPVECWVPDPTRNENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKG
DNLYLSAVDVCGMFTNRSGSQQWRGLSRYFKVQLRKRR
(SEQ ID NO: 49)

>BAE02852 gi|68445649|dbj|BAE02852.1| VP1 protein [JC polyomavirus]
FLTPEMGDPDEHLRGFSKSISISDTFESDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTE
VIGVTTLMNVHSNGQATHDNGAGKPVQGTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQ
VMNTEHKAYLDKNKAYPVECWVPDPTRNENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKG
DNLYLSAVDVCGMFTNRSGFQQWRGLSRYFKVQLRKRR
(SEQ ID NO: 50)

>BAE02853 gi|68445651|dbj|BAE02853.1| VP1 protein [JC polyomavirus]
FLTPEMGDPDEHLRGFSKSISISDTFESDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTE
VLGVTTLMNVHCNGQATHDNGAGKPVQGTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQ
VMNTEHKAYLDKNKAYPVECWVPDPTRNENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKG
DNLYLSAVDVCGMFTNRSGSQQWRGLSRYFKVQLRKRR
(SEQ ID NO: 51)

>BAE02854 gi|68445653|dbj|BAE02854.1| VP1 protein [JC polyomavirus]
FLTPEMGDPDEHFRGFSKSISISDTFESDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTE
VIGVTTLMNVHSNGQATHDNGAGKPVQGTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQ
VMNTEHKAYLDKNKAYPVECWVPDPTRNENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKG
DNLYLSAVDVCGMFTNRSGSQQWRGLSRYFKVQLRKRR
(SEQ ID NO: 52)

>BAE02855 gi|68445655|dbj|BAE02855.1| VP1 protein [JC polyomavirus]
FLTPEMGDPDEHLRGFSKSISISDTFESDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTE
VIGVTTLMNVHSNGQATHDNGAGKPVQGTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQ
VMNTEHKAYLDKNKAYPVECWVPDPTRNENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKG
DNLYLSAVDVCGMFTNRSGSQQWRGLSRYFKVQLRKRR
(SEQ ID NO: 53)

>BAE02856 gi|68445657|dbj|BAE02856.1| VP1 protein [JC polyomavirus]
FLTPEMGDPDEHLRGFSKSISISDTFESDSPNKDMLPCYSVARIPLPNLNEDLTCGNILMWEAVTLKTE
VIGVTTLMNVHSNGQATHDNGAGKPVQGTSFHFFSVGGEALELQGVVFNYRTKYPDGTIFPKNATVQSQ
VMNTEHKAYLDKNKAYPVECWVPDPTRNENTRYFGTLTGGENVPPVLHITNTATTVLLDEFGVGPLCKG
DNLYLSAVDVCGMFTDRSGSQQWRGLSRYFKVQLRKRR
(SEQ ID NO: 54)

Fig. 3-8

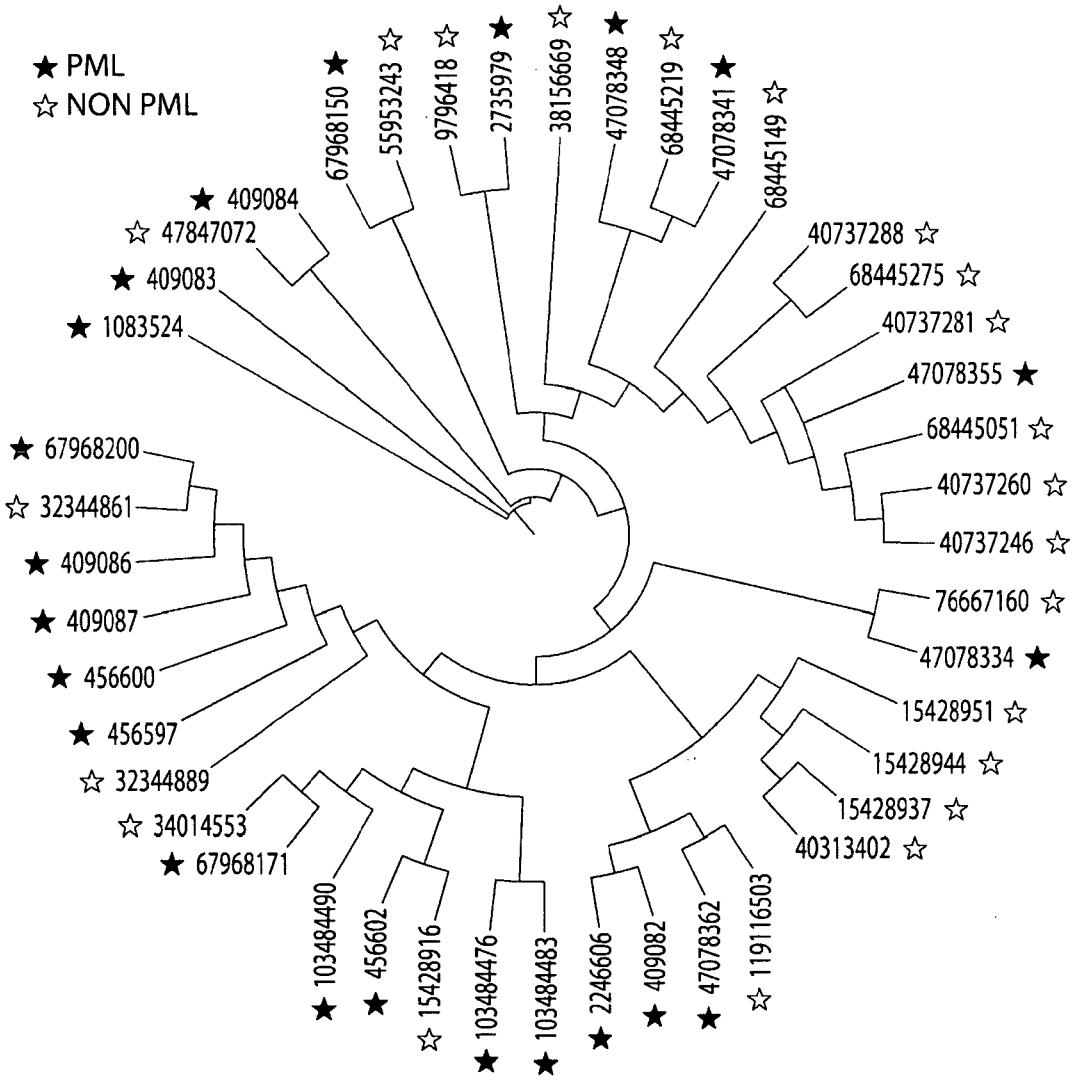

★ PML
☆ NON PML
★ 67968150
☆ 55953243
☆ 9796418
★ 2735979
☆ 38156669
★ 47078348
☆ 68445219
★ 47078341
☆ 68445149
☆ 40737288
☆ 68445275
☆ 40737281
★ 47078355
☆ 68445051
☆ 40737260
☆ 40737246
☆ 76667160
★ 47078334
☆ 15428951
☆ 15428944
☆ 15428937
☆ 40313402
☆ 119116503
★ 47078362
★ 409082
★ 2246606
★ 103484483
★ 103484476
☆ 15428916
★ 456602
★ 103484490
★ 67968171
☆ 34014553
☆ 32344889
★ 456597
★ 456600
★ 409087
★ 409086
☆ 32344861
★ 67968200
★ 1083524
★ 409083
☆ 47847072
★ 409084

Fig. 4A

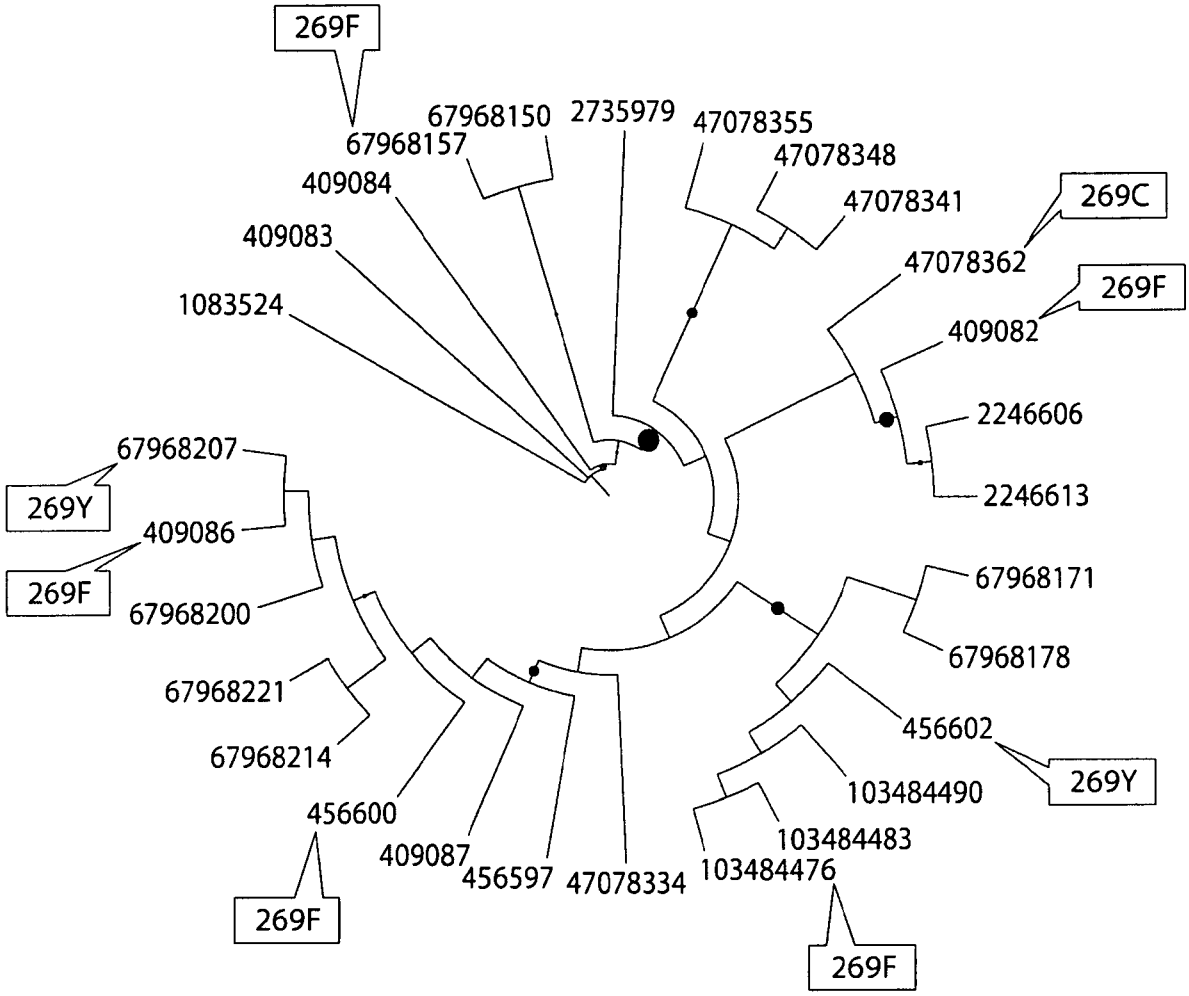

269F
67968157
67968150
2735979
47078355
47078348
47078341
269C
47078362
269F
409082
2246606
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67968178
456602
269Y
103484490
103484483
103484476
269F
47078334
456597
409087
456600
269F
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409086
269F
67968207
269Y
1083524
409083
409084

Fig. 4B

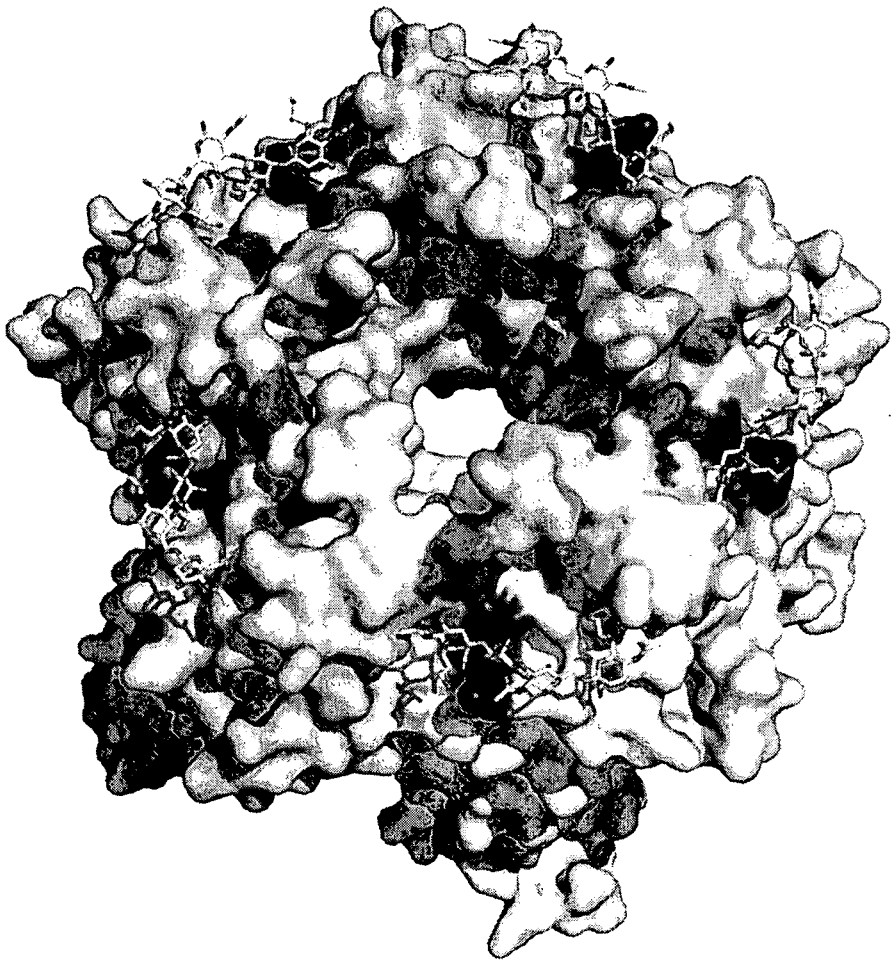


Fig. 5A


H129
V223
S267
MPyV
V296
N265
S269
D66
K60
S61
S123
G57
Q271
L55
R56

Fig. 5B

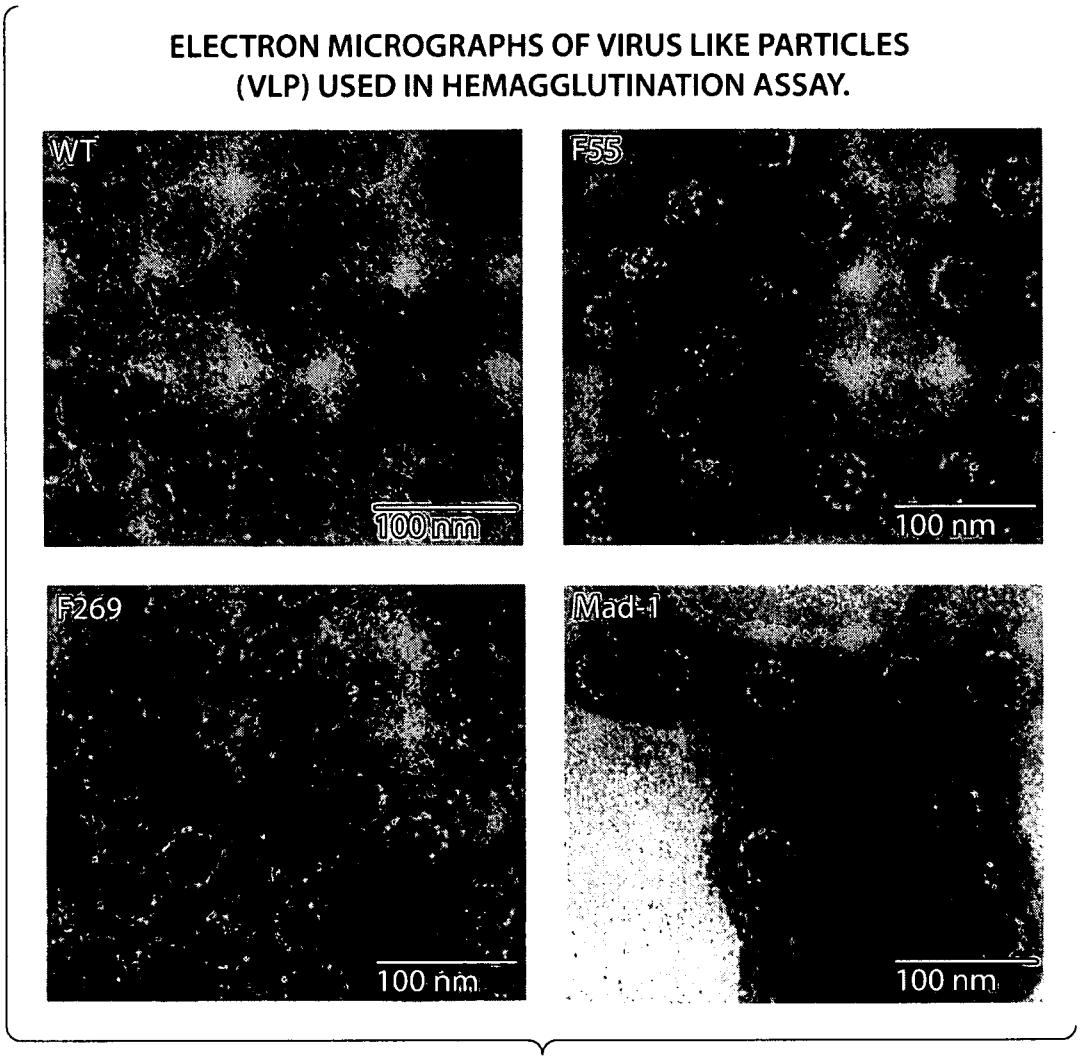

ELECTRON MICROGRAPHS OF VIRUS LIKE PARTICLES
(VLP) USED IN HEMAGGLUTINATION ASSAY.
WT
100 nm
F55
100 nm
F269
100 nm
Mad-1
100 nm

