

The sequence files in this directory are fasta-formatted alignments of "mosaic" sequences designed as candidate vaccine antigens by the genetic algorithm described in the following manuscript

[In press at Nature Medicine as of (05-Dec-2006)]:

Polyvalent vaccines for optimal coverage of potential T-cell epitopes in global HIV-1 variants

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Each file contains several sets of sequences; each set is designed for maximal 9-mer coverage of HIV-1 sequences in a particular phylogenetic subset of HIV-1 (B-clade, C-clade, or M group). Nomenclature is as follows:

GENE-clade-syn#.#

e.g., POL-B.syn4.2 is the second sequence of a 4-sequence mosaic covering B-clade Pol sequences. The sets of mosaics are separated from each other by a single blank line.

EACH SET IS TO BE USED TOGETHER -- e.g. the 6 sequences "nef_coreC.syn6.1" through "nef_coreC.syn6.6" should neither be split apart from each other nor used with other sequences.

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>POL-B.syn1.1

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RWPVKTIHTDNPNFISTTVKAACWWAGIKQEFGIYPNPQSQGVVESMNNELKKIIIGQVR
EQAEHLKTAVQMAVFIHNFKRKGGIGGYSAGERMIDIATDIQTTELQKQITKLQNFRVY
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>POL-B.syn6.5

FFRENLAFPQGKAREFPSEQTRANSPTS-----ELQVWGRDNNSLSEAGA
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DSTKWRKLVDFRELNKKQTQDFWEVQLGIPHPSGLKKKKSVTVLDVGDAYFSVPLDKEFRK
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LYVGS DLEIEQHRTKIEELRQHLLRWGFTTPDKKHQKEPPFLWMGYELHPDKWTVQPIVL
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REILKEPVHGVYYDPSKDLIAEIQKQGEQWTYQIYQEPFKNLKTGKYAKMRGAHTNDVK
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QDSGLEVNIVTDSQYALGIIQAQPDKSESEIVNQIIIEQLIKKEKVYLAWVPAHKGIGGNE
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GEAMHGQVDCSPGIWQLDCTHLEGKVILVAVHVASGYIEAEVIPAETGQETAYFILKLAG
RWPVKTVHTDNGSNFTSNTVKAACWWAGIKQEFGI PYNPQSQGVVESMNKQLKQIIIGQVR
DQAEHLKTAVQMAVFIHNFKRKGGIGGYTAGERIVDIIATDIQTRELQKQITKIQNFRVY
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ED-

>POL-B.syn6.6

FFREDLAFLQGKAREFSSEQTRAISPTR-----ELQVWGRDNNSPSEAGA
DR----QGTVS-FNFPQITLWQRPLVTIRIGGQLKEALLDTGADDTVLEEMSLPGRWKPK
MIGGIGGGFIKVRQYDQILIEICGHKAVGTVLIGPTPVNI IGRNLLTQIGCTLNFPISPID
TVPVKLKPGMDGPKVKQWPLTEEEKIKALIEICTELENEGKISKIGPENPYNTPIFAIAKKK
DSTKWRKLVDFRELNKRQTQDFWEVQLGIPHPSGLKKKKSVTVLDVGDAYFSIPLDEDFRK
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LYVGS DLEIGQHRTKIEELREHLLRWGFTTPDKKHQKEPPFLWMGYELHPDKWTVQPI TL
PEKDSWTVNDIQKLVGKLNWASQIYAGIKVKQLCKLLRGTKSLTEVVPLTAEAELELAEN
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QVDKLVSA GIRRVLFLDGIDKAQEEHEKYHNNWRAMASDFNI PPVVAKEIVASCDKCQLK
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RWPVKTIHTDN GRNFTSNSVKAACWWAGIKQEFGI PYNPQSQGVVESMNRELKKI IGQIR
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>POL-C.syn1.1

FFRENLAFPQGEAREFPSEQTRANSPTS RANSPTS R-----ELQV--RGDNPRSEAGA
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DSTKWRKLVDFREL NKRTQDFWEVQLGIPHPAGLKKKKS VTVLDVGDAYFSVPLDEGFRK
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LYVGS DLEIGQHRAKIEELREHLLKWGFTTPDKKHQKEPPFLWMGYELHPDKWTVQPIQL
PEKDSWTVNDIQKLVGKLNWASQIYPGIKVRQLCKLLRGAKALTDIVPLTEEA ELELAEN
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QDSGSEVNIVTDSQYALGIIQAQPDKSESELVNQII EQLIKKERVYLSWVPAHKGIGGNE
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GEAIHGQVDCSPGIWQLDCTHLEGKIIILVAVHVASGYIEAEVIPAETGQETAYYILKLAG
RWPVKVIHTDN GSNFTSA AVKAACWWAGIQQEFGI PYNPQSQGVVESMNKELKKI IGQVR
DQAEHLKTAVQMAVFIHNFKRKGGIGGYSAGERIIDIIATDIQT KELQKQIIKI QNFRVY
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EDQ