Fig. 6

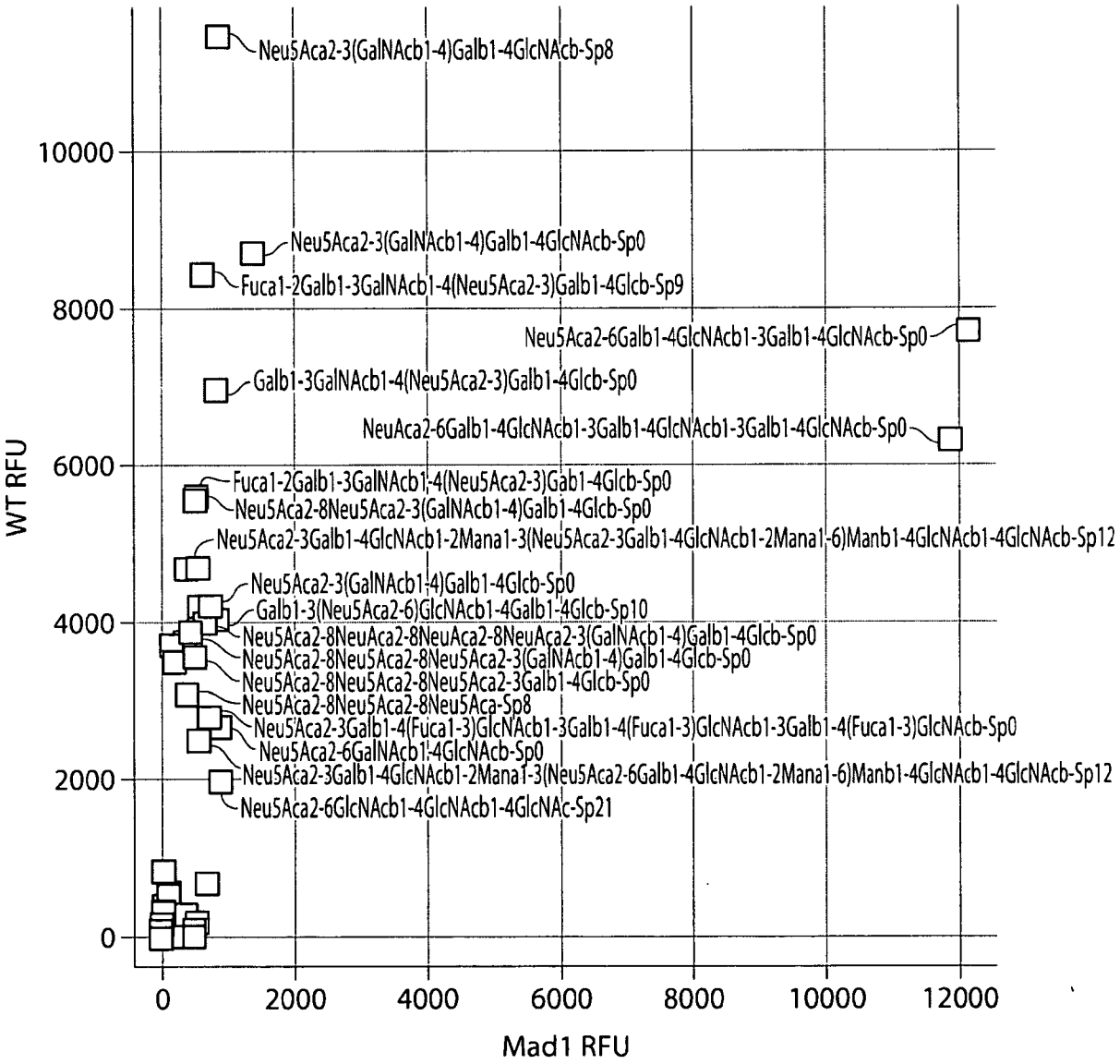

Neu5Aca2-3(GalNAcb1-4)Galb1-4GlcNAcb-Sp8
Neu5Aca2-3(GalNAcb1-4)Galb1-4GlcNAcb-Sp0
Fuca1-2Galb1-3GalNAcb1-4(Neu5Aca2-3)Galb1-4Glcb-Sp9
Neu5Aca2-6Galb1-4GlcNAcb1-3Galb1-4GlcNAcb-Sp0
Galb1-3GalNAcb1-4(Neu5Aca2-3)Galb1-4Glcb-Sp0
NeuAca2-6Galb1-4GlcNAcb1-3Galb1-4GlcNAcb1-3Galb1-4GlcNAcb-Sp0
Fuca1-2Galb1-3GalNAcb1-4(Neu5Aca2-3)Gab1-4Glcb-Sp0
Neu5Aca2-8Neu5Aca2-3(GalNAcb1-4)Galb1-4Glcb-Sp0
Neu5Aca2-3Galb1-4GlcNAcb1-2Mana1-3(Neu5Aca2-3Galb1-4GlcNAcb1-2Mana1-6)Manb1-4GlcNAcb1-4GlcNAcb-Sp12
Neu5Aca2-3(GalNAcb1-4)Galb1-4Glcb-Sp0
Galb1-3(Neu5Aca2-6)GlcNAcb1-4Galb1-4Glcb-Sp10
Neu5Aca2-8NeuAca2-8NeuAca2-8NeuAca2-3(GalNAcb1-4)Galb1-4Glcb-Sp0
Neu5Aca2-8Neu5Aca2-8Neu5Aca2-3(GalNAcb1-4)Galb1-4Glcb-Sp0
Neu5Aca2-8Neu5Aca2-8Neu5Aca2-3Galb1-4Glcb-Sp0
Neu5Aca2-8Neu5Aca2-8Neu5Aca-Sp8
Neu5Aca2-3Galb1-4(Fuca1-3)GlcNAcb1-3Galb1-4(Fuca1-3)GlcNAcb1-3Galb1-4(Fuca1-3)GlcNAcb-Sp0
Neu5Aca2-6GalNAcb1-4GlcNAcb-Sp0
Neu5Aca2-3Galb1-4GlcNAcb1-2Mana1-3(Neu5Aca2-6Galb1-4GlcNAcb1-2Mana1-6)Manb1-4GlcNAcb1-4GlcNAcb-Sp12
Neu5Aca2-6GlcNAcb1-4GlcNAcb1-4GlcNAc-Sp21
10000
8000
6000
4000
2000
0
WT RFU
0
2000
4000
6000
8000
10000
12000
Mad1 RFU

Fig. 7

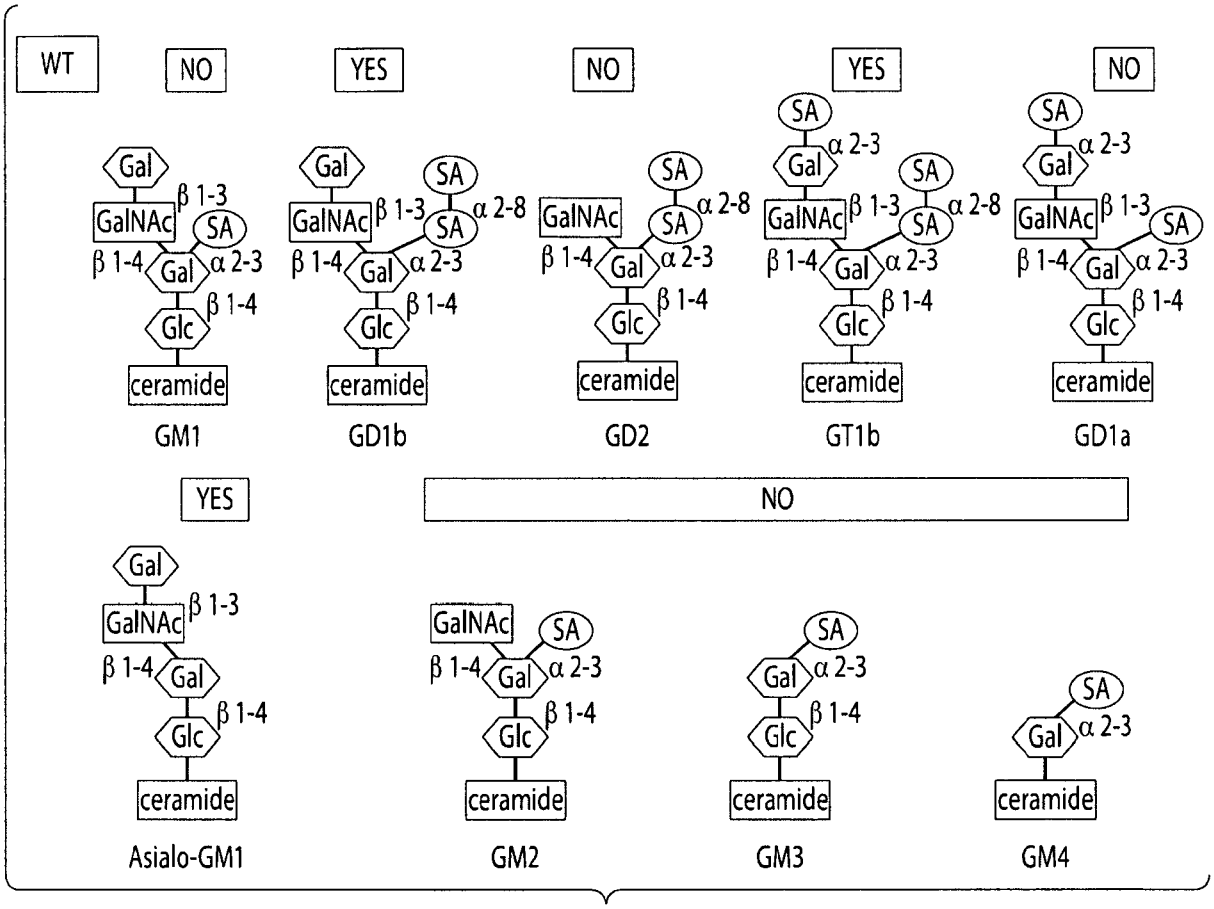

WT
NO
YES
NO
YES
NO
Gal
GalNAc
SA
Glc
ceramide
β 1-3
β 1-4
α 2-3
α 2-8
GM1
GD1b
GD2
GT1b
GD1a
YES
NO
Asialo-GM1
GM2
GM3
GM4

Fig. 8

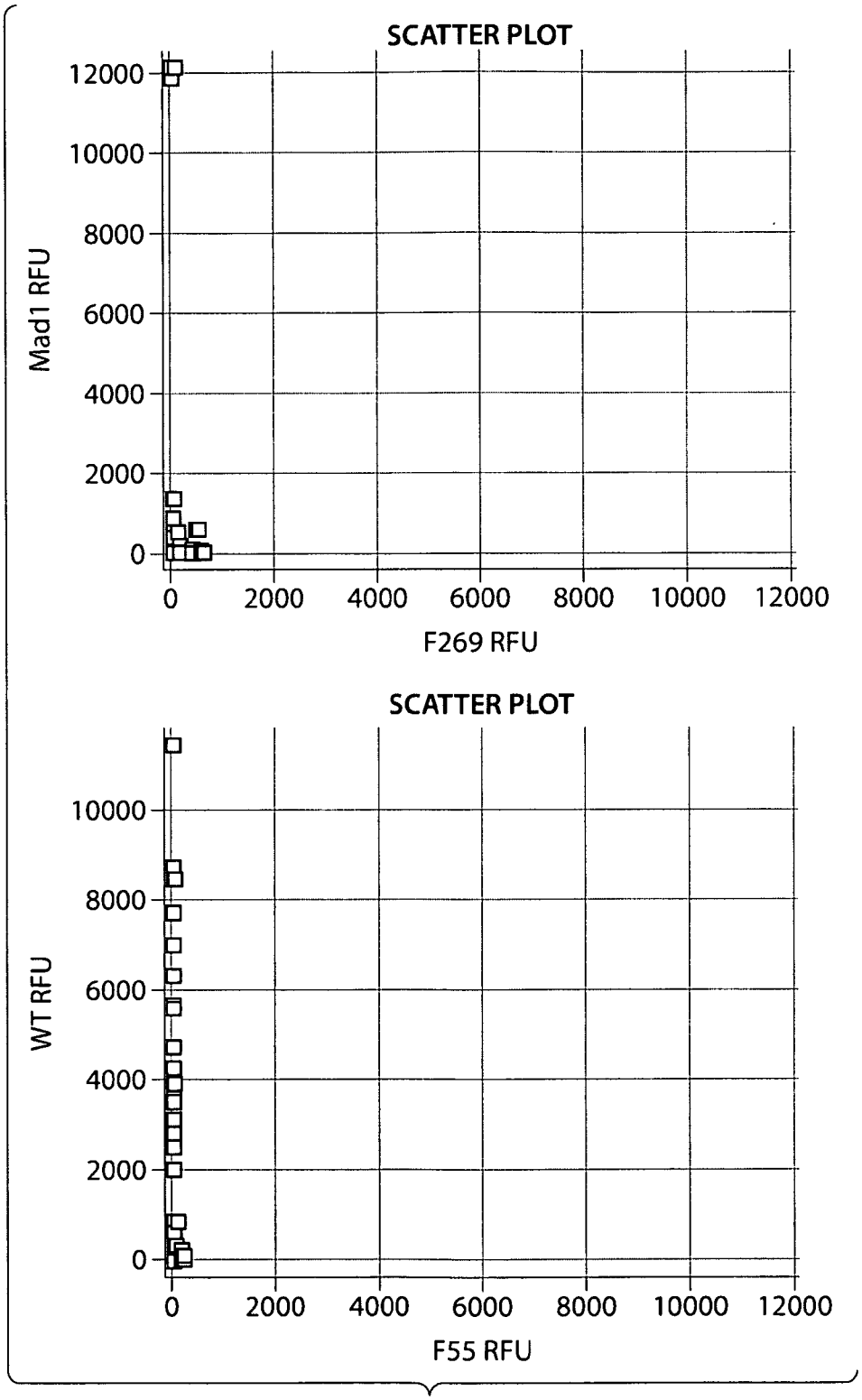

SCATTER PLOT
Mad1 RFU
12000
10000
8000
6000
4000
2000
0
0
2000
4000
6000
8000
10000
12000
F269 RFU
SCATTER PLOT
WT RFU
10000
8000
6000
4000
2000
0
0
2000
4000
6000
8000
10000
12000
F55 RFU

Fig. 9

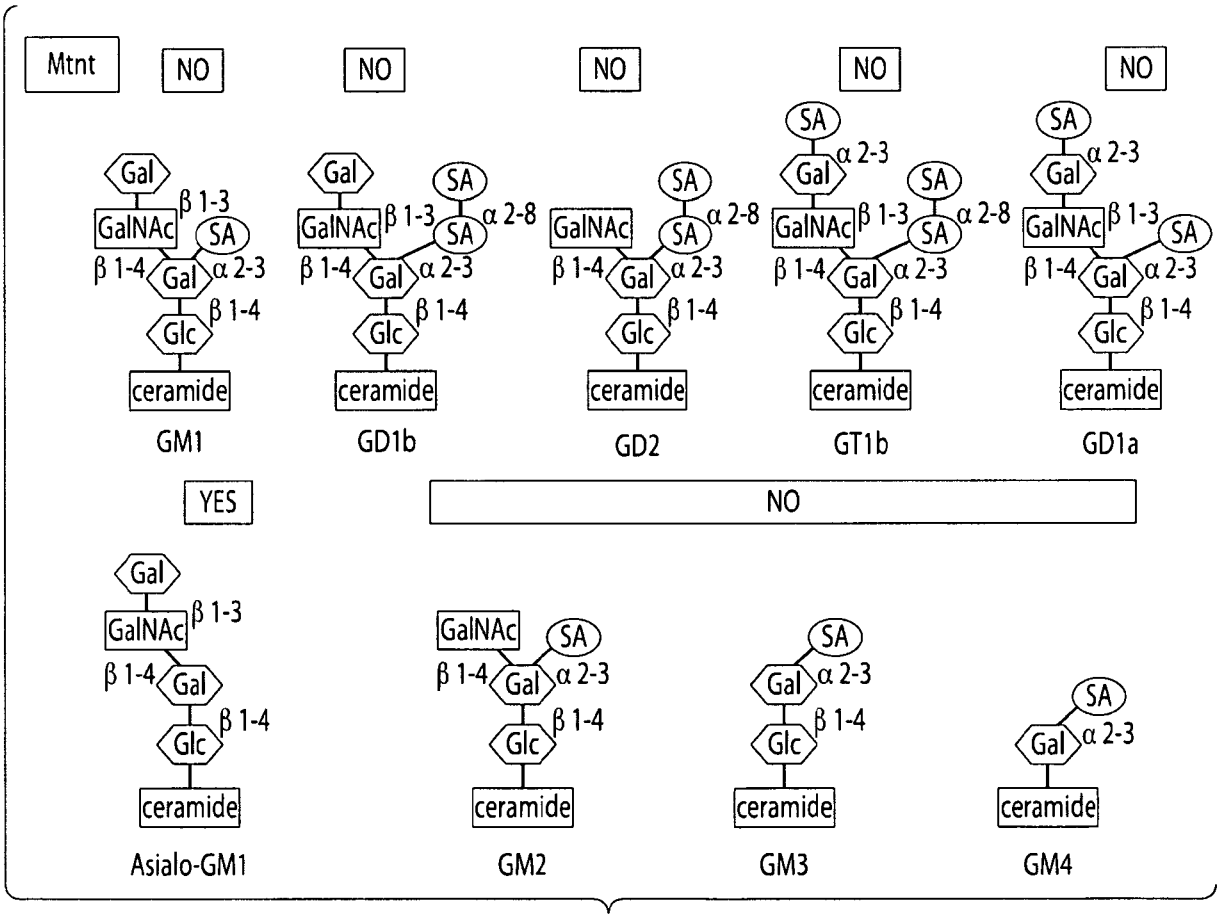

Mtnt
NO
NO
NO
NO
NO
Gal
GalNAc
SA
Glc
ceramide
β 1-3
β 1-4
α 2-3
α 2-8
GM1
GD1b
GD2
GT1b
GD1a
YES
NO
Asialo-GM1
GM2
GM3
GM4

Fig. 10

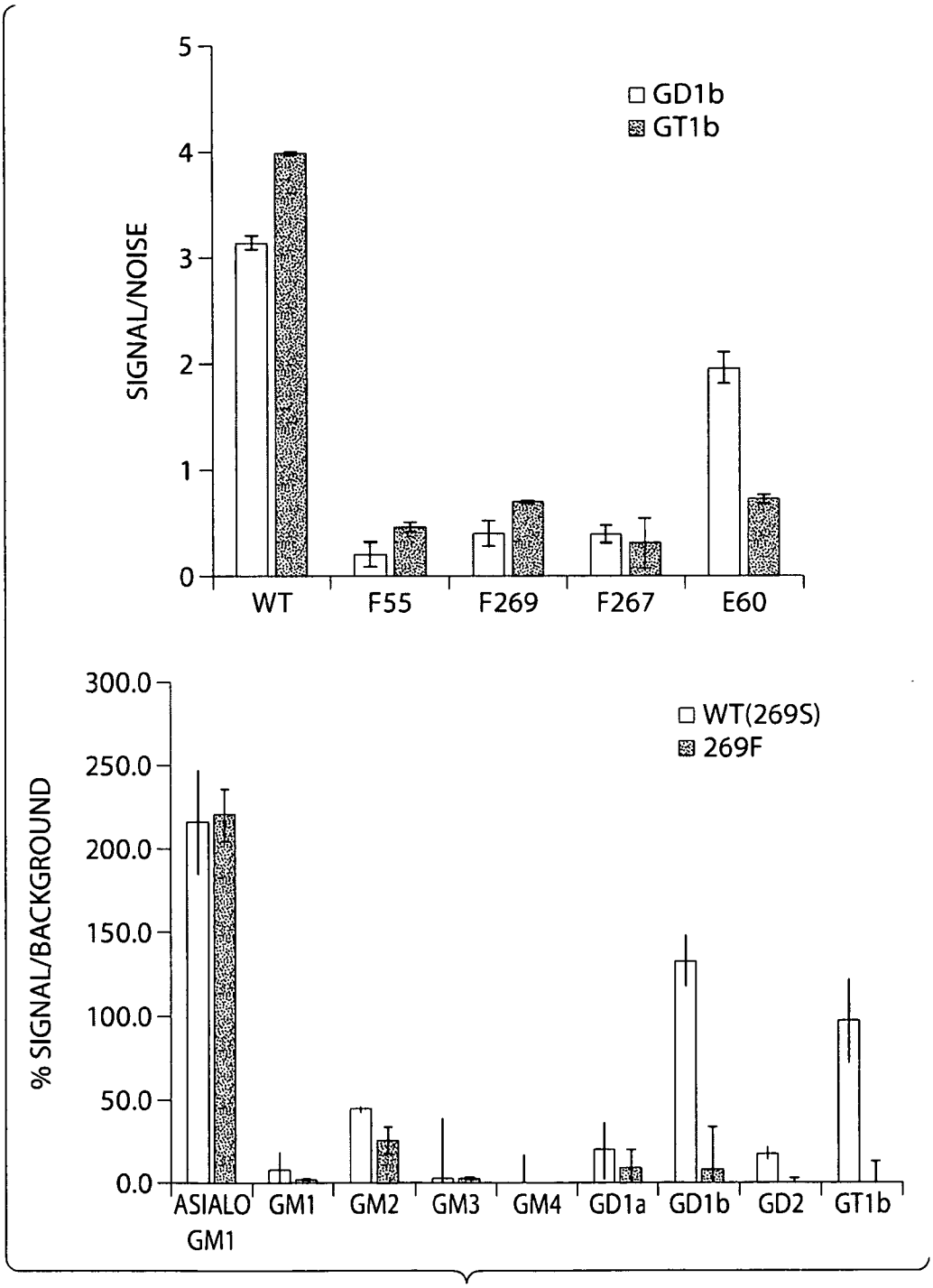

SIGNAL/NOISE
5
4
3
2
1
0
GD1b
GT1b
WT
F55
F269
F267
E60
% SIGNAL/BACKGROUND
300.0
250.0
200.0
150.0
100.0
50.0
0.0
WT(269S)
269F
ASIALO GM1
GM1
GM2
GM3
GM4
GD1a
GD1b
GD2
GT1b

Fig. 11

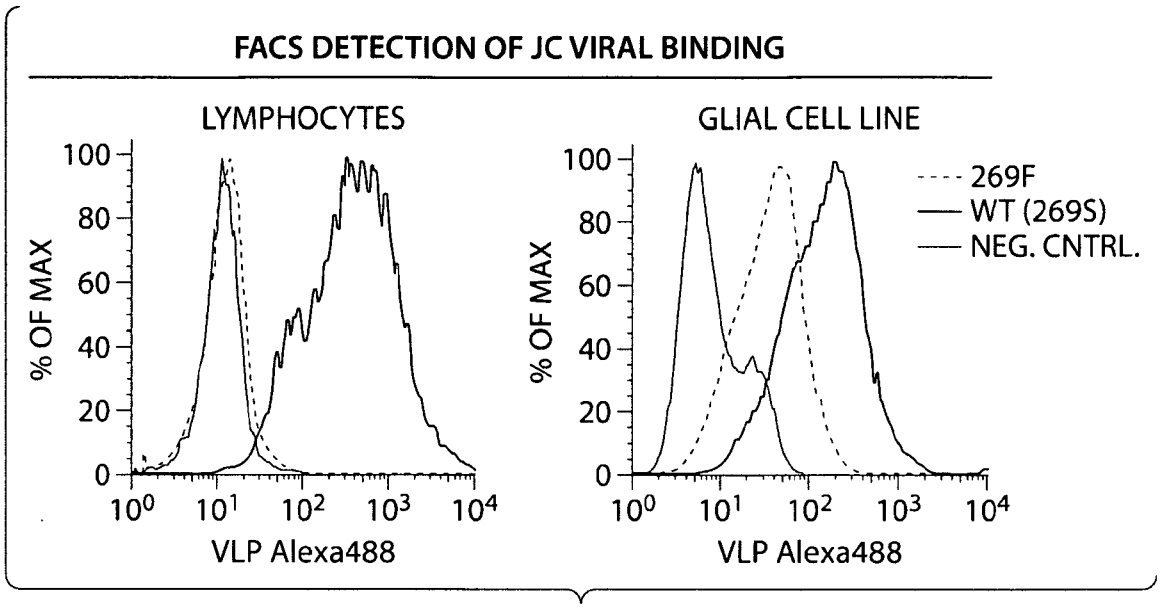

FACS DETECTION OF JC VIRAL BINDING
LYMPHOCYTES
GLIAL CELL LINE
% OF MAX
100
80
60
40
20
0
10^0 10^1 10^2 10^3 10^4
VLP Alexa488
269F
WT (269S)
NEG. CNTRL.

Fig. 12

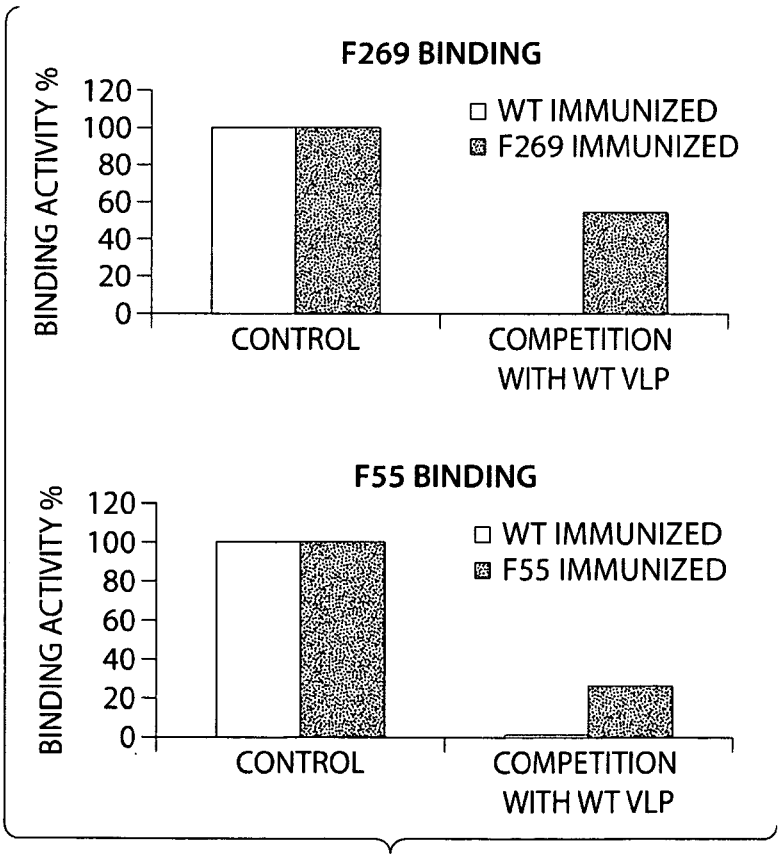

F269 BINDING
BINDING ACTIVITY %
120
100
80
60
40
20
0
WT IMMUNIZED
F269 IMMUNIZED
CONTROL
COMPETITION WITH WT VLP
F55 BINDING
BINDING ACTIVITY %
WT IMMUNIZED
F55 IMMUNIZED
CONTROL
COMPETITION WITH WT VLP

Fig. 13

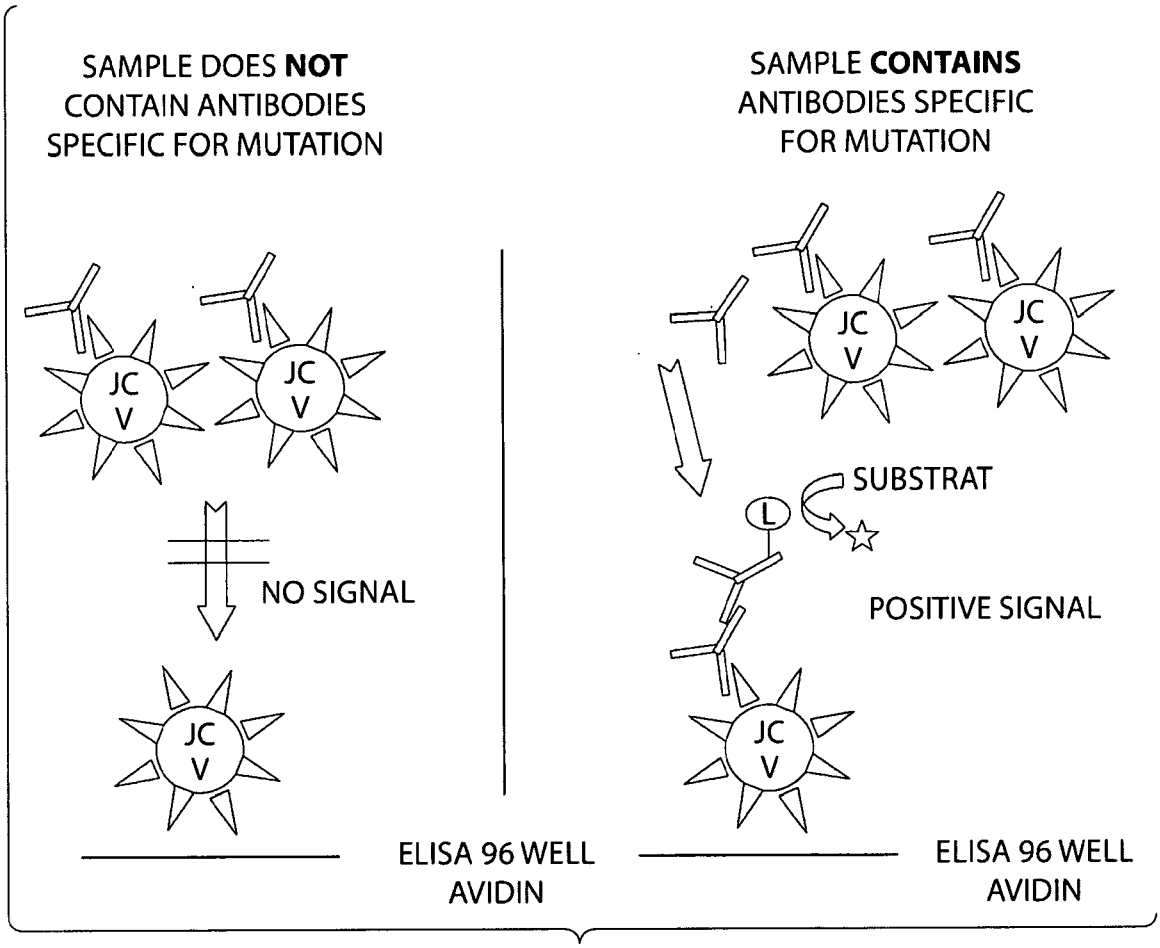

SAMPLE DOES **NOT** CONTAIN ANTIBODIES SPECIFIC FOR MUTATION
SAMPLE **CONTAINS** ANTIBODIES SPECIFIC FOR MUTATION
JC V
JC V
NO SIGNAL
JC V
JC V
JC V
SUBSTRAT
L
POSITIVE SIGNAL
JC V
ELISA 96 WELL AVIDIN
ELISA 96 WELL AVIDIN

Fig. 14

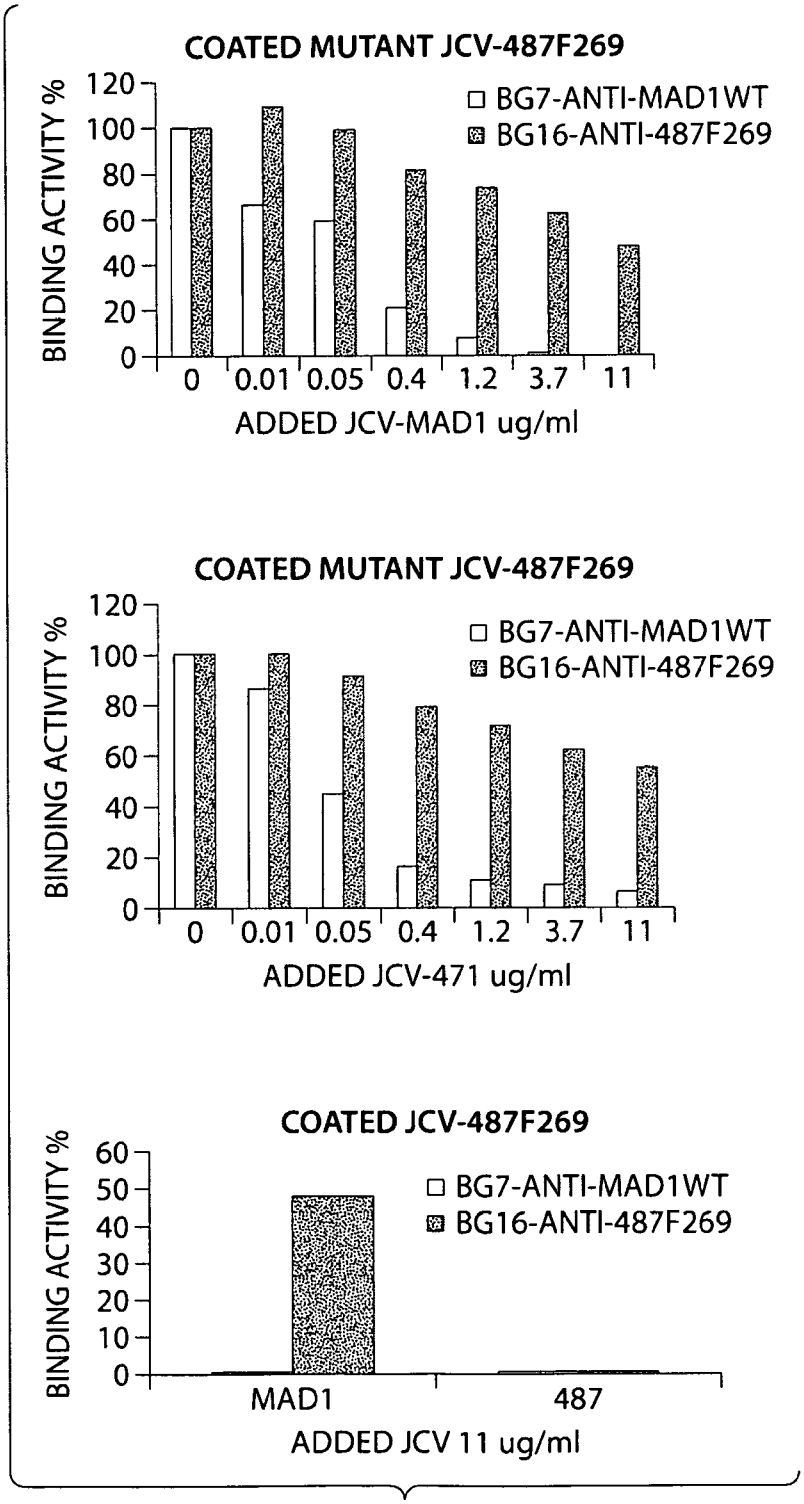

COATED MUTANT JCV-487F269
BINDING ACTIVITY %
120
100
80
60
40
20
0
BG7-ANTI-MAD1WT
BG16-ANTI-487F269
0
0.01
0.05
0.4
1.2
3.7
11
ADDED JCV-MAD1 ug/ml
COATED MUTANT JCV-487F269
BINDING ACTIVITY %
120
100
80
60
40
20
0
BG7-ANTI-MAD1WT
BG16-ANTI-487F269
0
0.01
0.05
0.4
1.2
3.7
11
ADDED JCV-471 ug/ml
COATED JCV-487F269
BINDING ACTIVITY %
60
50
40
30
20
10
0
BG7-ANTI-MAD1WT
BG16-ANTI-487F269
MAD1
487
ADDED JCV 11 ug/ml

Fig. 15

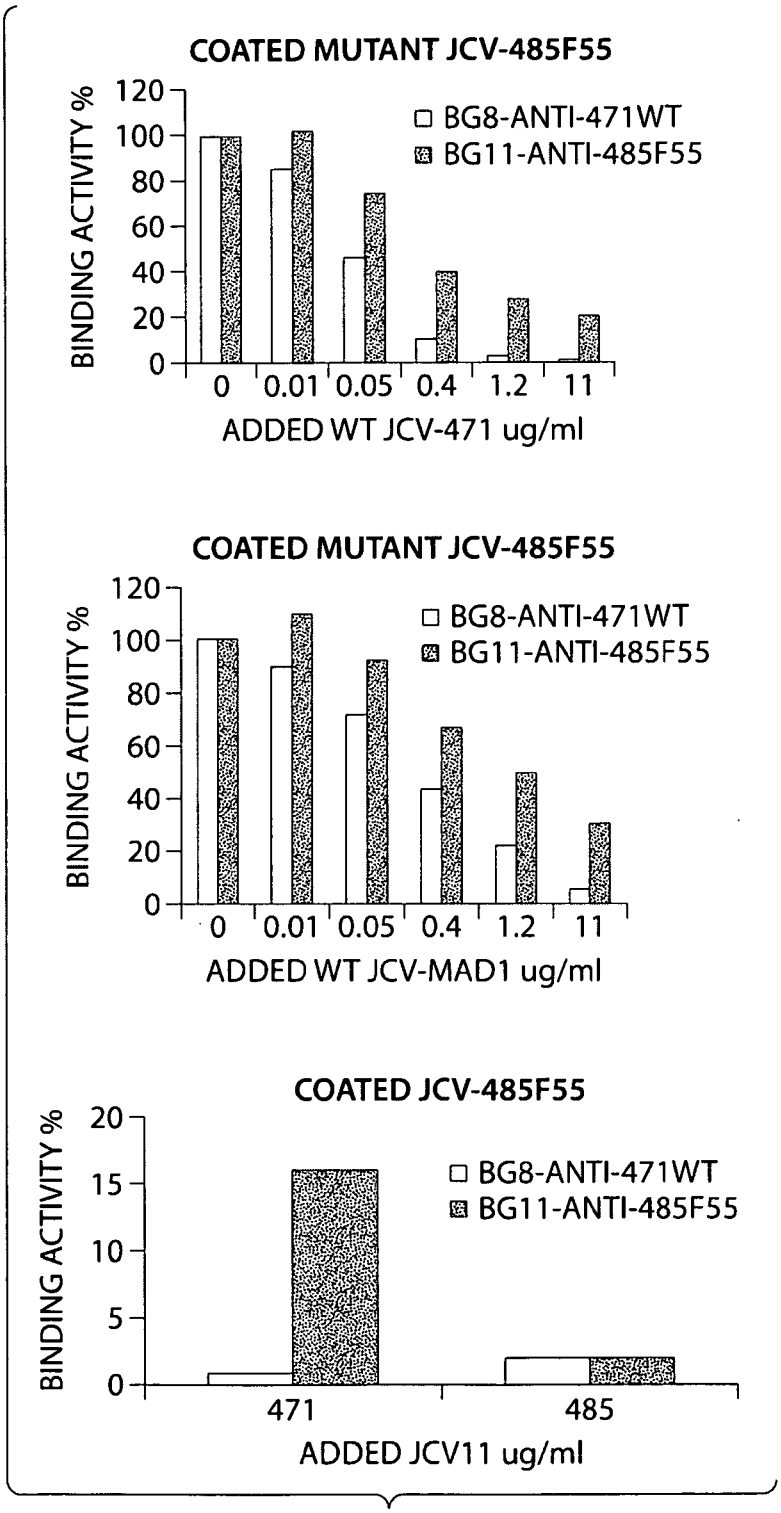

COATED MUTANT JCV-485F55
BINDING ACTIVITY %
120
100
80
60
40
20
0
BG8-ANTI-471WT
BG11-ANTI-485F55
0
0.01
0.05
0.4
1.2
11
ADDED WT JCV-471 ug/ml
COATED MUTANT JCV-485F55
BINDING ACTIVITY %
120
100
80
60
40
20
0
BG8-ANTI-471WT
BG11-ANTI-485F55
0
0.01
0.05
0.4
1.2
11
ADDED WT JCV-MAD1 ug/ml
COATED JCV-485F55
BINDING ACTIVITY %
20
15
10
5
0
BG8-ANTI-471WT
BG11-ANTI-485F55
471
485
ADDED JCV11 ug/ml

Fig. 16

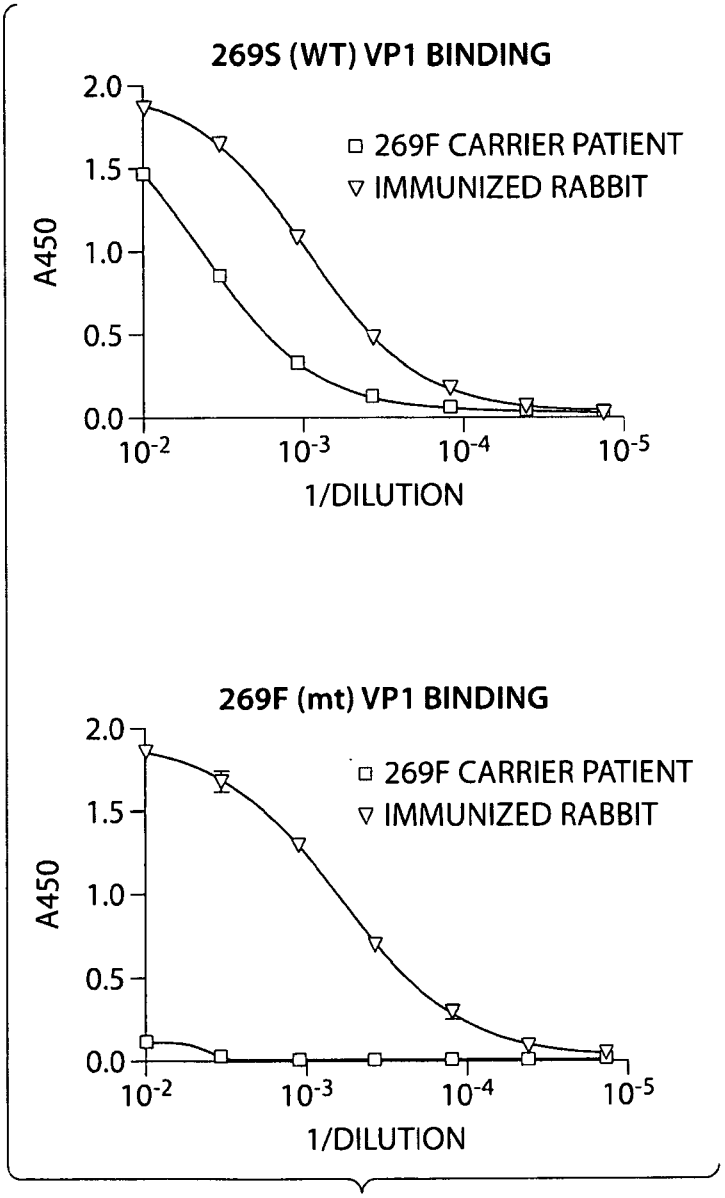

269S (WT) VP1 BINDING
2.0
1.5
1.0
0.5
0.0
A450
269F CARRIER PATIENT
IMMUNIZED RABBIT
10^{-2}
10^{-3}
10^{-4}
10^{-5}
1/DILUTION
269F (mt) VP1 BINDING
2.0
1.5
1.0
0.5
0.0
A450
269F CARRIER PATIENT
IMMUNIZED RABBIT
10^{-2}
10^{-3}
10^{-4}
10^{-5}
1/DILUTION