>POL-C.syn3.1

FFRENLAFPQGEAREFPPEQTRANSPT-RANSPTS R-----KLQV--RGDNPCSEAGA
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PEKDSWTVNDIQRLVGKLNWASQIYPGIKVRQLCKLLRGTALTDIVPLTEEALELAEN
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QDSGLEVNIVTDSQYALGIIQAQPDKSESELVNQIIIEELIKKERVYLSWVPAHKGIGENE
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GEAIGHQVDCSPGMWQLDCTHLEGKVIILVAVHVASGYVEAEVIPAETGQETAYFILKLAG
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>POL-C.syn3.2

FFRENLAFFQQGEAREFPSEQTRANSPTSRTNSPTSRELQV--RGDNPRSEAGV
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LYVGSLEIGQHRAKIEELRAHLLKWGLTTPDKKHQKEPPFLWMGYELHPDKWTVQPIKL
PEKDSWTVNDIQKIVGKLNWASQIYPGIKVKQLCKLLRGAKALTDIIPLTEEALELAEN
REILKEPVHGAAYDPSKDLVAEIQKQGHQDQWTYQIYQEPYKNLKTGKYAKMRTAHTNDVR
QLTEAVQKIAQESIVIWGKTPKFRLLPIQKETWETWWTDYWQATWIPWEFINTPLVLKLW
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QDSGPEVNIVTDSQYALGIIQAQPDSESELVNQIIIEQLINKERIYLSWVPAHKGIGGNE
QVDKLVSSGIRKVLFLDGIDKAQEDHEKYHNNWRAMASDFNLPPIVAREIVASCDKCQLK
GEAMHGQVDCSPGVWQLDCTHLEGKIIILVAVHVASGYMEAEVIPAETGQETAYYILKLAG
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DQAEHLKTAVQMAVLIHNFKRRGGIGGYSAGERIVDIIATDIQTRELQKQIIQIQNFRVY
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ED-

>POL-C.syn3.3

FFRENLAFPQGKAREFPSEQARANSPTSRSRANSPTS- - - - -ELQV--RRDNPRSEAGA
ER-- - -QGT-- -LNCPQITLWQRPLVSIKIGGQTREALLDTGADDTVLEEISLPGKWKPK
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ENQ

>POL-C.syn4.1

FFRENLAFPQGKAREFPSEQARANSPTSRSRANSPTS- - - - -ELQV--RRDNPRSEAGA
ER-- - -QGT-- -LNLQITLWQRPLVSIKVGQIKEALLDTGADDTVLEDINLPGKWKPK
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REILKEPVHGVYDPSKELIAEIQKQGQDQWYQIYQEPFKNLKTGKYAKRRTAHTNDVK
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GEAIHGQVDCSPGVWQLDCTHLEGKIIILVAVHVASGYVEAEVIPAETGQETAYFLLKLAG
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ENQ

>POL-C.syn4.2

FFRENLAFPQGEAREFPSEQTRANSPT-RANSPTS-----KLQV--RGDNPRSEAGV
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EDQ

>POL-C.syn4.3

FFRENLAFPQGEAREFPPEQTRANSPTSRTNSPTS-----ELQV--RGDNPHSEAGA
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LYIGSDLEIGQHRAKIEELRAHLLKWGFTTPDKKHQKEPPFLWMGCELHPDKWTVQPIQL
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EN-

>POL-C.syn4.4

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DQAEHLKTAVQMAVLIHNFKRKGIGGYSAGERIVDIIATDIQTKELQKQIIKIQNFRVY
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ED-

>POL-C.syn6.1

FFRENLAFFPQGKAREFPSEQTRAISPTSR-----ELQV--RGNNPRSEAGA
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ED-

>POL-C.syn6.2

FFRENLAFPQGEARELPSEQTRANGPTSR-----ELQV--RGDNPCSEAGA
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QLTEAVQKIAQESIVIWGKTPKFRLLPIQKETWEAWWTDYWQATWIPDWEFVNTPLVKLW
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QDSGSKVNIIVTDTSQYALGIIQAQPKSESELVSQIIIEQLINKEKIYLSWVPAHKGIGGNE
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EDQ