Fig. 17

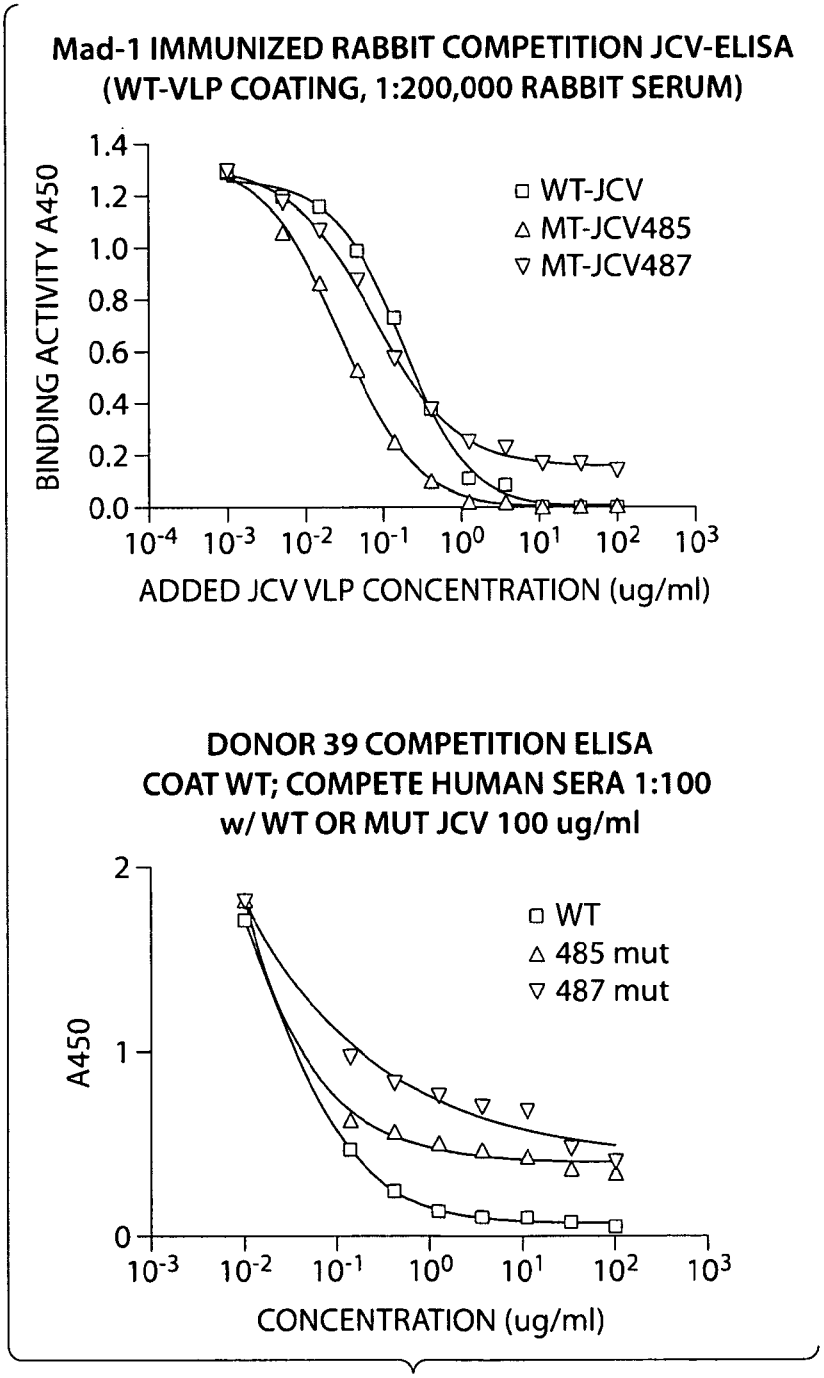

Mad-1 IMMUNIZED RABBIT COMPETITION JCV-ELISA
(WT-VLP COATING, 1:200,000 RABBIT SERUM)
BINDING ACTIVITY A450
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
WT-JCV
MT-JCV485
MT-JCV487
10-4 10-3 10-2 10-1 100 101 102 103
ADDED JCV VLP CONCENTRATION (ug/ml)
DONOR 39 COMPETITION ELISA
COAT WT; COMPETE HUMAN SERA 1:100
w/ WT OR MUT JCV 100 ug/ml
A450
2
1
0
WT
485 mut
487 mut
10-3 10-2 10-1 100 101 102 103
CONCENTRATION (ug/ml)

Fig. 18

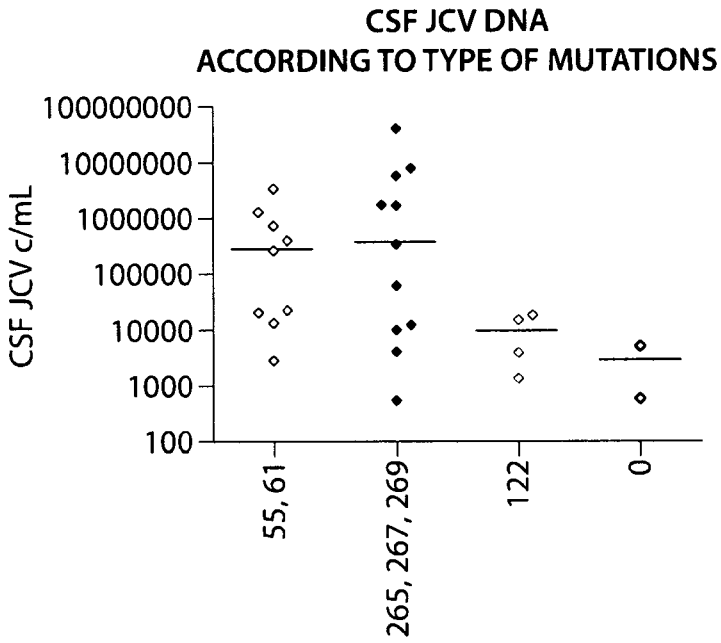

CSF JCV DNA
ACCORDING TO TYPE OF MUTATIONS
CSF JCV c/mL
100000000
10000000
1000000
100000
10000
1000
100
55, 61
265, 267, 269
122
0

Fig. 19

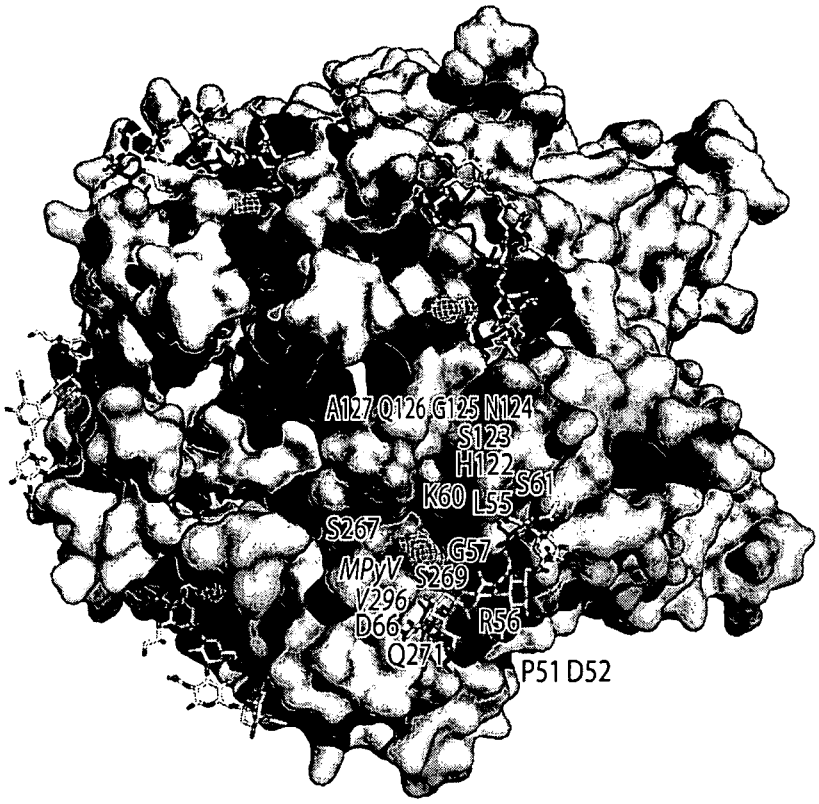


Fig. 20A

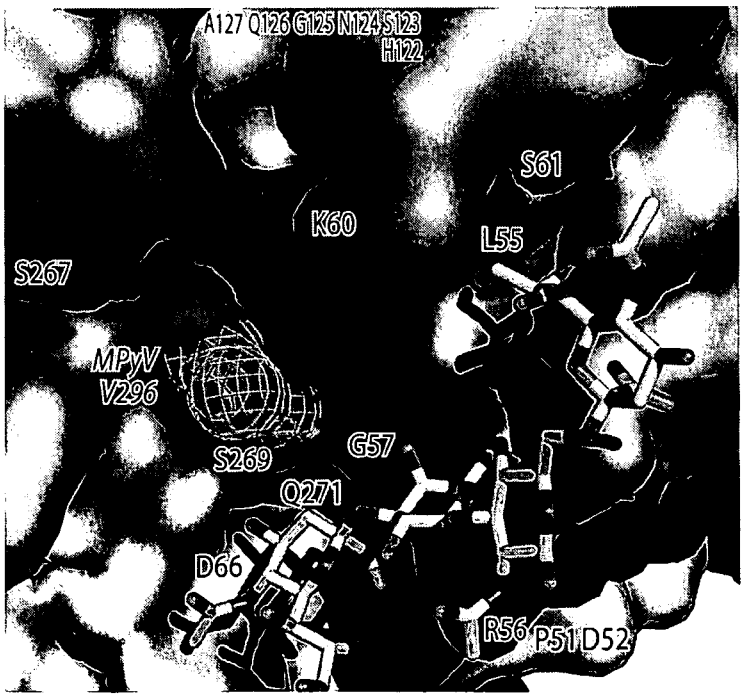
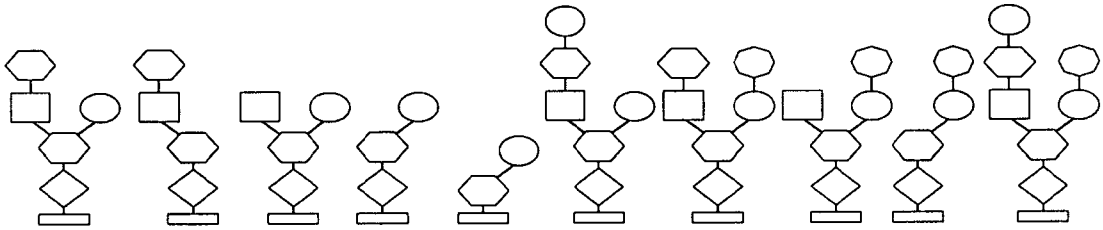


Fig. 20B



	GM_1	AsialoGM_1	GM_2	GM_3	GM_4	GD_{1a}	GD_{1b}	GD_2	GD_3	GT_{1b}
WILD TYPE	24	279	9	2	16	244	1393	1225	14	894
L55F	17	290	19	7	35	35	54	41	20	15
K60E	54	268	31	26	45	66	102	98	136	37
D66H	507	122	200	13	24	641	790	708	602	581
N265D	784	919	820	768	1080	963	1222	1087	947	878
S267F	47	158	36	27	66	43	72	74	46	36
S269F	59	313	41	22	70	55	100	76	58	46
S269Y	45	1023	48	15	49	60	73	68	32	23
Q271H	243	494	65	29	80	574	796	704	541	525



CERAMIDE GLUCOSAMINE Glc GALACTOSAMINE Gal N-ACETYLGALACTOSAMINE GalNAc SIALIC ACID α 2-3 SA SIALIC ACID α 2-8 SA

Fig. 21

SEQUENCE LISTING

<110> BIOGEN IDEC MA INC.

<120> METHODS FOR THE DETECTION OF JC POLYOMA VIRUS

<130> SG2579A

<140> NOT YET ASSIGNED
<141> 2010-02-05

<150> US 61/150,310
<151> 2009-02-05

<160> 62

<170> PatentIn version 3.5

<210> 1
<211> 354
<212> PRT
<213> JC virus

<400> 1

```
Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
1               5                  10                  15

Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
            20                  25                  30

Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
        35                  40                  45

Gly Asp Pro Asp Glu His Leu Arg Gly Phe Ser Lys Ser Ile Ser Ile
    50                  55                  60

Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn Lys Asp Met Leu Pro Cys
65                  70                  75                  80

Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
                85                  90                  95

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
            100                 105                 110

Ile Gly Val Thr Thr Leu Met Asn Val His Ser Asn Gly Gln Ala Thr
        115                 120                 125

His Asp Asn Gly Ala Ala Lys Pro Val Gln Gly Thr Ser Phe His Phe
    130                 135                 140

Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Val Phe Asn
145                 150                 155                 160

Tyr Arg Thr Thr Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr
```

```
                165                 170                 175

Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys
            180                 185                 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
        195                 200                 205

Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
    210                 215                 220

Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu
225                 230                 235                 240

Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
                245                 250                 255

Val Asp Val Cys Gly Met Phe Thr Asn Arg Ser Gly Ser Gln Gln Trp
            260                 265                 270

Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
        275                 280                 285

Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
    290                 295                 300

Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305                 310                 315                 320

Ile Glu Glu Val Arg Val Phe Glu Gly Thr Glu Gln Leu Pro Gly Asp
                325                 330                 335

Pro Asp Met Met Arg Tyr Val Asp Arg Tyr Gly Gln Leu Gln Thr Lys
            340                 345                 350

Met Leu
```

<210> 2
<211> 349
<212> PRT
<213> Simian Virus 40

<400> 2

```
Pro Lys Lys Pro Lys Glu Pro Val Gln Val Pro Lys Leu Val Ile Lys
1                5                  10                  15

Gly Gly Ile Glu Val Leu Gly Val Lys Thr Gly Val Asp Ser Phe Thr
            20                  25                  30

Glu Val Glu Cys Phe Leu Asn Pro Gln Met Gly Asn Pro Asp Glu His
        35                  40                  45
```

```
Gln Lys Gly Leu Ser Lys Ser Leu Ala Ala Glu Lys Gln Phe Thr Asp
    50                  55                  60

Asp Ser Pro Asp Lys Glu Gln Leu Pro Cys Tyr Ser Val Ala Arg Ile
65                  70                  75                  80

Pro Leu Pro Asn Ile Asn Glu Asp Leu Thr Cys Gly Asn Ile Leu Met
                85                  90                  95

Trp Glu Ala Val Thr Val Lys Thr Glu Val Ile Gly Val Thr Ala Met
            100                 105                 110

Leu Asn Leu His Ser Gly Thr Gln Lys Thr His Glu Asn Gly Ala Gly
        115                 120                 125

Lys Pro Ile Gln Gly Ser Asn Phe His Phe Phe Ala Val Gly Gly Glu
    130                 135                 140

Pro Leu Glu Leu Gln Gly Val Leu Ala Asn Tyr Arg Thr Lys Tyr Pro
145                 150                 155                 160

Ala Gln Thr Val Thr Pro Lys Asn Ala Thr Val Asp Ser Gln Gln Met
                165                 170                 175

Asn Thr Asp His Lys Ala Val Leu Asp Lys Asp Asn Ala Tyr Pro Val
            180                 185                 190

Glu Cys Trp Val Pro Asp Pro Ser Lys Asn Glu Asn Thr Arg Tyr Phe
        195                 200                 205

Gly Thr Tyr Thr Gly Gly Glu Asn Val Pro Pro Val Leu His Ile Thr
    210                 215                 220

Asn Thr Ala Thr Thr Val Leu Leu Asp Glu Gln Gly Val Gly Pro Leu
225                 230                 235                 240

Cys Lys Ala Asp Ser Leu Tyr Val Ser Ala Asp Val Asp Ile Cys Gly
                245                 250                 255

Leu Phe Thr Asn Thr Ser Gly Thr Gln Gln Trp Lys Gly Leu Pro Arg
            260                 265                 270

Tyr Phe Lys Ile Thr Leu Arg Lys Arg Ser Val Lys Asn Pro Tyr Pro
        275                 280                 285

Ile Ser Phe Leu Leu Ser Asp Leu Ile Asn Arg Arg Thr Gln Arg Val
    290                 295                 300

Asp Gly Gln Pro Met Ile Gly Met Ser Ser Gln Val Glu Glu Val Arg
305                 310                 315                 320
```

```
Val Tyr Glu Asp Thr Glu Glu Leu Pro Gly Asp Pro Asp Met Ile Arg
                325                 330                 335

Tyr Ile Asp Glu Phe Gly Gln Thr Thr Thr Arg Met Gln
            340                 345
```

<210> 3
<211> 133
<212> PRT
<213> JC virus

<400> 3

```
Asn Val Pro Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu
1               5                   10                  15

Leu Asp Glu Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr
            20                  25                  30

Leu Ser Ala Val Asp Val Cys Gly Met Phe Thr Asn Arg Ser Gly Ser
        35                  40                  45

Gln Gln Trp Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys
    50                  55                  60

Arg Arg Val Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu
65                  70                  75                  80

Ile Asn Arg Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met
                85                  90                  95

Asp Ala Gln Val Glu Glu Val Arg Val Phe Glu Gly Thr Glu Glu Leu
            100                 105                 110

Pro Gly Asp Pro Asp Met Met Arg Tyr Val Asp Arg Tyr Gly Gln Leu
        115                 120                 125

Gln Thr Lys Met Leu
    130
```

<210> 4
<211> 133
<212> PRT
<213> JC virus

<400> 4

```
Asn Val Pro Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu
1               5                   10                  15

Leu Asp Glu Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr
            20                  25                  30
```

Leu Ser Ala Val Asp Val Cys Gly Met Phe Thr Asn Arg Ser Gly Ser
35 40 45

Gln Gln Trp Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys
50 55 60

Arg Arg Val Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu
65 70 75 80

Ile Asn Arg Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met
85 90 95

Asp Ala Gln Val Glu Glu Val Arg Val Phe Glu Gly Thr Glu Glu Leu
100 105 110

Pro Gly Asp Pro Asp Met Met Arg Tyr Val Asp Arg Tyr Gly Gln Leu
115 120 125

Gln Thr Lys Met Leu
130

<210> 5
<211> 354
<212> PRT
<213> JC virus

<400> 5

Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
1 5 10 15

Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
20 25 30

Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
35 40 45

Gly Asp Pro Asp Glu His Phe Arg Gly Phe Ser Lys Ser Ile Ser Ile
50 55 60

Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn Lys Asp Met Leu Pro Cys
65 70 75 80

Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
85 90 95

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
100 105 110

Ile Gly Val Thr Thr Leu Met Asn Val His Ser Asn Gly Gln Ala Ala
115 120 125

His Asp Asn Gly Ala Gly Lys Pro Val Gln Gly Thr Ser Phe His Phe

```
    130                 135                 140

Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Val Phe Asn
145                 150                 155                 160

Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr
                165                 170                 175

Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys
            180                 185                 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
        195                 200                 205

Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
    210                 215                 220

Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu
225                 230                 235                 240

Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
                245                 250                 255

Val Asp Val Cys Gly Met Phe Thr Asn Arg Ser Gly Ser Gln Gln Trp
            260                 265                 270

Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
        275                 280                 285

Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
    290                 295                 300

Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305                 310                 315                 320

Val Glu Glu Val Arg Val Phe Glu Gly Thr Glu Glu Leu Pro Gly Asp
                325                 330                 335

Pro Asp Met Met Arg Tyr Val Asp Arg Tyr Gly Gln Leu Gln Thr Lys
            340                 345                 350

Met Leu


<210>  6
<211>  354
<212>  PRT
<213>  JC virus

<400>  6

Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
1               5                   10                  15
```

```
Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
            20                  25                  30

Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
        35                  40                  45

Gly Asp Pro Asp Glu His Phe Arg Gly Phe Ser Lys Ser Ile Ser Ile
    50                  55                  60

Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn Lys Asp Met Leu Pro Cys
65                  70                  75                  80

Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
                85                  90                  95

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
            100                 105                 110

Ile Gly Val Thr Thr Leu Met Asn Val His Ser Asn Gly Gln Ala Thr
        115                 120                 125

His Asp Asn Gly Ala Gly Lys Pro Val Gln Gly Thr Ser Phe His Phe
    130                 135                 140

Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Val Phe Asn
145                 150                 155                 160

Tyr Arg Thr Thr Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr
                165                 170                 175

Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys
            180                 185                 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
        195                 200                 205

Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
    210                 215                 220

Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu
225                 230                 235                 240

Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
                245                 250                 255

Val Asp Val Cys Gly Met Phe Thr Asn Arg Ser Gly Ser Gln Gln Trp
            260                 265                 270

Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
        275                 280                 285
```

```
Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
    290                 295                 300

Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305                 310                 315                 320

Val Glu Glu Val Arg Val Phe Glu Gly Thr Glu Glu Leu Pro Gly Asp
                325                 330                 335

Pro Asp Met Met Arg Tyr Val Asp Arg Tyr Gly Gln Leu Gln Thr Lys
            340                 345                 350

Met Leu
```

<210> 7
<211> 354
<212> PRT
<213> JC virus

<400> 7

```
Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
1               5                   10                  15

Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
            20                  25                  30

Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
        35                  40                  45

Gly Asp Pro Asp Glu His Leu Arg Gly Phe Ser Lys Ser Ile Ser Ile
    50                  55                  60

Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn Lys Asp Met Leu Pro Cys
65                  70                  75                  80

Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
                85                  90                  95

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
            100                 105                 110

Ile Gly Val Thr Thr Leu Met Asn Val His Ser Asn Gly Gln Ala Ala
        115                 120                 125

His Asp Asn Gly Ala Gly Lys Pro Val Gln Gly Thr Ser Phe His Phe
    130                 135                 140

Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Val Phe Asn
145                 150                 155                 160
```

```
Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr
                165                 170                 175

Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys
            180                 185                 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
        195                 200                 205

Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
    210                 215                 220

Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu
225                 230                 235                 240

Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
                245                 250                 255

Val Asp Val Cys Gly Met Phe Thr Asn Arg Ser Gly Phe Gln Gln Trp
            260                 265                 270

Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
        275                 280                 285

Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
    290                 295                 300

Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305                 310                 315                 320

Val Glu Glu Val Arg Val Phe Glu Gly Thr Glu Glu Leu Pro Gly Asp
                325                 330                 335

Pro Asp Met Met Arg Tyr Val Asp Arg Tyr Gly Gln Leu Gln Thr Lys
            340                 345                 350

Met Leu
```

<210> 8
<211> 354
<212> PRT
<213> JC virus

<400> 8

```
Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
1               5                   10                  15

Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
            20                  25                  30
```

```
Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
        35                  40                  45

Gly Asp Pro Asp Glu His Leu Arg Gly Phe Ser Lys Ser Ile Ser Ile
    50                  55                  60

Ser His Thr Phe Glu Ser Asp Ser Pro Asn Arg Asp Met Leu Pro Cys
65                  70                  75                  80

Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
                85                  90                  95

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
            100                 105                 110

Ile Gly Val Thr Ser Leu Met Asn Val His Ser Asn Gly Gln Ala Thr
        115                 120                 125

His Asp Asn Gly Ala Gly Lys Pro Val Gln Gly Thr Ser Phe His Phe
    130                 135                 140

Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Leu Phe Asn
145                 150                 155                 160

Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr
                165                 170                 175

Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys
            180                 185                 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
        195                 200                 205

Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
    210                 215                 220

Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu
225                 230                 235                 240

Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
                245                 250                 255

Val Asp Val Cys Gly Met Phe Thr Asn Arg Ser Gly Ser Gln Gln Trp
            260                 265                 270

Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
        275                 280                 285

Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
    290                 295                 300
```

Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305 310 315 320

Val Glu Glu Val Arg Val Phe Glu Gly Thr Glu Glu Leu Pro Gly Asp
325 330 335

Pro Asp Met Met Arg Tyr Val Asp Lys Tyr Gly Gln Leu Gln Thr Lys
340 345 350

Met Leu

<210> 9
<211> 354
<212> PRT
<213> JC virus

<400> 9

Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
1 5 10 15

Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
20 25 30

Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
35 40 45

Gly Asp Pro Asp Glu His Leu Arg Gly Phe Ser Lys Ser Ile Ser Ile
50 55 60

Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn Lys Asp Met Leu Pro Cys
65 70 75 80

Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
85 90 95

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
100 105 110

Ile Gly Val Thr Ser Leu Met Asn Val His Ser Asn Gly Gln Ala Thr
115 120 125

His Asp Asn Gly Ala Gly Lys Pro Val Gln Gly Thr Ser Phe His Phe
130 135 140

Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Leu Phe Asn
145 150 155 160

Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr
165 170 175

Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys

```
            180                 185                 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
        195                 200                 205

Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
    210                 215                 220

Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu
225                 230                 235                 240

Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
                245                 250                 255

Val Asp Val Cys Gly Met Phe Thr Asn Arg Leu Gly Ser Gln Gln Trp
            260                 265                 270

Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
        275                 280                 285

Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
    290                 295                 300

Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305                 310                 315                 320

Val Glu Glu Val Arg Val Phe Glu Gly Thr Glu Glu Leu Pro Gly Asp
                325                 330                 335

Pro Asp Met Met Arg Tyr Val Asp Lys Tyr Gly Gln Leu Gln Thr Lys
            340                 345                 350

Met Leu


<210>  10
<211>  354
<212>  PRT
<213>  JC virus

<400>  10

Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
1               5                   10                  15

Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
            20                  25                  30

Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
        35                  40                  45

Gly Asp Pro Asp Glu His Leu Arg Gly Phe Ser Lys Ser Ile Ser Ile
    50                  55                  60
```

```
Ser Asp Thr Phe Glu Ser Asp Ser Pro Ser Lys Asp Met Leu Pro Cys
65                  70                  75                  80

Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
                85                  90                  95

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
            100                 105                 110

Ile Gly Val Thr Ser Leu Met Asn Val His Ser Asn Gly Gln Ala Ala
        115                 120                 125

His Asp Asn Gly Ala Gly Lys Pro Val Gln Gly Thr Ser Phe His Phe
    130                 135                 140

Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Val Phe Asn
145                 150                 155                 160

Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr
                165                 170                 175

Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys
            180                 185                 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
        195                 200                 205

Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
    210                 215                 220

Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu
225                 230                 235                 240

Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
                245                 250                 255

Val Asp Val Cys Gly Met Phe Thr Asn Arg Ser Gly Ser Gln Gln Trp
            260                 265                 270

Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
        275                 280                 285

Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
    290                 295                 300

Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305                 310                 315                 320

Val Glu Glu Val Arg Val Phe Glu Gly Thr Glu Glu Leu Pro Gly Asp
                325                 330                 335
```

```
Pro Asp Met Met Arg Tyr Val Asp Lys Tyr Gly Gln Leu Gln Thr Lys
            340                 345                 350

Met Leu
```

<210> 11
<211> 354
<212> PRT
<213> JC virus

<400> 11

```
Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
1               5                  10                  15

Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
            20                  25                  30

Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
        35                  40                  45

Gly Asp Pro Asp Glu His Leu Arg Gly Phe Ser Lys Ser Ile Ser Ile
    50                  55                  60

Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn Lys Asp Met Leu Pro Cys
65                  70                  75                  80

Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
                85                  90                  95

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
            100                 105                 110

Leu Gly Val Thr Thr Leu Met Asn Val His Ser Asn Gly Gln Ala Thr
        115                 120                 125

His Asp Asn Gly Ala Gly Lys Pro Val Gln Gly Thr Ser Phe His Phe
    130                 135                 140

Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Val Phe Asn
145                 150                 155                 160

Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr
                165                 170                 175

Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys
            180                 185                 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
        195                 200                 205
```

```
Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
    210                 215                 220

Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu
225                 230                 235                 240

Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
                245                 250                 255

Val Asp Val Cys Gly Met Phe Thr Asn Arg Ser Gly Phe Gln Gln Trp
            260                 265                 270

Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
        275                 280                 285

Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
    290                 295                 300

Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305                 310                 315                 320

Val Glu Glu Val Arg Val Phe Glu Gly Thr Glu Glu Leu Pro Gly Asp
                325                 330                 335

Pro Asp Met Met Arg Tyr Val Asp Arg Tyr Gly Gln Leu Gln Thr Lys
            340                 345                 350

Met Leu
```

<210> 12
<211> 354
<212> PRT
<213> JC virus

<400> 12

```
Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
1               5                   10                  15

Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
            20                  25                  30

Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
        35                  40                  45

Gly Asp Pro Asp Glu His Leu Arg Gly Phe Ser Lys Ser Ile Ser Ile
    50                  55                  60

Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn Lys Asp Met Leu Pro Cys
65                  70                  75                  80
```

```
Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
                85                  90                  95

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
            100                 105                 110

Leu Gly Val Thr Thr Leu Met Asn Val His Ser Asn Gly Gln Ala Thr
        115                 120                 125

His Asp Asn Gly Ala Gly Lys Pro Val Gln Gly Thr Ser Phe His Phe
    130                 135                 140

Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Val Phe Asn
145                 150                 155                 160

Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr
                165                 170                 175

Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys
            180                 185                 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
        195                 200                 205

Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
    210                 215                 220

Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu
225                 230                 235                 240

Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
                245                 250                 255

Val Asp Val Cys Gly Met Phe Thr Asn Arg Ser Gly Ser Gln Gln Trp
            260                 265                 270

Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
        275                 280                 285

Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
    290                 295                 300

Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305                 310                 315                 320

Val Glu Glu Val Arg Val Phe Glu Gly Thr Glu Glu Leu Pro Gly Asp
                325                 330                 335

Pro Asp Met Met Arg Tyr Val Asp Arg Tyr Gly Gln Leu Gln Thr Lys
            340                 345                 350
```

Met Leu

<210> 13
<211> 354
<212> PRT
<213> JC virus

<400> 13

Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
1 5 10 15

Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
20 25 30

Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
35 40 45

Gly Asp Pro Asp Glu His Leu Arg Gly Phe Ser Lys Ser Ile Ser Ile
50 55 60

Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn Lys Asp Met Leu Pro Cys
65 70 75 80

Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
85 90 95

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
100 105 110

Leu Gly Val Thr Thr Leu Met Asn Val His Ser Asn Gly Gln Ala Thr
115 120 125

His Asp Asn Gly Ala Gly Lys Pro Val Gln Gly Thr Ser Phe His Phe
130 135 140

Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Val Phe Asn
145 150 155 160

Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr
165 170 175

Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys
180 185 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
195 200 205

Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
210 215 220

Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu

225 230 235 240

Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
245 250 255

Val Asp Val Cys Gly Met Phe Thr Asn Arg Ser Gly Ser Gln Gln Trp
260 265 270

Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
275 280 285

Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
290 295 300

Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305 310 315 320

Val Glu Glu Val Arg Val Phe Glu Gly Thr Glu Glu Leu Pro Gly Asp
325 330 335

Pro Asp Met Met Arg Tyr Val Asp Arg Tyr Gly Gln Leu Gln Thr Lys
340 345 350

Met Leu

<210> 14
<211> 354
<212> PRT
<213> JC virus

<400> 14

Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
1 5 10 15

Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
20 25 30

Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
35 40 45

Gly Asp Pro Asp Glu His Leu Arg Gly Phe Ser Lys Ser Ile Ser Ile
50 55 60

Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn Lys Asp Met Leu Pro Cys
65 70 75 80

Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
85 90 95

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
100 105 110

```
Leu Gly Val Thr Thr Leu Met Asn Val His Ser Asn Gly Gln Ala Thr
        115                 120                 125

His Asp Asn Gly Ala Gly Lys Pro Val Gln Gly Thr Ser Phe His Phe
    130                 135                 140

Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Val Phe Asn
145                 150                 155                 160

Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr
                165                 170                 175

Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys
            180                 185                 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
        195                 200                 205

Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
    210                 215                 220

Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu
225                 230                 235                 240

Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
                245                 250                 255

Val Asp Val Cys Gly Met Phe Thr Asn Arg Ser Gly Phe Gln Gln Trp
            260                 265                 270

Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
        275                 280                 285

Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
    290                 295                 300

Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305                 310                 315                 320

Val Glu Glu Val Arg Val Phe Glu Gly Thr Glu Glu Leu Pro Gly Asp
                325                 330                 335

Pro Asp Met Met Arg Tyr Val Asp Arg Tyr Gly Gln Leu Gln Thr Lys
            340                 345                 350

Met Leu
```

<210> 15
<211> 354

<212> PRT
<213> JC virus

<400> 15

```
Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
1               5                  10                  15

Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
            20                  25                  30

Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
        35                  40                  45

Gly Asp Pro Asp Glu His Leu Arg Gly Phe Ser Lys Ser Ile Ser Ile
    50                  55                  60

Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn Lys Asp Met Leu Pro Cys
65                  70                  75                  80

Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
                85                  90                  95

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
            100                 105                 110

Ile Gly Val Thr Thr Leu Met Asn Val His Ser Asn Gly Gln Ala Thr
        115                 120                 125

His Asp Asn Gly Ala Gly Lys Pro Val Gln Gly Thr Ser Phe His Phe
    130                 135                 140

Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Val Phe Asn
145                 150                 155                 160

Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr
                165                 170                 175

Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys
            180                 185                 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
        195                 200                 205

Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
    210                 215                 220

Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu
225                 230                 235                 240

Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
                245                 250                 255
```

```
Val Asp Val Cys Gly Met Phe Thr Asn Arg Ser Gly Tyr Gln Gln Trp
            260                 265                 270

Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
        275                 280                 285

Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
    290                 295                 300

Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305                 310                 315                 320

Val Glu Glu Val Arg Val Phe Glu Gly Thr Glu Glu Leu Pro Gly Asp
                325                 330                 335

Pro Asp Met Met Arg Tyr Val Asp Arg Tyr Gly Gln Leu Gln Thr Lys
            340                 345                 350

Met Leu
```

<210> 16
<211> 354
<212> PRT
<213> JC virus

<400> 16

```
Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
1               5                   10                  15

Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
            20                  25                  30

Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
        35                  40                  45

Gly Asp Pro Asp Glu His Leu Arg Gly Phe Ser Lys Ser Ile Ser Ile
    50                  55                  60

Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn Lys Asp Met Leu Pro Cys
65                  70                  75                  80

Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
                85                  90                  95

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
            100                 105                 110

Leu Gly Val Thr Thr Leu Met Asn Val His Ser Asn Gly Gln Ala Thr
        115                 120                 125
```

```
His Asp Asn Gly Ala Gly Lys Pro Val Gln Gly Thr Ser Phe His Phe
    130                 135                 140

Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Val Phe Asn
145                 150                 155                 160

Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr
                165                 170                 175

Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys
            180                 185                 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
        195                 200                 205

Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
    210                 215                 220

Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu
225                 230                 235                 240

Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
                245                 250                 255

Val Asp Val Cys Gly Met Phe Thr Asn Arg Ser Gly Phe Gln Gln Trp
            260                 265                 270

Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
        275                 280                 285

Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
    290                 295                 300

Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305                 310                 315                 320

Val Glu Glu Val Arg Val Phe Glu Gly Thr Glu Glu Leu Pro Gly Asp
                325                 330                 335

Pro Asp Met Met Arg Tyr Val Asp Arg Tyr Gly Gln Leu Gln Thr Lys
            340                 345                 350

Met Leu
```

<210> 17
<211> 354
<212> PRT
<213> JC virus

<400> 17

```
Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
```

```
1               5                   10                  15

Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
            20                  25                  30

Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
        35                  40                  45

Gly Asp Pro Asp Glu His Leu Arg Gly Phe Ser Lys Ser Ile Ser Ile
    50                  55                  60

Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn Lys Asp Met Leu Pro Cys
65                  70                  75                  80

Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
                85                  90                  95

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
            100                 105                 110

Ile Gly Val Thr Thr Leu Met Asn Val His Ser Asn Gly Gln Ala Thr
        115                 120                 125

His Asp Asn Gly Ala Gly Lys Pro Val Gln Gly Thr Ser Phe His Phe
    130                 135                 140

Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Val Phe Asn
145                 150                 155                 160

Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr
                165                 170                 175

Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys
            180                 185                 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
        195                 200                 205

Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
    210                 215                 220

Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu
225                 230                 235                 240

Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
                245                 250                 255

Val Asp Val Cys Gly Met Phe Thr Asn Arg Ser Gly Tyr Gln Gln Trp
            260                 265                 270

Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
```

```
        275                 280                 285

Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
    290                 295                 300

Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305                 310                 315                 320

Val Glu Glu Val Arg Val Phe Glu Gly Thr Glu Glu Leu Pro Gly Asp
                325                 330                 335

Pro Asp Met Met Arg Tyr Val Asp Arg Tyr Gly Gln Leu Gln Thr Lys
            340                 345                 350

Met Leu
```

<210> 18
<211> 354
<212> PRT
<213> JC virus

<400> 18

```
Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
1               5                   10                  15

Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
            20                  25                  30

Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
        35                  40                  45

Gly Asp Pro Asp Glu His Leu Arg Gly Phe Ser Lys Ser Ile Ser Ile
    50                  55                  60

Ser Asp Thr Phe Glu Ser Asp Ser Pro Ser Lys Asp Met Leu Pro Cys
65                  70                  75                  80

Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
                85                  90                  95

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
            100                 105                 110

Ile Gly Val Thr Ser Leu Met Asn Val His Ser Asn Gly Gln Ala Ala
        115                 120                 125

His Asp Asn Gly Ala Gly Lys Pro Val Gln Gly Thr Ser Phe His Phe
    130                 135                 140

Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Val Phe Asn
145                 150                 155                 160
```

```
Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr
                165                 170                 175

Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys
            180                 185                 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
        195                 200                 205

Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
    210                 215                 220

Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu
225                 230                 235                 240

Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
                245                 250                 255

Val Asp Val Cys Gly Met Phe Thr Asn Arg Ser Gly Ser Gln Gln Trp
            260                 265                 270

Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
        275                 280                 285

Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
    290                 295                 300

Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305                 310                 315                 320

Val Glu Glu Val Arg Val Phe Glu Gly Thr Glu Glu Leu Pro Gly Asp
                325                 330                 335

Pro Asp Met Met Arg Tyr Val Asp Lys Tyr Gly Gln Leu Gln Thr Lys
            340                 345                 350

Met Leu
```

<210> 19
<211> 354
<212> PRT
<213> JC virus

<400> 19

```
Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
1               5                   10                  15

Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
            20                  25                  30
```

```
Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
        35                  40                  45

Gly Asp Pro Asp Glu His Leu Arg Gly Phe Ser Lys Ser Ile Ser Ile
    50                  55                  60

Ser Asp Thr Phe Glu Ser Asp Ser Pro Ser Lys Asp Met Leu Pro Cys
65                  70                  75                  80

Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
                85                  90                  95

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
            100                 105                 110

Ile Gly Val Thr Ser Leu Met Asn Val His Ser Asn Gly Gln Ala Ala
        115                 120                 125

His Asp Asn Gly Ala Gly Lys Pro Val Gln Gly Thr Ser Phe His Phe
    130                 135                 140

Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Val Phe Asn
145                 150                 155                 160

Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr
                165                 170                 175

Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys
            180                 185                 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
        195                 200                 205

Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
    210                 215                 220

Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu
225                 230                 235                 240

Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
                245                 250                 255

Val Asp Val Cys Gly Met Phe Thr Asn Arg Ser Gly Phe Gln Gln Trp
            260                 265                 270

Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
        275                 280                 285

Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
    290                 295                 300
```

```
Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305                 310                 315                 320

Val Glu Glu Val Arg Val Phe Glu Gly Thr Glu Glu Leu Pro Gly Asp
                325                 330                 335

Pro Asp Met Met Arg Tyr Val Asp Lys Tyr Gly Gln Leu Gln Thr Lys
            340                 345                 350

Met Leu
```