>POL-C.syn6.3

FFREDLAFPQGEARKFPPEQTRANSPTSANSPTS-----KLQV--RGDNPRSEAGV
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DSTKWRKLVDFKELNKRTQDFWEVQLGIPHPAGLKKKSVTVLDVGDYFVSPLDENFRK
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LYVGSdleIGQHRAKIEELRDHLLKWGFTTPDKKHQKEPPFLWMGYELHPDKWTVQPIEL
PEKDSWTVNDIQKLVGKLNWASQIYPGIQVKQLCKLLRGAKALTDVVPLTEEALELAEN
REILKEPVHGAYYDPSKDLIAEIQKQGHQWTYQIYQEPYKNLKTGKYAKRRAAHTNDVK
QLTEAVQKIAMESIVIWGKTPKFRLPIQKETWETWWTEYWQATWIPEWEFVNTPLVKLW
YQLEKEPIAGAETFYVDGAANRETKMGKAGYITDRGRQKIIISLTETTNQKTELHAIQLAL
QDSGSEANIVTDSQYALGIIQAQPDRSESELVNIIEQLIKKERVYLAWVPAHKGIGENE
QVDKLVSSGIRKILFLDGIDKAQEEHEKYHSNWKAMASEFNLPVAREIVASCDKCQLK
GEAMHGQVDCSPRIWQLDCTHLERKVIILVAVHVASGYMEAEPVPAETGQETAYFILKLAG
RWPVKVIHTDNGSNFTSNAVKAACWWAGIHQEFGIYPNPQSQGVVESMNKELKKIIEQVR
DQAEHLKTAVQMAVLIHNFKRKGGIGGYTAGERIIDIATDIQTKELQNQITKIQNFRVY
YRDNRDPIWKGPALLWKGEAVVLQDNSDIKVPPRRKVKIIRDYGKQMAGADCVAGRQD
ED-

>POL-C.syn6.4

FFRKNLAFPQGEAREFPPEQTRANSPTS-----ELQV--RGDNPLSEAGA
ERQGTLQGT---LNCPOITLWQRPLVSIKVGQIKEALLDTGADDTVLEEISLPGKWKPK
MIGGIGGFIKVRQYDQIVIEICGKKAIGAVLVGPTPVNIIRRNMLTQLRCTLNFPISPIK
TVPVKLKPGMDGPKVKQWPLSEEKIKALTAICEDMEKEGKITKIGPENPYNTPIFIAIKK
DSTKWRKLVDFRELNKRTQDFWEVQLGIPHPGLKKKSVTVLDVEDAYFVSPLDEGFRK
YTAFTIPSINNATPGIRYQYNVLPQGWKGSPAIFQSSMTKILEPFRTKNPDIVYQYMDD
LYVGSdleIGQHRAKIEKLREHLLRWGLTTPDKKHQKEPPFLWMGYELHPDKWTVQPIQL
PDKDSWTVNDIQKLVGKLNWASQIYAGIKVKQLCRLLRGAKALTDIIPLEEALELAEN
REILKEPVHGAYYDPSKDLIAEIQKQGGQWTYQIYQEPYKNLKTGKYAKMRTAHTNDVK
QLAEAVQKITMESIVIWGRTPKFRLPIQKETWETWWTDYWQATWIPEWEFINTPLVKLW
YQLEKEPIVGAETFYVDGAANRETKLGKAGYVTDKGRQKIVSLTETTNQKTELQAIHLAL

QDSGSEVNIVTDSQYALRI IQAQPKSESELVNQII IEQLINKERI YLSWVPAHKGIGGNE
QVDKLVSNGIRKVLFLDGLIEKAQEEHERYHSNWRAMANEFNLPPIVAREIVASCDKCQIK
GEAMHGQVDCSPGVWQLDCTHLEGKVILVAVHVASGYVEAEVIPAETGQEAAYFILKLAG
RWPVKTIHTDNGSNFTSTAVKAAACWWAGIKQEFGI PYNPQSQGVVESMNKELKKI IGQVR
DQAEHLKTAVQMAVLIHNFKRKGGIGDYSAGERIIDIIATDMQTKELQKQII KVNFRVY
YRDSRDPIWKGPakLLWKGEgAVVIQDNGDIKVPRRKVKII KDYGRQMAGADCVASRQD
ED-

>POL-C.syn6.5

FFRENLAFFPEGEAREFPSEQARANSPTS-----ELQV--RRDNPRSEAGA
EG----QGT---LNFPQITLWQRPLVSIRVGGQIKEALLDTGADDTVLEEINLPGRWKPK
MIGGIGGFIKVRQYDQITIEICGKKAIGTVLVGPTPINI IGRNMLTQIGCTLNFPISPIE
TVPVKLKPGMDGPKIKQWPLTEEEKIKALKAI CEEMEKEGKIEKIGPENPYNTPVFAIKKK
DSTKWRKLVDFRELNKRTQDFWEIQLGIPHPAGLKRKKSVTVLVDVGDAYFSVPLYEDFRK
YTAFTIPSVNNETPGIRYQYNVLPQGWKGSPAIFQCSMTKILEPFRAQNPEIIVIYQYMDD
LYVGSdleIGQHRAKVEELREHLLKWGLTTPDKKHQKEPPFLWMGYELHPDKWTVQPIQL
PEKESWTVNDIQKIVGKLNWASQIYPGIKVRQLCRLLRGAKALTDIVPLTAEAELELAEN
REILKEPVHGVYDPSKELIAEIQKQGGDQWTYQIYQEPFKNLKTGKYAKMRSaHTNDVK
QLTEAVQKIALESIVIWGKAPKFRLPiQKETWEIWWTDYWQATWIPEWEFINTPPLVKLW
YQLEKEPIAGVETfYVDGAANRDtkIGKAGYVTDGRGRQKIVSLSETTNQKTELQAIQLAL
QDSGLEVNIVTDSQYALGI IQAQPDNSESELVNQII EELIKKERVYLSWVPAHKGIGGNE
QVDKLVSkgIRKVLFLDGLDKAQEEHEKYHNNWRAMASDFNLPVVAKEIVACCDKCQLK
GEAIHGQVDCSPGIWQLDCTHLEGKVI I VAVHVASGYLEAEVIPAETGQETAYFLLKLAG
RWPVKVIHTDNGPNFTSAAVKAAACWWAGINQEFGI PYNPQSQGVVESMNKELKKI IGQVR
EQAEHLKTAVQMAVFIHNFKRKGGIGGYSAGERIVDIIATDIQTKELQNQII KIQNFRVY
YRDSRDPIWKGPakLLWKGEgAVVIQENSDIKVPRRKAKII KDYGKQMAGDDCVAGRQD
EDQ

>POL-C.syn6.6

FFRENLAFFQQGEAREFPSEQTRANSPT-RANSPTSRTNSPTSRELQV--RGDNPHSEAGA
ER----QGS---LNFPQITLWQRPLVTIKIGGQLKEALLDTGADDTVLEDINLPgKWKPR
MIGGIGGFIKVRQYEQIPIEICGKKAIGTVLIGPTPVNI IGRNLLTQLGCTLNFPISPIE
TIPVKLKPGMDGPKVKQWPLTEEEKIKALTAICEEMEKEGKITKIGPDNPYNTPVFAIKKK
DSTKWRKLVDFRELNKRTQDFWEVQLGIPHPAGLKKKKSVTVLVDVGDAYFSVPLDKDFRK
YTAFTIPSTNNETPGIRYQYNVLPQGWKGSPAIFQSSMIKILEPFRAKNPELVIIYQYMDD

LYVGS DLEIMQHRAKIEELRAHLLKWGFTTPDKKHQKEPPFLWMGYELHPDKWTVQPIVL
PEKDSWTVNDIQKLVGKLNWASQIYPGIKVKQLCKLLRGTKALTDIVPLTEEALELAEN
REILKETVHGAYYDPSKDLIAEIQKQGYDQWYQIYQEPFKNLKTGKYAKKRTAHTNDVR
QLTEAVQKIAIESIVIWGKTPKFRLPIKETWETWWADYWQATWIPEWEFVNTPLVLKLW
YQLEKDPIAGAETFYVDGAANRETKKGKAGYVTDKGRQKVVTLTETTNQKAELQAIQLAL
QDSGPEVNIVTDSQYALRI IQAQPDKSESGLVNQIIEQLIKKEKVYLSWVPAHKGIGGNE
QIDKLVSSGIRRVLF LDGIDKAQEDHEKYHSNWRAMAGEFNLP PVVAKEIVASCDKCQOK
GEA IHGQVDCSPGIWQLDCTHLEGKIILVAVHVASGYIEAEVIPAETGQDTAYYILKLAG
RWPVKVIHTDNGTNFTSAAVKAACWWASIQQEFGI PYNPQSQGVVEAMNKELKKIIGQIR
DQAEHLKTAVLMAVFIHNFKRKGGIGEYSAGERIIDIIASDIQTKELQKQITKIQNFRVY
YRDSRDPVWKGP AKLLWKGE GAVVIQDNSDIKVIPRRKAKIIRDYGKQMAGADCVAGGQD
ED-