<210> 20
<211> 354
<212> PRT
<213> JC virus

<400> 20

```
Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
1               5                   10                  15

Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
            20                  25                  30

Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
        35                  40                  45

Gly Asp Pro Asp Glu His Leu Arg Gly Phe Ser Lys Ser Ile Ser Ile
    50                  55                  60

Ser Asp Thr Phe Glu Ser Asp Ser Pro Ser Lys Asp Met Leu Pro Cys
65                  70                  75                  80

Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
                85                  90                  95

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
            100                 105                 110

Ile Gly Val Thr Ser Leu Met Asn Val His Ser Asn Gly Gln Ala Ala
        115                 120                 125

His Asp Asn Gly Ala Gly Lys Pro Val Gln Gly Thr Ser Phe His Phe
    130                 135                 140

Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Val Phe Asn
145                 150                 155                 160

Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr
                165                 170                 175
```

```
Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys
            180                 185                 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
        195                 200                 205

Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
    210                 215                 220

Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu
225                 230                 235                 240

Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
                245                 250                 255

Val Asp Val Cys Gly Met Phe Thr Asn Arg Ser Gly Phe Gln Gln Trp
            260                 265                 270

Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
        275                 280                 285

Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
    290                 295                 300

Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305                 310                 315                 320

Val Glu Glu Val Arg Val Phe Glu Gly Thr Glu Glu Leu Pro Gly Asp
                325                 330                 335

Pro Asp Met Met Arg Tyr Val Asp Lys Tyr Gly Gln Leu Gln Thr Lys
            340                 345                 350

Met Leu
```

<210> 21
<211> 344
<212> PRT
<213> JC virus

<400> 21

```
Met Gly Ala Ala Leu Ala Leu Leu Gly Asp Leu Val Ala Thr Val Ser
1               5                   10                  15

Glu Ala Ala Ala Ala Thr Gly Phe Ser Val Ala Glu Ile Ala Ala Gly
            20                  25                  30

Glu Ala Ala Ala Thr Ile Glu Val Glu Ile Ala Ser Leu Ala Thr Val
        35                  40                  45

Glu Gly Ile Thr Ser Thr Ser Glu Ala Ile Ala Ala Ile Gly Leu Thr
```

```
    50                  55                  60

Pro Glu Thr Tyr Ala Val Ile Thr Gly Ala Pro Gly Ala Val Ala Gly
65                  70                  75                  80

Phe Ala Ala Leu Val Gln Thr Val Thr Gly Gly Ser Ala Ile Ala Gln
                85                  90                  95

Leu Gly Tyr Arg Phe Phe Ala Asp Trp Asp His Lys Val Ser Thr Val
            100                 105                 110

Gly Leu Phe Gln Gln Pro Ala Met Ala Leu Gln Leu Phe Asn Pro Glu
        115                 120                 125

Asp Tyr Tyr Asp Ile Leu Phe Pro Gly Val Asn Ala Phe Val Asn Asn
    130                 135                 140

Ile His Tyr Leu Asp Pro Arg His Trp Gly Pro Ser Leu Phe Ser Thr
145                 150                 155                 160

Ile Ser Gln Ala Phe Trp Asn Leu Val Arg Asp Asp Leu Pro Ser Leu
                165                 170                 175

Thr Ser Gln Glu Ile Gln Arg Arg Thr Gln Lys Leu Phe Val Glu Ser
            180                 185                 190

Leu Ala Arg Phe Leu Glu Glu Thr Thr Trp Ala Ile Val Asn Ser Pro
        195                 200                 205

Val Asn Leu Tyr Asn Tyr Ile Ser Asp Tyr Tyr Ser Arg Leu Ser Pro
    210                 215                 220

Val Arg Pro Ser Met Val Arg Gln Val Ala Gln Arg Glu Gly Thr Tyr
225                 230                 235                 240

Ile Ser Phe Gly His Ser Tyr Thr Gln Ser Ile Asp Asp Ala Asp Ser
                245                 250                 255

Ile Gln Glu Val Thr Gln Arg Leu Asp Leu Lys Thr Pro Asn Val Gln
            260                 265                 270

Ser Gly Glu Phe Ile Glu Lys Ser Ile Ala Pro Gly Gly Ala Asn Gln
        275                 280                 285

Arg Ser Ala Pro Gln Trp Met Leu Pro Leu Leu Leu Gly Leu Tyr Gly
    290                 295                 300

Thr Val Thr Pro Ala Leu Glu Ala Tyr Glu Asp Gly Pro Asn Lys Lys
305                 310                 315                 320

Lys Arg Arg Lys Glu Gly Pro Arg Ala Ser Ser Lys Thr Ser Tyr Lys
```

```
                325                 330                 335

Arg Arg Ser Arg Ser Ser Arg Ser
            340
```

<210> 22
<211> 354
<212> PRT
<213> JC virus

<400> 22

```
Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
1               5                  10                  15

Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
            20                  25                  30

Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
        35                  40                  45

Gly Asp Pro Asp Glu His Leu Arg Gly Phe Ser Lys Ser Ile Ser Ile
    50                  55                  60

Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn Lys Asp Met Leu Pro Cys
65                  70                  75                  80

Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
                85                  90                  95

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
            100                 105                 110

Ile Gly Val Thr Thr Leu Met Asn Val His Ser Asn Gly Gln Ala Thr
        115                 120                 125

His Asp Asn Gly Ala Gly Lys Pro Val Gln Gly Thr Ser Phe His Phe
    130                 135                 140

Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Val Phe Asn
145                 150                 155                 160

Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr
                165                 170                 175

Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys
            180                 185                 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
        195                 200                 205

Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
    210                 215                 220
```

```
Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu
225                 230                 235                 240

Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
                245                 250                 255

Val Asp Val Cys Gly Met Phe Thr Asn Arg Ser Gly Ser Gln Gln Trp
            260                 265                 270

Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
        275                 280                 285

Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
    290                 295                 300

Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305                 310                 315                 320

Val Glu Glu Val Arg Val Phe Glu Gly Thr Glu Glu Leu Pro Gly Asp
                325                 330                 335

Pro Asp Met Met Arg Tyr Val Asp Arg Tyr Gly Gln Leu Gln Thr Lys
            340                 345                 350

Met Leu
```

<210> 23
<211> 354
<212> PRT
<213> JC virus

<400> 23

```
Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
1               5                   10                  15

Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
            20                  25                  30

Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
        35                  40                  45

Gly Asp Pro Asp Glu His Leu Arg Gly Phe Ser Lys Leu Ile Ser Ile
    50                  55                  60

Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn Lys Asp Met Leu Pro Cys
65                  70                  75                  80

Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
                85                  90                  95
```

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
100 105 110

Ile Gly Val Thr Thr Leu Met Asn Val His Ser Asn Gly Gln Ala Thr
115 120 125

His Asp Asn Gly Ala Gly Lys Pro Val Gln Gly Thr Ser Phe His Phe
130 135 140

Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Val Phe Asn
145 150 155 160

Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr
165 170 175

Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys
180 185 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
195 200 205

Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
210 215 220

Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu
225 230 235 240

Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
245 250 255

Val Asp Val Cys Gly Met Phe Thr Asn Arg Ser Gly Ser Gln Gln Trp
260 265 270

Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
275 280 285

Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
290 295 300

Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305 310 315 320

Val Glu Glu Val Arg Val Phe Glu Gly Thr Glu Glu Leu Pro Gly Asp
325 330 335

Pro Asp Met Met Arg Tyr Val Asp Arg Tyr Gly Gln Leu Gln Thr Lys
340 345 350

Met Leu

<210> 24
<211> 354
<212> PRT
<213> JC virus

<400> 24

Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
1 5 10 15

Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
20 25 30

Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
35 40 45

Gly Asp Pro Asp Glu His Leu Arg Gly Phe Ser Lys Ser Ile Ser Ile
50 55 60

Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn Lys Asp Met Leu Pro Cys
65 70 75 80

Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
85 90 95

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
100 105 110

Ile Gly Val Thr Thr Leu Met Asn Val His Ser Asn Gly Gln Ala Thr
115 120 125

His Asp Asn Gly Ala Gly Lys Pro Val Gln Gly Thr Ser Phe His Phe
130 135 140

Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Val Phe Asn
145 150 155 160

Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr
165 170 175

Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys
180 185 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
195 200 205

Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
210 215 220

Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu
225 230 235 240

```
Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
                245                 250                 255

Val Asp Val Cys Gly Met Phe Thr Asn Arg Ser Gly Ser Gln Gln Trp
            260                 265                 270

Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
        275                 280                 285

Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
    290                 295                 300

Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305                 310                 315                 320

Val Glu Glu Val Arg Val Phe Glu Gly Thr Glu Glu Leu Pro Gly Asp
                325                 330                 335

Pro Asp Met Met Arg Tyr Val Asp Arg Tyr Gly Gln Leu Gln Thr Lys
            340                 345                 350

Met Leu
```

<210> 25
<211> 354
<212> PRT
<213> JC virus

<400> 25

```
Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
1               5                   10                  15

Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
            20                  25                  30

Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
        35                  40                  45

Gly Asp Pro Asp Glu His Leu Arg Gly Phe Ser Lys Ser Ile Ser Ile
    50                  55                  60

Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn Lys Asp Met Leu Pro Cys
65                  70                  75                  80

Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
                85                  90                  95

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
            100                 105                 110

Leu Gly Val Thr Thr Leu Met Asn Val His Ser Asn Gly Gln Ala Thr
```

115 120 125

His Asp Asn Gly Ala Gly Lys Pro Val Gln Gly Thr Ser Phe His Phe
130 135 140

Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Val Phe Asn
145 150 155 160

Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr
165 170 175

Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys
180 185 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
195 200 205

Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
210 215 220

Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu
225 230 235 240

Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
245 250 255

Val Asp Val Cys Gly Met Phe Thr Asn Arg Ser Gly Ser Gln Gln Trp
260 265 270

Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
275 280 285

Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
290 295 300

Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305 310 315 320

Val Glu Glu Val Arg Val Phe Glu Gly Thr Glu Glu Leu Pro Gly Asp
325 330 335

Pro Asp Met Met Arg Tyr Val Asp Arg Tyr Gly Gln Leu Gln Thr Lys
340 345 350

Met Leu

<210> 26
<211> 354
<212> PRT
<213> JC virus

<400> 26

```
Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
1               5                  10                  15

Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
            20                  25                  30

Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
        35                  40                  45

Gly Asp Pro Asp Glu His Leu Arg Gly Phe Ser Lys Ser Ile Ser Ile
    50                  55                  60

Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn Lys Asp Met Leu Pro Cys
65                  70                  75                  80

Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
                85                  90                  95

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
            100                 105                 110

Leu Gly Val Thr Thr Leu Met Asn Val His Ser Asn Gly Gln Ala Thr
        115                 120                 125

His Asp Asn Gly Ala Gly Lys Pro Val Gln Gly Thr Ser Phe His Phe
    130                 135                 140

Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Val Phe Asn
145                 150                 155                 160

Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr
                165                 170                 175

Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys
            180                 185                 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
        195                 200                 205

Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
    210                 215                 220

Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu
225                 230                 235                 240

Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
                245                 250                 255

Val Asp Val Cys Gly Met Phe Thr Asn Arg Ser Gly Tyr Gln Gln Trp
            260                 265                 270
```

```
Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
        275                 280                 285

Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
    290                 295                 300

Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305                 310                 315                 320

Val Glu Glu Val Arg Val Phe Glu Gly Thr Glu Glu Leu Pro Gly Asp
                325                 330                 335

Pro Asp Met Met Arg Tyr Val Asp Arg Tyr Gly Gln Leu Gln Thr Lys
            340                 345                 350

Met Leu
```

<210> 27
<211> 354
<212> PRT
<213> JC virus

<400> 27

```
Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
1               5                   10                  15

Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
            20                  25                  30

Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
        35                  40                  45

Gly Asp Pro Asp Glu His Leu Arg Gly Phe Ser Met Ser Ile Ser Ile
    50                  55                  60

Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn Lys Asp Met Leu Pro Cys
65                  70                  75                  80

Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
                85                  90                  95

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
            100                 105                 110

Leu Gly Val Thr Thr Leu Met Asn Val His Ser Asn Gly Gln Ala Thr
        115                 120                 125

His Asp Asn Gly Ala Gly Lys Pro Val Gln Gly Thr Ser Phe His Phe
    130                 135                 140
```

```
Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Val Phe Asn
145                 150                 155                 160

Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr
                165                 170                 175

Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys
            180                 185                 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
        195                 200                 205

Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
    210                 215                 220

Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu
225                 230                 235                 240

Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
                245                 250                 255

Val Asp Val Cys Gly Met Phe Thr Asn Arg Ser Gly Ser Gln Gln Trp
            260                 265                 270

Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
        275                 280                 285

Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
    290                 295                 300

Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305                 310                 315                 320

Val Glu Glu Val Arg Val Phe Glu Gly Thr Glu Glu Leu Pro Gly Asp
                325                 330                 335

Pro Asp Met Met Arg Tyr Val Asp Arg Tyr Gly Gln Leu Gln Thr Lys
            340                 345                 350

Met Leu
```

<210> 28
<211> 354
<212> PRT
<213> JC virus

<400> 28

```
Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
1               5                   10                  15
```

```
Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
            20                  25                  30

Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
        35                  40                  45

Gly Asp Pro Asp Glu His Leu Arg Gly Phe Ser Lys Ser Ile Ser Ile
    50                  55                  60

Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn Lys Asp Met Leu Pro Cys
65                  70                  75                  80

Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
                85                  90                  95

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
            100                 105                 110

Leu Gly Val Thr Thr Leu Met Asn Val His Cys Asn Gly Gln Ala Thr
        115                 120                 125

His Asp Asn Gly Ala Gly Lys Pro Val Gln Gly Thr Ser Phe His Phe
    130                 135                 140

Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Val Phe Asn
145                 150                 155                 160

Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr
                165                 170                 175

Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys
            180                 185                 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
        195                 200                 205

Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
    210                 215                 220

Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu
225                 230                 235                 240

Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
                245                 250                 255

Val Asp Val Cys Gly Met Phe Thr Asn Arg Ser Gly Ser Gln Gln Trp
            260                 265                 270

Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
        275                 280                 285
```

Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
290 295 300

Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305 310 315 320

Val Glu Glu Val Arg Val Phe Glu Gly Thr Glu Glu Leu Pro Gly Asp
325 330 335

Pro Asp Met Met Arg Tyr Val Asp Arg Tyr Gly Gln Leu Gln Thr Lys
340 345 350

Met Leu

<210> 29
<211> 354
<212> PRT
<213> JC virus

<400> 29

Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
1 5 10 15

Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
20 25 30

Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
35 40 45

Gly Asp Pro Asp Glu His Leu Arg Gly Phe Ser Lys Ser Ile Ser Ile
50 55 60

Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn Lys Asp Met Leu Pro Cys
65 70 75 80

Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
85 90 95

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
100 105 110

Leu Gly Val Thr Thr Leu Met Asn Val His Cys Asn Gly Gln Ala Thr
115 120 125

His Asp Asn Gly Ala Gly Lys Pro Val Gln Gly Thr Ser Phe His Phe
130 135 140

Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Val Phe Asn
145 150 155 160

Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr

```
                165                 170                 175

Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys
            180                 185                 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
        195                 200                 205

Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
    210                 215                 220

Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu
225                 230                 235                 240

Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
                245                 250                 255

Val Asp Val Cys Gly Met Phe Thr Asn Arg Ser Gly Ser Gln Gln Trp
            260                 265                 270

Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
        275                 280                 285

Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
    290                 295                 300

Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305                 310                 315                 320

Val Glu Glu Val Arg Val Phe Glu Gly Thr Glu Glu Leu Pro Gly Asp
                325                 330                 335

Pro Asp Met Met Arg Tyr Val Asp Arg Tyr Gly Gln Leu Gln Thr Lys
            340                 345                 350

Met Leu
```

<210> 30
<211> 245
<212> PRT
<213> JC virus

<400> 30

```
Phe Leu Thr Pro Glu Met Gly Asp Pro Asp Glu His Leu Arg Gly Phe
1               5                   10                  15

Ser Lys Ser Ile Ser Ile Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn
            20                  25                  30

Lys Asp Met Leu Pro Cys Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn
        35                  40                  45
```

```
Leu Asn Glu Asp Leu Thr Cys Gly Asn Ile Leu Met Trp Glu Ala Val
    50                  55                  60

Thr Leu Lys Thr Glu Val Ile Gly Val Thr Thr Leu Met Asn Val His
65                  70                  75                  80

Ser Asn Gly Gln Ala Thr His Asp Asn Gly Ala Gly Lys Pro Val Gln
                85                  90                  95

Gly Thr Ser Phe His Phe Phe Ser Val Gly Gly Glu Ala Leu Glu Leu
            100                 105                 110

Gln Gly Val Val Phe Asn Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile
        115                 120                 125

Phe Pro Lys Asn Ala Thr Val Gln Ser Gln Val Met Asn Thr Glu His
    130                 135                 140

Lys Ala Tyr Leu Asp Lys Asn Lys Ala Tyr Pro Val Glu Cys Trp Val
145                 150                 155                 160

Pro Asp Pro Thr Arg Asn Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr
                165                 170                 175

Gly Gly Glu Asn Val Pro Pro Val Leu His Ile Thr Asn Thr Ala Thr
            180                 185                 190

Thr Val Leu Leu Asp Glu Phe Gly Val Gly Pro Leu Cys Lys Gly Asp
        195                 200                 205

Asn Leu Tyr Leu Ser Ala Val Asp Val Cys Gly Met Phe Thr Asn Arg
    210                 215                 220

Ser Gly Ser Gln Gln Trp Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln
225                 230                 235                 240

Leu Arg Lys Arg Arg
                245
```

<210> 31
<211> 245
<212> PRT
<213> JC virus

<400> 31

```
Phe Leu Thr Pro Glu Met Gly Asp Pro Asp Glu His Leu Arg Gly Phe
1               5                   10                  15

Ser Lys Ser Ile Ser Ile Ser His Thr Phe Glu Ser Asp Ser Pro Asn
            20                  25                  30
```

```
Lys Asp Met Leu Pro Cys Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn
        35                  40                  45

Leu Asn Glu Asp Leu Thr Cys Gly Asn Ile Leu Met Trp Glu Ala Val
    50                  55                  60

Thr Leu Lys Thr Glu Val Ile Gly Val Thr Thr Leu Met Asn Val His
65                  70                  75                  80

Ser Asn Gly Gln Ala Thr His Asp Asn Gly Ala Gly Lys Pro Val Gln
                85                  90                  95

Gly Thr Ser Phe His Phe Phe Ser Val Gly Gly Glu Ala Leu Glu Leu
            100                 105                 110

Gln Gly Val Val Phe Asn Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile
        115                 120                 125

Phe Pro Lys Asn Ala Thr Val Gln Ser Gln Val Met Asn Thr Glu His
    130                 135                 140

Lys Ala Tyr Leu Asp Lys Asn Lys Ala Tyr Pro Val Glu Cys Trp Val
145                 150                 155                 160

Pro Asp Pro Thr Arg Asn Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr
                165                 170                 175

Gly Gly Glu Asn Val Pro Pro Val Leu His Ile Thr Asn Thr Ala Thr
            180                 185                 190

Thr Val Leu Leu Asp Glu Phe Gly Val Gly Pro Leu Cys Lys Gly Asp
        195                 200                 205

Asn Leu Tyr Leu Ser Ala Val Asp Val Cys Gly Met Phe Thr Asn Arg
    210                 215                 220

Ser Gly Ser Gln Gln Trp Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln
225                 230                 235                 240

Leu Arg Lys Arg Arg
                245
```

<210> 32
<211> 245
<212> PRT
<213> JC virus

<400> 32

```
Phe Leu Thr Pro Glu Met Gly Asp Pro Asp Glu His Leu Arg Gly Phe
1               5                   10                  15
```

Ser Lys Ser Ile Ser Ile Ser Asn Thr Phe Glu Ser Asp Ser Pro Asn
20 25 30

Lys Asp Met Leu Pro Cys Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn
35 40 45

Leu Asn Glu Asp Leu Thr Cys Gly Asn Ile Leu Met Trp Glu Ala Val
50 55 60

Thr Leu Lys Thr Glu Val Ile Gly Val Thr Thr Leu Met Asn Val His
65 70 75 80

Ser Asn Gly Gln Ala Thr His Asp Asn Gly Ala Gly Lys Pro Val Gln
85 90 95

Gly Thr Ser Phe His Phe Phe Ser Val Gly Gly Glu Ala Leu Glu Leu
100 105 110

Gln Gly Val Val Phe Asn Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile
115 120 125

Phe Pro Lys Asn Ala Thr Val Gln Ser Gln Val Met Asn Thr Glu His
130 135 140

Lys Ala Tyr Leu Asp Lys Asn Lys Ala Tyr Pro Val Glu Cys Trp Val
145 150 155 160

Pro Asp Pro Thr Arg Asn Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr
165 170 175

Gly Gly Glu Asn Val Pro Pro Val Leu His Ile Thr Asn Thr Ala Thr
180 185 190

Thr Val Leu Leu Asp Glu Phe Gly Val Gly Pro Leu Cys Lys Gly Asp
195 200 205

Asn Leu Tyr Leu Ser Ala Val Asp Val Cys Gly Met Phe Thr Asn Arg
210 215 220

Ser Gly Ser Gln Gln Trp Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln
225 230 235 240