>POL-M.syn1.1

FFRENLAFPQGEAREFPSEQTRANSPTS RANSPTS R-----ELQV--RGDNPRSEAGA
ER----QGT---LNFPQITLWQRPLVTIKIGGQLKEALLDTGADDTVLEDINLPGKWPK
MIGGIGGFIKVRQYDQILIEICGKKAIGTVLVGPTPVNIIGRNMLTQIGCTLNFPISPIE
TVPVKLKPGMDGPKVKQWPLTEEKIKALTEICTEMEKEGKISKIGPENPYNTPVFAIKKK
DSTKWRKLVDFREL NKR TQDFWEVQLGIPHPAGLKKKKS VTVLDVGDAYFSVPLDESFRK
YTAFTIPSINNETPGIRYQYNVLPQGWKGSPAIFQSSMTKILEPFRKQNPDIVIYQYMDD
LYVGS DLEIGQHRAKIEELREHLLKWGFTTPDKKHQKEPPFLWMGYELHPDKWTVQPIQL
PEKDSWTVNDIQKLVGKLNWASQIYPGIKVKQLCKLLRGAKALTDIVPLTEEALELAEN
REILKEPVHGVYDPSKDLIAEIQKQGDQWYQIYQEPFKNLKTGKYAKMRTAHTNDVK
QLTEAVQKIATESIVIWGKTPKFRLPIKETWETWWTDYWQATWIPEWEFVNTPLVLKLW
YQLEKEPIVGAETFYVDGAANRETKLGKAGYVTD RGRQKVVS LTETTNQKTELQAIQLAL
QDSGSEVNIVTDSQYALGI IQAQPDKSESELVNQIIEQLIKKEKVYLSWVPAHKGIGGNE
QVDKLVSSGIRKVLFLDGIDKAQEEHEKYHSNWRAMASDFNLPPIVAKEIVASCDKCQLK
GEAMHGQVDCSPGIWQLDCTHLEGKVILVAVHVASGYIEAEVIPAETGQETAYFILKLAG
RWPVKVIHTDNGSNFTSAAVKAACWWAGIQQEFGI PYNPQSQGVVESMNKELKKIIGQVR
DQAEHLKTAVQMAVFIHNFKRKGGIGGYSAGERIIDIIATDIQTKELQKQITKIQNFRVY
YRDSRDP IWKGP AKLLWKGE GAVVIQDNSDIKVVPRRKAKIIRDYGKQMAGDDCVAGRQD
EDQ

>POL-M.syn3.1

FFRENLAFPQGEAREFPSEQTRANSPTSRSANSPTS-----ELQV--RGDNPRSEAGA
ER---QGT---LNFPQITLWQRPLVSIKVGGGQIKEALLDTGADDTVLEEINLPGKWKPK
MIGGIGGGFIKVRQYDQIPIEICGKRAIGTVLVGPTPINIIGRNMLTQLGCTLNFPISPIK
TVPVKLKPGMDGPKVKQWPLTEEEKIKALTAICEEMEKEGKITKIGPENPYNTPVFAIKKK
DGTKWRKLVDFRELNKRTQDFWEVQLGIPHPSGLKKKKSVSVDVGDAYFSVPLDESFRK
YTAFTIP SINNETPGIRYCYNVLPQGWKGS PAIFQCSMTKILEPFRAQNPEIVIQYMDD
LYIGSDLEIGQHRAKIEELREHLLRWGFTTPDKKHQKEPPFLWMGCELHPDKWTVQPIQL
PEKDSWTVNDIQKIVGKLNWASQIYPGIKVRQLCKLLRGAKALTDIVPLTEEALELELAEN
REILREPVHGVYYDPSKDLVAEIQKQGQDQWYQIYQEPFKNLKTGKYAKMRTAHTNDVK
QLTEAVQKIALESIVIWGKIPKFRLLPIQKETWEAWWMEYWQATWIPEWEFINTPPLVKLW
YQLEKEPIAGAETFYVDGAANRETKIGKAGYVTDGRQKIVSLTETTNQKAELQAIQLAL
QDSGPEVNIVTDSQYALGIIQAHPDKSESELVNQIIIEQLIKKERVYLSWVPAHKGIGENE
QVDKLVSN GIRKILFLDGDIDKAQEEHEKYHSNWRAMASEFNLPPIVAKEIVASCNKCQLK
GEALHGQVDCSPGMWQLDCTHLEGKVILVAVHVASGYMEA EVIPAETGQETAYYILKLAG
RWPVKVVHTDNGSNFTSTAVKAACWWAGIQQEFGI PYNPQSQGVIESMNKELKKIIGQIR
DQAEHLKTAVQMAVFIHNFKRKGIGEYSAGERIIDIIATDIQTRELQKQIIKIQNFRVY
YRDSRDPIWKGP AKLLWKGE GAVVLQDN SDIKV VPRRKVKIIKDYGKQMAGADCVAGRQD
ENQ