Leu Arg Lys Arg Arg
245

<210> 33
<211> 245
<212> PRT
<213> JC virus

<400> 33

Phe Leu Thr Pro Glu Met Gly Asp Pro Asp Glu His Leu Arg Gly Phe

1 5 10 15

Ser Glu Ser Ile Ser Ile Ser His Thr Phe Glu Ser Asp Ser Pro Asn
20 25 30

Lys Asp Met Leu Pro Cys Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn
35 40 45

Leu Asn Glu Asp Leu Thr Cys Gly Asn Ile Leu Met Trp Glu Ala Val
50 55 60

Thr Leu Lys Thr Glu Val Ile Gly Val Thr Thr Leu Met Asn Val His
65 70 75 80

Ser Asn Gly Gln Ala Thr His Asp Asn Gly Ala Gly Lys Pro Val Gln
85 90 95

Gly Thr Ser Phe His Phe Phe Ser Val Gly Gly Glu Ala Leu Glu Leu
100 105 110

Gln Gly Val Val Phe Asn Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile
115 120 125

Phe Pro Lys Asn Ala Thr Val Gln Ser Gln Val Met Asn Thr Glu His
130 135 140

Lys Ala Tyr Leu Asp Lys Asn Lys Ala Tyr Pro Val Glu Cys Trp Val
145 150 155 160

Pro Asp Pro Thr Arg Asn Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr
165 170 175

Gly Gly Glu Asn Val Pro Pro Val Leu His Ile Thr Asn Thr Ala Thr
180 185 190

Thr Val Leu Leu Asp Glu Phe Gly Val Gly Pro Leu Cys Lys Gly Asp
195 200 205

Asn Leu Tyr Leu Ser Ala Val Asp Val Cys Gly Met Phe Thr Asn Arg
210 215 220

Ser Gly Ser Gln Gln Trp Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln
225 230 235 240

Leu Arg Lys Arg Arg
245

<210> 34
<211> 245
<212> PRT
<213> JC virus

<400> 34

Phe Leu Thr Pro Glu Met Gly Asp Pro Asp Glu His Leu Arg Gly Phe
1 5 10 15

Ser Lys Ser Ile Ser Ile Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn
20 25 30

Lys Asp Met Leu Pro Cys Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn
35 40 45

Leu Asn Glu Asp Leu Thr Cys Gly Asn Ile Leu Met Trp Glu Ala Val
50 55 60

Thr Leu Lys Thr Glu Val Leu Gly Val Thr Thr Leu Met Asn Val His
65 70 75 80

Ser Asn Gly Gln Ala Thr His Asp Asn Gly Ala Gly Lys Pro Val Gln
85 90 95

Gly Thr Ser Phe His Phe Phe Ser Val Gly Gly Glu Ala Leu Glu Leu
100 105 110

Gln Gly Val Val Phe Asn Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile
115 120 125

Phe Pro Lys Asn Ala Thr Val Gln Ser Gln Val Met Asn Thr Glu His
130 135 140

Lys Ala Tyr Leu Asp Lys Asn Lys Ala Tyr Pro Val Glu Cys Trp Val
145 150 155 160

Pro Asp Pro Thr Arg Asn Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr
165 170 175

Gly Gly Glu Asn Val Pro Pro Val Leu His Ile Thr Asn Thr Ala Thr
180 185 190

Thr Val Leu Leu Asp Glu Phe Gly Val Gly Pro Leu Cys Lys Gly Asp
195 200 205

Asn Leu Tyr Leu Ser Ala Val Asp Val Cys Gly Met Phe Thr Asn Arg
210 215 220

Phe Gly Ser Gln Gln Trp Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln
225 230 235 240

Leu Arg Lys Arg Arg
245

<210> 35
<211> 245

<212> PRT
<213> JC virus

<400> 35

Phe Leu Thr Pro Glu Met Gly Asp Pro Asp Glu His Leu Arg Gly Phe
1 5 10 15

Ser Met Ser Ile Ser Ile Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn
20 25 30

Lys Asp Met Leu Pro Cys Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn
35 40 45

Leu Asn Glu Asp Leu Thr Cys Gly Asn Ile Leu Met Trp Glu Ala Val
50 55 60

Thr Leu Lys Thr Glu Val Ile Gly Val Thr Thr Leu Met Asn Val His
65 70 75 80

Ser Asn Gly Gln Ala Thr His Asp Asn Gly Ala Gly Lys Pro Val Gln
85 90 95

Gly Thr Ser Phe His Phe Phe Ser Val Gly Gly Glu Ala Leu Glu Leu
100 105 110

Gln Gly Val Val Phe Asn Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile
115 120 125

Phe Pro Lys Asn Ala Thr Val Gln Ser Gln Val Met Asn Thr Glu His
130 135 140

Lys Ala Tyr Leu Asp Lys Asn Lys Ala Tyr Pro Val Glu Cys Trp Val
145 150 155 160

Pro Asp Pro Thr Arg Asn Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr
165 170 175

Gly Gly Glu Asn Val Pro Pro Val Leu His Ile Thr Asn Thr Ala Thr
180 185 190

Thr Val Leu Leu Asp Glu Phe Gly Val Gly Pro Leu Cys Lys Gly Asp
195 200 205

Asn Leu Tyr Leu Ser Ala Val Asp Val Cys Gly Met Phe Thr Asn Arg
210 215 220

Ser Gly Ser Gln His Trp Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln
225 230 235 240

Leu Arg Lys Arg Arg
245

<210> 36
<211> 245
<212> PRT
<213> JC virus

<400> 36

Phe Leu Thr Pro Glu Met Gly Asp Pro Asp Glu His Leu Arg Gly Phe
1 5 10 15

Ser Lys Ser Ile Ser Ile Ser His Thr Phe Glu Ser Asp Ser Pro Asn
20 25 30

Lys Asp Met Leu Pro Cys Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn
35 40 45

Leu Asn Glu Asp Leu Thr Cys Gly Asn Ile Leu Met Trp Glu Ala Val
50 55 60

Thr Leu Lys Thr Glu Val Ile Gly Val Thr Thr Leu Met Asn Val His
65 70 75 80

Ser Asn Gly Gln Ala Thr His Asp Asn Gly Ala Gly Lys Pro Val Gln
85 90 95

Gly Thr Ser Phe His Phe Phe Ser Val Gly Gly Glu Ala Leu Glu Leu
100 105 110

Gln Gly Val Val Phe Asn Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile
115 120 125

Phe Pro Lys Asn Ala Thr Val Gln Ser Gln Val Met Asn Thr Glu His
130 135 140

Lys Ala Tyr Leu Asp Lys Asn Lys Ala Tyr Pro Val Glu Cys Trp Val
145 150 155 160

Pro Asp Pro Thr Arg Asn Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr
165 170 175

Gly Gly Glu Asn Val Pro Pro Val Leu His Ile Thr Asn Thr Ala Thr
180 185 190

Thr Val Leu Leu Asp Glu Phe Gly Val Gly Pro Leu Cys Lys Gly Asp
195 200 205

Asn Leu Tyr Leu Ser Ala Val Asp Val Cys Gly Met Phe Thr Asn Arg
210 215 220

Ser Gly Ser Gln Gln Trp Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln
225 230 235 240

Leu Arg Lys Arg Arg
245

<210> 37
<211> 245
<212> PRT
<213> JC virus

<400> 37

Phe Leu Thr Pro Glu Met Gly Asp Pro Asp Glu His Leu Arg Gly Phe
1 5 10 15

Ser Lys Ser Ile Ser Ile Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn
20 25 30

Lys Asp Met Leu Pro Cys Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn
35 40 45

Leu Asn Glu Asp Leu Thr Cys Gly Asn Ile Leu Met Trp Glu Ala Val
50 55 60

Thr Leu Lys Thr Glu Val Leu Gly Val Thr Thr Leu Met Asn Val His
65 70 75 80

Ser Asn Gly Gln Ala Thr His Asp Asn Gly Ala Gly Lys Pro Val Gln
85 90 95

Gly Thr Ser Phe His Phe Phe Ser Val Gly Gly Glu Ala Leu Glu Leu
100 105 110

Gln Gly Val Val Phe Asn Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile
115 120 125

Phe Pro Lys Asn Ala Thr Val Gln Ser Gln Val Met Asn Thr Glu His
130 135 140

Lys Ala Tyr Leu Asp Lys Asn Lys Ala Tyr Pro Val Glu Cys Trp Val
145 150 155 160

Pro Asp Pro Thr Arg Asn Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr
165 170 175

Gly Gly Glu Asn Val Pro Pro Val Leu His Ile Thr Asn Thr Ala Thr
180 185 190

Thr Val Leu Leu Asp Glu Phe Gly Val Gly Pro Leu Cys Lys Gly Asp
195 200 205

Asn Leu Tyr Leu Ser Ala Val Asp Val Cys Gly Met Phe Thr Asn Arg
210 215 220

Ser Gly Phe Gln Gln Trp Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln

225 230 235 240

Leu Arg Lys Arg Arg
245

<210> 38
<211> 245
<212> PRT
<213> JC virus

<400> 38

Phe Leu Thr Pro Glu Met Gly Asp Pro Asp Glu His Leu Arg Gly Phe
1 5 10 15

Ser Lys Ser Ile Ser Ile Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn
20 25 30

Lys Asp Met Leu Pro Cys Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn
35 40 45

Leu Asn Glu Asp Leu Thr Cys Gly Asn Ile Leu Met Trp Glu Ala Val
50 55 60

Thr Leu Lys Thr Glu Val Leu Gly Val Thr Thr Leu Met Asn Val His
65 70 75 80

Ser Asn Gly Gln Ala Thr His Asp Asn Gly Ala Gly Lys Pro Val Gln
85 90 95

Gly Thr Ser Phe His Phe Phe Ser Val Gly Gly Glu Ala Leu Glu Leu
100 105 110

Gln Gly Val Val Phe Asn Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile
115 120 125

Phe Pro Lys Asn Ala Thr Val Gln Ser Gln Val Met Asn Thr Glu His
130 135 140

Lys Ala Tyr Leu Asp Lys Asn Lys Ala Tyr Pro Val Glu Cys Trp Val
145 150 155 160

Pro Asp Pro Thr Arg Asn Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr
165 170 175

Gly Gly Glu Asn Val Pro Pro Val Leu His Ile Thr Asn Thr Ala Thr
180 185 190

Thr Val Leu Leu Asp Glu Phe Gly Val Gly Pro Leu Cys Lys Gly Asp
195 200 205

Asn Leu Tyr Leu Ser Ala Val Asp Val Cys Gly Met Phe Thr Asn Arg
210 215 220

```
Phe Gly Ser Gln Gln Trp Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln
225                 230                 235                 240

Leu Arg Lys Arg Arg
            245
```

<210> 39
<211> 245
<212> PRT
<213> JC virus

<400> 39

```
Phe Leu Thr Pro Glu Met Gly Asp Pro Asp Glu His Leu Arg Gly Phe
1               5                   10                  15

Ser Lys Ser Ile Ser Ile Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn
            20                  25                  30

Lys Asp Met Leu Pro Cys Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn
        35                  40                  45

Leu Asn Glu Asp Leu Thr Cys Gly Asn Ile Leu Met Trp Glu Ala Val
    50                  55                  60

Thr Leu Lys Thr Glu Val Ile Gly Val Thr Thr Leu Met Asn Val His
65                  70                  75                  80

Ser Asn Gly Gln Ala Thr His Asp Asn Gly Ala Gly Lys Pro Val Gln
                85                  90                  95

Gly Thr Ser Phe His Phe Phe Ser Val Gly Gly Glu Ala Leu Glu Leu
            100                 105                 110

Gln Gly Val Val Phe Asn Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile
        115                 120                 125

Phe Pro Lys Asn Ala Thr Val Gln Ser Gln Val Met Asn Thr Glu His
    130                 135                 140

Lys Ala Tyr Leu Asp Lys Asn Lys Ala Tyr Pro Val Glu Cys Trp Val
145                 150                 155                 160

Pro Asp Pro Thr Arg Asn Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr
                165                 170                 175

Gly Gly Glu Asn Ala Pro Pro Val Leu His Ile Thr Asn Thr Ala Thr
            180                 185                 190

Thr Val Leu Leu Asp Glu Phe Gly Val Gly Pro Leu Cys Lys Gly Asp
        195                 200                 205
```

```
Asn Leu Tyr Leu Ser Ala Val Asp Val Cys Gly Met Phe Thr Asn Arg
    210                 215                 220

Ser Gly Ser Gln Gln Trp Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln
225                 230                 235                 240

Leu Arg Lys Arg Arg
                245
```

<210> 40
<211> 245
<212> PRT
<213> JC virus

<400> 40

```
Phe Leu Thr Pro Glu Met Gly Asp Pro Asp Glu His Leu Arg Gly Phe
1               5                   10                  15

Ser Lys Ser Ile Ser Ile Ser Asp Thr Phe Asp Ser Asp Ser Pro Asn
            20                  25                  30

Lys Asp Met Leu Pro Cys Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn
        35                  40                  45

Leu Asn Glu Asp Leu Thr Cys Gly Asn Ile Leu Met Trp Glu Ala Val
    50                  55                  60

Thr Leu Lys Thr Glu Val Ile Gly Val Thr Thr Leu Met Asn Val His
65                  70                  75                  80

Ser Asn Gly Gln Ala Thr His Asp Asn Gly Ala Gly Lys Pro Val Gln
                85                  90                  95

Gly Thr Ser Phe His Phe Phe Ser Val Gly Gly Glu Ala Leu Glu Leu
            100                 105                 110

Gln Gly Val Val Phe Asn Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile
        115                 120                 125

Phe Pro Lys Asn Ala Thr Val Gln Ser Gln Val Met Asn Thr Glu His
    130                 135                 140

Lys Ala Tyr Leu Asp Lys Asn Lys Ala Tyr Pro Val Glu Cys Trp Val
145                 150                 155                 160

Pro Asp Pro Thr Arg Asn Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr
                165                 170                 175

Gly Gly Glu Asn Val Pro Pro Val Leu His Ile Thr Asn Thr Ala Thr
            180                 185                 190
```

```
Thr Val Leu Leu Asp Glu Phe Gly Val Gly Pro Leu Cys Lys Gly Asp
        195                 200                 205

Asn Leu Tyr Leu Ser Ala Val Asp Val Cys Gly Met Phe Thr Asn Arg
    210                 215                 220

Ser Gly Phe Gln Gln Trp Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln
225                 230                 235                 240

Leu Arg Lys Arg Arg
                245
```

<210> 41
<211> 354
<212> PRT
<213> JC virus

<400> 41

```
Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
1               5                   10                  15

Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
            20                  25                  30

Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
        35                  40                  45

Gly Asp Pro Asp Glu His Leu Arg Gly Phe Ser Lys Ser Ile Ser Ile
    50                  55                  60

Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn Lys Asp Met Leu Pro Cys
65                  70                  75                  80

Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
                85                  90                  95

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
            100                 105                 110

Ile Gly Val Thr Thr Leu Met Asn Val His Ser Asn Gly Gln Ala Ala
        115                 120                 125

His Asp Asn Gly Ala Gly Lys Pro Val Gln Gly Thr Ser Phe His Phe
    130                 135                 140

Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Val Phe Asn
145                 150                 155                 160

Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr
                165                 170                 175

Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys
```

```
            180                 185                 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
        195                 200                 205

Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
    210                 215                 220

Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu
225                 230                 235                 240

Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
                245                 250                 255

Val Asp Val Cys Gly Met Phe Thr Asn Arg Ser Gly Ser Gln Gln Trp
            260                 265                 270

Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
        275                 280                 285

Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
    290                 295                 300

Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305                 310                 315                 320

Val Glu Glu Val Arg Val Phe Glu Gly Thr Glu Glu Leu Pro Gly Asp
                325                 330                 335

Pro Asp Met Met Arg Tyr Val Asp Arg Tyr Gly Gln Leu Gln Thr Lys
            340                 345                 350

Met Leu
```

<210> 42
<211> 354
<212> PRT
<213> JC virus

<400> 42

```
Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
1               5                   10                  15

Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
            20                  25                  30

Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
        35                  40                  45

Gly Asp Pro Asp Glu His Leu Arg Gly Phe Ser Lys Ser Ile Ser Ile
    50                  55                  60
```

```
Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn Lys Asp Met Leu Pro Cys
65                  70                  75                  80

Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
                85                  90                  95

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
            100                 105                 110

Leu Gly Val Thr Thr Leu Met Asn Val His Ser Asn Gly Gln Ala Thr
        115                 120                 125

His Asp Asn Gly Ala Gly Lys Pro Val Gln Gly Thr Ser Phe His Phe
    130                 135                 140

Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Val Phe Asn
145                 150                 155                 160

Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr
                165                 170                 175

Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys
            180                 185                 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
        195                 200                 205

Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
    210                 215                 220

Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu
225                 230                 235                 240

Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
                245                 250                 255

Val Asp Val Cys Gly Met Phe Thr Thr Arg Ser Gly Ser Gln Gln Trp
            260                 265                 270

Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
        275                 280                 285

Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
    290                 295                 300

Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305                 310                 315                 320

Ile Glu Glu Val Arg Val Phe Glu Gly Thr Glu Glu Leu Pro Gly Asp
                325                 330                 335
```

```
Pro Asp Met Met Arg Tyr Val Asp Arg Tyr Gly Gln Leu Gln Thr Lys
            340                 345                 350

Met Leu
```

<210> 43
<211> 354
<212> PRT
<213> JC virus

<400> 43

```
Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
1               5                   10                  15

Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
            20                  25                  30

Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
        35                  40                  45

Gly Asp Pro Asp Glu His Leu Arg Gly Phe Ser Lys Ser Ile Ser Ile
    50                  55                  60

Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn Lys Asp Met Leu Pro Cys
65                  70                  75                  80

Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
                85                  90                  95

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
            100                 105                 110

Ile Gly Val Thr Thr Leu Met Asn Val His Ser Asn Gly Gln Ala Thr
        115                 120                 125

His Asp Asn Gly Ala Ala Lys Pro Val Gln Gly Thr Ser Phe His Phe
    130                 135                 140

Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Val Phe Asn
145                 150                 155                 160

Tyr Arg Thr Thr Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr
                165                 170                 175

Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys
            180                 185                 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
        195                 200                 205
```

Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
210 215 220

Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu
225 230 235 240

Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
245 250 255

Val Asp Val Cys Gly Met Phe Thr Asn Arg Phe Gly Ser Gln Gln Trp
260 265 270

Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
275 280 285

Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
290 295 300

Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305 310 315 320

Ile Glu Glu Val Arg Val Phe Glu Gly Thr Glu Gln Leu Pro Gly Asp
325 330 335

Pro Asp Met Met Arg Tyr Val Asp Arg Tyr Gly Gln Leu Gln Thr Lys
340 345 350

Met Leu

<210> 44
<211> 354
<212> PRT
<213> JC virus

<400> 44

Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
1 5 10 15

Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
20 25 30

Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
35 40 45

Gly Asp Pro Asp Glu His Phe Arg Gly Phe Ser Lys Ser Ile Ser Ile
50 55 60

Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn Lys Asp Met Leu Pro Cys
65 70 75 80

```
Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
                85                  90                  95

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
            100                 105                 110

Ile Gly Val Thr Thr Leu Met Asn Val His Ser Asn Gly Gln Ala Thr
        115                 120                 125

His Asp Asn Gly Ala Ala Lys Pro Val Gln Gly Thr Ser Phe His Phe
    130                 135                 140

Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Val Phe Asn
145                 150                 155                 160

Tyr Arg Thr Thr Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr
                165                 170                 175

Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys
            180                 185                 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
        195                 200                 205

Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
    210                 215                 220

Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu
225                 230                 235                 240

Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
                245                 250                 255

Val Asp Val Cys Gly Met Phe Thr Asn Arg Ser Gly Ser Gln Gln Trp
            260                 265                 270

Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
        275                 280                 285

Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
    290                 295                 300

Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305                 310                 315                 320

Ile Glu Glu Val Arg Val Phe Glu Gly Thr Glu Gln Leu Pro Gly Asp
                325                 330                 335

Pro Asp Met Met Arg Tyr Val Asp Arg Tyr Gly Gln Leu Gln Thr Lys
            340                 345                 350
```