>POL-M.syn3.2

FFRENLAFPQGEARKFSSEQTGANSPTS-----ELRV--RRGDNPLSEAGA
ER---RGTVP SLSFPQITLWQRPLVTVKIGGQLIEALLDTGADDTVLEDINLPGKWKPR
MIGGIGGGFIKVKQYDQILIEICGKKAIGTVLVGPTPVNIIGRNMLTQIGCTLNFPISPID
TVPVTLKPGMDGPKIKQWPLTEEEKIKALTEICTEMEKEGKISRIGPENPYNTPIFAIKKK
DSTKWRKLVDFRELNKKTQDFWEVQLGIPHAGLKKKRSVTVLDVGDAYFSVPLDKDFRK
YTAFTIPSTNNETPGIRYQYNVLPQGWKGS PSIFQSSMTRILEPFRAKNPEIVIQYMDD
LYVGS DLEIEQHRTKIEELRQHLLRWGLTTPDKKHQKEPPFLWMGYELHPDRWTVQPIEL
PEKESWTVNDIQKLVGKLNWASQIYAGIKVKQLCKLLRGTKALTEVVPLTEEALELELEN
REILKDPVHGAYYDPSKDLIAEIQKQGHQDQWYQIYQEYKNLKTGKYARKRSAHTNDVR
QLTEAVQKIATESIVIWGKTPKFRLLPIQRETWETWWDYQATWIPEWEFVNTPPLVKLW
YQLEKDPIAGVETFYVDGASNRETKKGKAGYVTDKGRQKVVS LTETTNQKTELHAIHLAL
QDSGSEVNIVTDSQYALGIIQAQPDRSESELVNQIIIEELIKKEKVYLSWVPAHKGIGGNE
QVDKLVSSGIRKVLFLDRIDKAQEEHERYHSNWRTMASDFNLPPIVAKEIVANC DKCQLK

GEAMHGQVDCSPGIWQIDCTHLEGKVIIVAVHVASGYIEAEVIPAETGQETAYFLLKLAG
RWPVKVIHTDNGSNFTSAAVKAACWWANVTQEFGI PYNPQSQGVVESMNKELKKIIGQVR
EQAEHLKTAVQMAVLIHNFKRKGGIGGYSAGERIIDIIASDIQTKELQKQIIKVQNFRVY
YRDSRDPVWKGPAKLLWKGEAVVIQDNSDIKVVP RRKVKIIRDYGKQMAGDDCVAGRQD
EDQ

>POL-M.syn3.3

FFREDLAF PQGKAREFSSEQTRANSPTRR-----ELQVWGRDNNSLSEAGA
DR---QGTVS-FSFPQITLWQRPLVTIKIGGQLKEALLDTGADDTVLEEMNLPGRWKPK
MIGGIGGFIKVRQYDQILIEICGHKAIGTVLIGPTPVNIIGRNLLTQIGCTLNFPISP
TVPVKLKPGMDGPRVKQWPLTEEEKIKALVEICTEMEKEGKISKIGPENPYNTPVFAIKK
DSTRWRKLVDFRELNKRRTQDFWEIQLGIPHPAGLKKKKSVTVLVDVGDAYFSVPLDEGFRK
YTAFTIPSVNNETPGVRYQYNVLPQGWKGSPAIFQSSMTKILEPFRKQNPDIVIYQYMDD
LYVGS DLEIGQHRTKIEELREHLLKWGFTTPDKKHQNEPPFLWMGYELHPDKWTVQPIVL
PEKDSWTVNDLQKLVGKLNWASQIYPGIKVKQLCRLLRGAKALTEVIPLTKEAELELAEN
REILKEPVHGVYYDPSKELIAEIQKQGQGWTYQIYQEPYKNLKTGKYARMGAHTNDVK
QLTEVVQKIAMESIVIWGKTPKFKLPIQKETWETWWTEYWQATWIPDWEFVNTPLVKLW
YQLEKEPIVGAETFYVDGAANRETKLGKAGYVTDGRGRQKVVS LTDTTNQKTELQAIHLAL
QDSGLEVNIVTDSQYAIGIIQAQPKSESELVSQIIIEQLIKKEKVYLAWVPAHKGIGGNE
QVDKLVSAGIRKVLFLDGIDKAQEDHEKYHNNWRAMASDFNLPPVVAKEIVASCDKCQLK
GEA IHGQVDCSPGIWQLDCTHLEGKIIILVAVHVASGYLEAEVIPAETGQETAYFILKLAG
RWPVKTIHTDNGSNFTSTTVKAACWWAGIKQEFGI PYNPQSQGVVESINKELKKIIGQVR
DQAEHLKTAVLMVFIHNFKR RGGIGGYSAGERIVDIIATDIQTKELQKQITKIQNFRVY
YRDSRDPLWKGP AKLLWKGEAVVIQDNSEIKVVP RRKAKIIRDYGKQMAGDDCVASRQD
ED-

>POL-M.syn4.1

FFRENLA FQQGEARKFSSEQTRANSPTRG-----ELQVWGRDNNPLSEAGA
ER---RGTVPSLSFPQITLWQRPLVTVKIGGQLIEALLDTGADDTVLEDINLP GKWKPK
MIGGIGGFIKVKQYDQILIEICGKKAIGTVLVGPTPVNIIGRNMLTQIGCTLNFPISP
TVPVTLKPGMDGPRIKQWPLTEEEKIKALTEICKEMEEEGKISKIGPENPYNTPIFAIAIKK
NSTRWRKLVDFRELNKKRTQDFWEVQLGIPHPAGLKRKKSVTVLVDVEDAYFSVPLDESRK
YTAFTIP SINNETPGVRYQYNVLPQGWKGSPAIFQCSMTKILEPFRIKNPEMVIYQYMDD
LYVGS DLEIGQHRIKIEELRAHLLSWGFTTPDKKHQKDPPFLWMGYELHPDRWTVQPIEL

PEKDSWTVNDIQKLVEKLNWASQIYSGIKVRQLCRLLRGAKALTDIVPLTEEALELELAEN
REILKEPVHGAYYDPSKDLVAEIQKQGQDQWYQIYQEPFKNLKTGKYARKRSAHTNDVK
QLTEVVQKIATESIVIWGKTPKFRLPIQRETWETWWTEYWQATWIPEWEFVNTPLVLKLN
YQLEKDPIAGVETFYVDGAASRETKLGKAGYVTDGRGRQKVVSLETETNQKTELHAIHLAL
QDSGSEVNIVTDSQYVLGIIQAQPDRSESELVNQIIIEELIKKEKVYLSWVPAHKGIGGNE
QVDKLVSSGIRKVLFLNGIDKAQEEHERYHSNWRTMASDFNLPPIVAKEIVANCDKCQLK
GEAMHGQVDCSPGVWQLDCTHLEGKVIIVAVHVASGYIEAEVIPAETGQEAAYFILKLAG
RWPVKVVHTDNGSNFTSAAVKAACWWANVRQEFGI PYNPQSQGVVESMNNELKKIIGQIR
DQAEHLKTAVLMAVFIHNFKRKGIGGEYSAGERIIDIIATDIQTRELQKQITKIQNFRVY
FRDSRDPIWKGPAKLLWKGEAVVIQDNSEIKVPPRRKVKIIRDYGKQMAGDDCVAGRQD
EN-

>POL-M.syn4.2

FFRENLAFPQGEAREFPSEQARANSPTSRSR-----DLWDGGRDNLP-SEAGA
ER----QGT---LNFPQITLWQRPLVTVRIGGQLREALDGTGADDTVLEDIDLPGKWKPK
IIGGIGGFIKVRQYEQIPIEICGHKAIGTVLVGPTPINIIGRNMLTQLGCTLNFPISPIK
TVPVKLKPGMDGPRVKQWPLTEEKIKALTAICEEMEKEGKITKIGPENPYNTPVFAIKKK
DSTRWRKLVDFRELNRRRTQDFWEVQLGIPHPAGLKKKRSVTVLDVGDAYFSVPLDEGFRK
YTAFTIPSVNNETPGIRYQYNVLPQGWKGPSIFQSSMTRILEPFRAKNPEIVIIYQYIDD
LYVRSdleigQHRAKIEELREHLLRWGFTTPDKKHQKEPPFLWMGCELHPDKWTVQPIQL
PEKDSWTINDIQKLVGKLNWASQIYPGIKVRQLCKLLRGTKALTDIVTLTEEALELELAEN
REILKDPVHGVIYDPSKELIAEIQKQGDDQWYQIYQEYKNLKTGKYAKRRTAHTNDVR
QLTEAVQKIALESIVIWGKIPKFRLPIQKETWEAWWMEYWQATWIPEWEYVNTPLVLKLN
YQLEKEPIIGAETFYVDGAANRETKLGKAGYVTNRGRQKVVSLETDTTNQKTELQAIQLAL
QDSGSEVNVVTDQSQUALGIIQAHPDKSESELVNQIIIEQLIKKERVYLSWVPAHKGIGGNE
QVDKLVSAGIRKVLFLDGIDKAQEDHERYHSNW RAMASDFNLPPVVAKEIVASCNKCQLK
GEAIIHGQVDCSPGIWQLDCTHLEGKIIIVAVHVASGYMEAEVIPAETGQETAYFILKLAG
RWPVKI IHTDNGSNFTSATVKAACWWANVTQEFGI PYNPQSQGVVESINKELKKIIGQVR
DQAEHLRTAVQMAVFIHNFKRKGIGGYSAGERIVDIIATDIQTKELQKQITKIQKFRVY
YRDSRDPLWKGPAKLLWKGEAVVIQDNSDIKVIPRRKAKI IKDYGKQMAGADCVAGRQD
EDQ