Met Leu

<210> 45
<211> 354
<212> PRT
<213> JC virus

<400> 45

Met Ala Pro Thr Lys Arg Lys Gly Glu Arg Lys Asp Pro Val Gln Val
1 5 10 15

Pro Lys Leu Leu Ile Arg Gly Gly Val Glu Val Leu Glu Val Lys Thr
20 25 30

Gly Val Asp Ser Ile Thr Glu Val Glu Cys Phe Leu Thr Pro Glu Met
35 40 45

Gly Asp Pro Asp Glu His Leu Arg Gly Phe Ser Asn Ser Ile Ser Ile
50 55 60

Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn Lys Asp Met Leu Pro Cys
65 70 75 80

Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn Leu Asn Glu Asp Leu Thr
85 90 95

Cys Gly Asn Ile Leu Met Trp Glu Ala Val Thr Leu Lys Thr Glu Val
100 105 110

Ile Gly Val Thr Thr Leu Met Asn Val His Ser Asn Gly Gln Ala Thr
115 120 125

His Asp Asn Gly Ala Ala Lys Pro Val Gln Gly Thr Ser Phe His Phe
130 135 140

Phe Ser Val Gly Gly Glu Ala Leu Glu Leu Gln Gly Val Val Phe Asn
145 150 155 160

Tyr Arg Thr Thr Tyr Pro Asp Gly Thr Ile Phe Pro Lys Asn Ala Thr
165 170 175

Val Gln Ser Gln Val Met Asn Thr Glu His Lys Ala Tyr Leu Asp Lys
180 185 190

Asn Lys Ala Tyr Pro Val Glu Cys Trp Val Pro Asp Pro Thr Arg Asn
195 200 205

Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr Gly Gly Glu Asn Val Pro
210 215 220

Pro Val Leu His Ile Thr Asn Thr Ala Thr Thr Val Leu Leu Asp Glu

225 230 235 240

Phe Gly Val Gly Pro Leu Cys Lys Gly Asp Asn Leu Tyr Leu Ser Ala
245 250 255

Val Asp Val Cys Gly Met Phe Thr Asn Arg Ser Gly Ser Gln Gln Trp
260 265 270

Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln Leu Arg Lys Arg Arg Val
275 280 285

Lys Asn Pro Tyr Pro Ile Ser Phe Leu Leu Thr Asp Leu Ile Asn Arg
290 295 300

Arg Thr Pro Arg Val Asp Gly Gln Pro Met Tyr Gly Met Asp Ala Gln
305 310 315 320

Ile Glu Glu Val Arg Val Phe Glu Gly Thr Glu Gln Leu Pro Gly Asp
325 330 335

Pro Asp Met Met Arg Tyr Val Asp Arg Tyr Gly Gln Leu Gln Thr Lys
340 345 350

Met Leu

<210> 46
<211> 245
<212> PRT
<213> JC virus

<400> 46

Phe Leu Thr Pro Glu Met Gly Asp Pro Asp Glu His Leu Arg Gly Phe
1 5 10 15

Ser Lys Ser Ile Ser Ile Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn
20 25 30

Lys Asp Met Leu Pro Cys Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn
35 40 45

Leu Asn Glu Asp Leu Thr Cys Gly Asn Ile Leu Met Trp Glu Ala Val
50 55 60

Thr Leu Lys Thr Glu Val Leu Gly Val Thr Thr Leu Met Asn Val His
65 70 75 80

Ser Asn Gly Gln Ala Thr His Asp Asn Gly Ala Gly Lys Pro Val Gln
85 90 95

Gly Thr Ser Phe His Phe Phe Ser Val Gly Gly Glu Ala Leu Glu Leu
100 105 110

```
Gln Gly Val Val Phe Asn Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile
        115                 120                 125

Phe Pro Lys Asn Ala Thr Val Gln Ser Gln Val Met Asn Thr Glu His
    130                 135                 140

Lys Ala Tyr Leu Asp Lys Asn Lys Ala Tyr Pro Val Glu Cys Trp Val
145                 150                 155                 160

Pro Asp Pro Thr Arg Asn Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr
                165                 170                 175

Gly Gly Glu Asn Val Pro Pro Val Leu His Ile Thr Asn Thr Ala Thr
            180                 185                 190

Thr Val Leu Leu Asp Glu Phe Gly Val Gly Pro Leu Cys Lys Gly Asp
        195                 200                 205

Asn Leu Tyr Leu Ser Ala Val Asp Val Cys Gly Met Phe Thr Asp Arg
    210                 215                 220

Ser Gly Ser Gln Gln Trp Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln
225                 230                 235                 240

Leu Arg Lys Arg Arg
                245
```

<210> 47
<211> 245
<212> PRT
<213> JC virus

<400> 47

```
Phe Leu Thr Pro Glu Met Gly Asp Pro Asp Glu His Phe Arg Gly Phe
1               5                   10                  15

Ser Lys Ser Ile Ser Ile Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn
            20                  25                  30

Lys Asp Met Leu Pro Cys Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn
        35                  40                  45

Leu Asn Glu Asp Leu Thr Cys Gly Asn Ile Leu Met Trp Glu Ala Val
    50                  55                  60

Thr Leu Lys Thr Glu Val Ile Gly Val Thr Thr Leu Met Asn Val His
65                  70                  75                  80

Ser Asn Gly Gln Ala Thr His Asp Asn Gly Ala Gly Lys Pro Val Gln
                85                  90                  95
```

```
Gly Thr Ser Phe His Phe Phe Ser Val Gly Gly Glu Ala Leu Glu Leu
            100                 105                 110

Gln Gly Val Val Phe Asn Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile
        115                 120                 125

Phe Pro Lys Asn Ala Thr Val Gln Ser Gln Val Met Asn Thr Glu His
    130                 135                 140

Lys Ala Tyr Leu Asp Lys Asn Lys Ala Tyr Pro Val Glu Cys Trp Val
145                 150                 155                 160

Pro Asp Pro Thr Arg Asn Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr
                165                 170                 175

Gly Gly Glu Asn Val Pro Pro Val Leu His Ile Thr Asn Thr Ala Thr
            180                 185                 190

Thr Val Leu Leu Asp Glu Phe Gly Val Gly Pro Leu Cys Lys Gly Asp
        195                 200                 205

Asn Leu Tyr Leu Ser Ala Val Asp Val Cys Gly Met Phe Thr Asn Arg
    210                 215                 220

Ser Gly Ser Gln Gln Trp Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln
225                 230                 235                 240

Leu Arg Lys Arg Arg
                245
```

<210> 48
<211> 245
<212> PRT
<213> JC virus

<400> 48

```
Phe Leu Thr Pro Glu Met Gly Asp Pro Asp Glu His Leu Arg Gly Phe
1               5                   10                  15

Ser Lys Ser Ile Ser Ile Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn
            20                  25                  30

Lys Asp Met Leu Pro Cys Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn
        35                  40                  45

Leu Asn Glu Asp Leu Thr Cys Gly Asn Ile Leu Met Trp Glu Ala Val
    50                  55                  60

Thr Leu Lys Thr Glu Val Leu Gly Val Thr Thr Leu Met Asn Val His
65                  70                  75                  80
```

Ser Asn Gly Gln Ala Thr His Asp Asn Gly Ala Gly Lys Pro Val Gln
85 90 95

Gly Thr Ser Phe His Phe Phe Ser Val Gly Gly Glu Ala Leu Glu Leu
100 105 110

Gln Gly Val Val Phe Asn Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile
115 120 125

Phe Pro Lys Asn Ala Thr Val Gln Ser Gln Val Met Asn Thr Glu His
130 135 140

Lys Ala Tyr Leu Asp Lys Asn Lys Ala Tyr Pro Val Glu Cys Trp Val
145 150 155 160

Pro Asp Pro Thr Arg Asn Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr
165 170 175

Gly Gly Glu Asn Val Pro Pro Val Leu His Ile Thr Asn Thr Ala Thr
180 185 190

Thr Val Leu Leu Asp Glu Phe Gly Val Gly Pro Leu Cys Lys Gly Asp
195 200 205

Asn Leu Tyr Leu Ser Ala Val Asp Val Cys Gly Met Phe Thr Asp Arg
210 215 220

Ser Gly Ser Gln Gln Trp Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln
225 230 235 240

Leu Arg Lys Arg Arg
245

<210> 49
<211> 245
<212> PRT
<213> JC virus

<400> 49

Phe Leu Thr Pro Glu Met Gly Asp Pro Asp Glu His Leu Arg Gly Phe
1 5 10 15

Ser Lys Ser Ile Ser Ile Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn
20 25 30

Lys Asp Met Leu Pro Cys Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn
35 40 45

Leu Asn Glu Asp Leu Thr Cys Gly Asn Ile Leu Met Trp Glu Ala Val
50 55 60

Thr Leu Lys Thr Glu Val Leu Gly Val Thr Thr Leu Met Asn Val His

65 70 75 80

Cys Asn Gly Gln Ala Thr His Asp Asn Gly Ala Gly Lys Pro Val Gln
85 90 95

Gly Thr Ser Phe His Phe Phe Ser Val Gly Gly Glu Ala Leu Glu Leu
100 105 110

Gln Gly Val Val Phe Asn Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile
115 120 125

Phe Pro Lys Asn Ala Thr Val Gln Ser Gln Val Met Asn Thr Glu His
130 135 140

Lys Ala Tyr Leu Asp Lys Asn Lys Ala Tyr Pro Val Glu Cys Trp Val
145 150 155 160

Pro Asp Pro Thr Arg Asn Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr
165 170 175

Gly Gly Glu Asn Val Pro Pro Val Leu His Ile Thr Asn Thr Ala Thr
180 185 190

Thr Val Leu Leu Asp Glu Phe Gly Val Gly Pro Leu Cys Lys Gly Asp
195 200 205

Asn Leu Tyr Leu Ser Ala Val Asp Val Cys Gly Met Phe Thr Asn Arg
210 215 220

Ser Gly Ser Gln Gln Trp Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln
225 230 235 240

Leu Arg Lys Arg Arg
245

<210> 50
<211> 245
<212> PRT
<213> JC virus

<400> 50

Phe Leu Thr Pro Glu Met Gly Asp Pro Asp Glu His Leu Arg Gly Phe
1 5 10 15

Ser Lys Ser Ile Ser Ile Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn
20 25 30

Lys Asp Met Leu Pro Cys Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn
35 40 45

Leu Asn Glu Asp Leu Thr Cys Gly Asn Ile Leu Met Trp Glu Ala Val
50 55 60

```
Thr Leu Lys Thr Glu Val Ile Gly Val Thr Thr Leu Met Asn Val His
65                  70                  75                  80

Ser Asn Gly Gln Ala Thr His Asp Asn Gly Ala Gly Lys Pro Val Gln
                85                  90                  95

Gly Thr Ser Phe His Phe Phe Ser Val Gly Gly Glu Ala Leu Glu Leu
            100                 105                 110

Gln Gly Val Val Phe Asn Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile
        115                 120                 125

Phe Pro Lys Asn Ala Thr Val Gln Ser Gln Val Met Asn Thr Glu His
    130                 135                 140

Lys Ala Tyr Leu Asp Lys Asn Lys Ala Tyr Pro Val Glu Cys Trp Val
145                 150                 155                 160

Pro Asp Pro Thr Arg Asn Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr
                165                 170                 175

Gly Gly Glu Asn Val Pro Pro Val Leu His Ile Thr Asn Thr Ala Thr
            180                 185                 190

Thr Val Leu Leu Asp Glu Phe Gly Val Gly Pro Leu Cys Lys Gly Asp
        195                 200                 205

Asn Leu Tyr Leu Ser Ala Val Asp Val Cys Gly Met Phe Thr Asn Arg
    210                 215                 220

Ser Gly Phe Gln Gln Trp Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln
225                 230                 235                 240

Leu Arg Lys Arg Arg
                245
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<210> 51
<211> 245
<212> PRT
<213> JC virus

<400> 51

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Phe Leu Thr Pro Glu Met Gly Asp Pro Asp Glu His Leu Arg Gly Phe
1               5                   10                  15

Ser Lys Ser Ile Ser Ile Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn
            20                  25                  30

Lys Asp Met Leu Pro Cys Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn
        35                  40                  45
```

```
Leu Asn Glu Asp Leu Thr Cys Gly Asn Ile Leu Met Trp Glu Ala Val
    50                  55                  60

Thr Leu Lys Thr Glu Val Leu Gly Val Thr Thr Leu Met Asn Val His
65                  70                  75                  80

Cys Asn Gly Gln Ala Thr His Asp Asn Gly Ala Gly Lys Pro Val Gln
                85                  90                  95

Gly Thr Ser Phe His Phe Phe Ser Val Gly Gly Glu Ala Leu Glu Leu
            100                 105                 110

Gln Gly Val Val Phe Asn Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile
        115                 120                 125

Phe Pro Lys Asn Ala Thr Val Gln Ser Gln Val Met Asn Thr Glu His
    130                 135                 140

Lys Ala Tyr Leu Asp Lys Asn Lys Ala Tyr Pro Val Glu Cys Trp Val
145                 150                 155                 160

Pro Asp Pro Thr Arg Asn Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr
                165                 170                 175

Gly Gly Glu Asn Val Pro Pro Val Leu His Ile Thr Asn Thr Ala Thr
            180                 185                 190

Thr Val Leu Leu Asp Glu Phe Gly Val Gly Pro Leu Cys Lys Gly Asp
        195                 200                 205

Asn Leu Tyr Leu Ser Ala Val Asp Val Cys Gly Met Phe Thr Asn Arg
    210                 215                 220

Ser Gly Ser Gln Gln Trp Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln
225                 230                 235                 240

Leu Arg Lys Arg Arg
                245
```

<210> 52
<211> 245
<212> PRT
<213> JC virus

<400> 52

```
Phe Leu Thr Pro Glu Met Gly Asp Pro Asp Glu His Phe Arg Gly Phe
1               5                   10                  15

Ser Lys Ser Ile Ser Ile Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn
            20                  25                  30
```

```
Lys Asp Met Leu Pro Cys Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn
        35                  40                  45

Leu Asn Glu Asp Leu Thr Cys Gly Asn Ile Leu Met Trp Glu Ala Val
    50                  55                  60

Thr Leu Lys Thr Glu Val Ile Gly Val Thr Thr Leu Met Asn Val His
65                  70                  75                  80

Ser Asn Gly Gln Ala Thr His Asp Asn Gly Ala Gly Lys Pro Val Gln
                85                  90                  95

Gly Thr Ser Phe His Phe Phe Ser Val Gly Gly Glu Ala Leu Glu Leu
            100                 105                 110

Gln Gly Val Val Phe Asn Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile
        115                 120                 125

Phe Pro Lys Asn Ala Thr Val Gln Ser Gln Val Met Asn Thr Glu His
    130                 135                 140

Lys Ala Tyr Leu Asp Lys Asn Lys Ala Tyr Pro Val Glu Cys Trp Val
145                 150                 155                 160

Pro Asp Pro Thr Arg Asn Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr
                165                 170                 175

Gly Gly Glu Asn Val Pro Pro Val Leu His Ile Thr Asn Thr Ala Thr
            180                 185                 190

Thr Val Leu Leu Asp Glu Phe Gly Val Gly Pro Leu Cys Lys Gly Asp
        195                 200                 205

Asn Leu Tyr Leu Ser Ala Val Asp Val Cys Gly Met Phe Thr Asn Arg
    210                 215                 220

Ser Gly Ser Gln Gln Trp Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln
225                 230                 235                 240

Leu Arg Lys Arg Arg
                245
```

<210> 53
<211> 245
<212> PRT
<213> JC virus

<400> 53

```
Phe Leu Thr Pro Glu Met Gly Asp Pro Asp Glu His Leu Arg Gly Phe
1               5                   10                  15

Ser Lys Ser Ile Ser Ile Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn
```

20 25 30

Lys Asp Met Leu Pro Cys Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn
35 40 45

Leu Asn Glu Asp Leu Thr Cys Gly Asn Ile Leu Met Trp Glu Ala Val
50 55 60

Thr Leu Lys Thr Glu Val Ile Gly Val Thr Thr Leu Met Asn Val His
65 70 75 80

Ser Asn Gly Gln Ala Thr His Asp Asn Gly Ala Gly Lys Pro Val Gln
85 90 95

Gly Thr Ser Phe His Phe Phe Ser Val Gly Gly Glu Ala Leu Glu Leu
100 105 110

Gln Gly Val Val Phe Asn Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile
115 120 125

Phe Pro Lys Asn Ala Thr Val Gln Ser Gln Val Met Asn Thr Glu His
130 135 140

Lys Ala Tyr Leu Asp Lys Asn Lys Ala Tyr Pro Val Glu Cys Trp Val
145 150 155 160

Pro Asp Pro Thr Arg Asn Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr
165 170 175

Gly Gly Glu Asn Val Pro Pro Val Leu His Ile Thr Asn Thr Ala Thr
180 185 190

Thr Val Leu Leu Asp Glu Phe Gly Val Gly Pro Leu Cys Lys Gly Asp
195 200 205

Asn Leu Tyr Leu Ser Ala Val Asp Val Cys Gly Met Phe Thr Asn Arg
210 215 220

Ser Gly Ser Gln Gln Trp Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln
225 230 235 240

Leu Arg Lys Arg Arg
245

<210> 54
<211> 245
<212> PRT
<213> JC virus

<400> 54

Phe Leu Thr Pro Glu Met Gly Asp Pro Asp Glu His Leu Arg Gly Phe
1 5 10 15

```
Ser Lys Ser Ile Ser Ile Ser Asp Thr Phe Glu Ser Asp Ser Pro Asn
            20                  25                  30

Lys Asp Met Leu Pro Cys Tyr Ser Val Ala Arg Ile Pro Leu Pro Asn
        35                  40                  45

Leu Asn Glu Asp Leu Thr Cys Gly Asn Ile Leu Met Trp Glu Ala Val
    50                  55                  60

Thr Leu Lys Thr Glu Val Ile Gly Val Thr Thr Leu Met Asn Val His
65                  70                  75                  80

Ser Asn Gly Gln Ala Thr His Asp Asn Gly Ala Gly Lys Pro Val Gln
                85                  90                  95

Gly Thr Ser Phe His Phe Phe Ser Val Gly Gly Glu Ala Leu Glu Leu
            100                 105                 110

Gln Gly Val Val Phe Asn Tyr Arg Thr Lys Tyr Pro Asp Gly Thr Ile
        115                 120                 125

Phe Pro Lys Asn Ala Thr Val Gln Ser Gln Val Met Asn Thr Glu His
    130                 135                 140

Lys Ala Tyr Leu Asp Lys Asn Lys Ala Tyr Pro Val Glu Cys Trp Val
145                 150                 155                 160

Pro Asp Pro Thr Arg Asn Glu Asn Thr Arg Tyr Phe Gly Thr Leu Thr
                165                 170                 175

Gly Gly Glu Asn Val Pro Pro Val Leu His Ile Thr Asn Thr Ala Thr
            180                 185                 190

Thr Val Leu Leu Asp Glu Phe Gly Val Gly Pro Leu Cys Lys Gly Asp
        195                 200                 205

Asn Leu Tyr Leu Ser Ala Val Asp Val Cys Gly Met Phe Thr Asp Arg
    210                 215                 220

Ser Gly Ser Gln Gln Trp Arg Gly Leu Ser Arg Tyr Phe Lys Val Gln
225                 230                 235                 240

Leu Arg Lys Arg Arg
                245
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<210> 55
<211> 20
<212> DNA
<213> Artificial Sequence

<220>

<223> SYNTHETIC OLIGONUCLEOTIDE

<400> 55
gcagccagct atggctttac 20

<210> 56
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> SYNTHETIC OLIGONUCLEOTIDE

<400> 56
gctgccattc atgagaggat 20

<210> 57
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> SYNTHETIC OLIGONUCLEOTIDE

<400> 57
cctcaatgga tgttgccttt 20

<210> 58
<211> 16
<212> DNA
<213> Artificial Sequence

<220>
<223> SYNTHETIC OLIGONUCLEOTIDE

<400> 58
aaaaccaaag acccct 16

<210> 59
<211> 24
<212> DNA
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<223> SYNTHETIC OLIGONUCLEOTIDE

<400> 59
ttgactcaat tacagaggta gaat 24

<210> 60
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> SYNTHETIC OLIGONUCLEOTIDE

<400> 60
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<210> 61
<211> 24

<212> DNA
<213> Artificial Sequence

<220>
<223> SYNTHETIC OLIGONUCLEOTIDE

<400> 61
aggtacgcct tgtgctctgt gttc 24

<210> 62
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> SYNTHETIC OLIGONUCLEOTIDE

<400> 62
gtgcagggca ccagctttca tt 22