>POL-M.syn4.3

FFRENLAFPQGKAREFPSEQTRANSPTSRSR-----ELQV--RGDNPRSEAGA
ER----QGT---FNFPQITLWQRPLVSIKVGQIKEALLDTGADDTVLEEINLPGKWKPR

MIGGIGGFIKVRQYDQILIEICGKRAIGTVLVGPTPANIIGRNLLTQLGCTLNFPISPIE
TVPVKLKPGMDGPKIKQWPLTEEEKIKALTEICTEMEKEGKISKIGPENPYNTPIFAIKKK
DSTKWRKLVDFKELNKRRTQDFWEVQLGIPHPSGLKKKKSVTVLDVGDAYFSVPLDEDFRK
YTAFTIPSTNNETPGIRYQYNVLPQGWKGSIPAIFQASMTKILEPFRAQNPEIIVYQYMDD
LYVGSdleIEQHRAKVEELREHLLKWGFTTPDKKHQNEPPFLWMGYELHPDKWTVQPIKL
PEKESWTVNDIQKLVGKLNWASQIYPGIKVKQLCRLLRGTKALTEVIPLTKEAELELAEN
REILREPVHGVYDPTKDLIAEIQKQGHQWTYQIYQEPHKNLKTGKYAKMRTAHTNDVK
QLAEAVQKIAMESIVIWGKIPKFKLPIQKETWETWWTDYWQATWIPDWEFVNTPLVKLW
YQLEKEPIAGAETFYVDGAANRETKIGKAGYVTDGRQKIVSLTETTQKAEQLAIQLAL
QDSGPEVNIIVTDSQYALGIIQAQPDKSESEIVNQIIIEKLIIEKDKVYLSWVPAHKGIGGNE
QIDKLVSNGIRKVLFLDGIIEKAQEEHEKYHSNWRAMASEFNLPPIVAKEIVASCDKCQLK
GEATHGQVDCSPGMWQLDCTHLEGKIIILVAVHVASGYIEAEVIPTETGQETAYYILKLAG
RWPVKVIHTDNGSNFTSTAVKAACWWAGIQQEFGI PYNPQGQGVVESMNKELKKIIGQVR
EQAEHLKTAVQMAVLIHNFKRKGGIGGYSAGERIIDIIASDIQTKELQKQIIKVQNFRVY
YRDSRDPIWKGPALLWKGEAVVLQDNNDIKVVP RRKVKIIKDYGKQMAGADCVASRQD
EN-

>POL-M.syn4.4

FFREDLAFPOGKAREFSSEQTRANSPTRR-----ELQVWGRDNNSLSEAGA
DR---QGTVS-FSFPQITLWQRPLVTIKIGGQLKEALLDTGADDTVLEEMNLPGRWKPK
MIGGIGGFIKVRQYDQIPIEICGKKAIGTVLIGPTPVNIIGRNLLTQIGCTLNFPISPIE
TIPVKLKPGMDGPKVKQWPLTEEEKIKALVEICTEMEKEGKISRIGPENPYNTPVFAIKKK
DGTKWRKLVDFRELNKRRTQDFWEIQLGIPHAPAGLKKKKSVSVLDVGDAYFSVPLDKDFRK
YTAFTIPSINNETPGIRYCYNVLPQGWKGSIPAIFQSSMTKILEPFRKQNPDIVYQYMDD
LYIGSDLEIGQHRTKIEELRQHLLRWGLTTPDKKHQNEPPFLWMGYELHPDKWTVQPIVL
PEKDSWTVNDLQKLVGKLNWASQIYAGIKVKQLCKLLRGAKALTEVVPLTEEAEELELEN
REILKEPVHGVYDPSKDLIAEIQKQGQGWTYQIYQEPYKNLKTGKYARMGAHTNDVK
QLTEAVQKIAQECIVIWGKTPKFKLPIQKETWETWWMDYWQATWIPWEFINTPLVKLW
YQLEKEPIVGAETFYVDGASNRETKKKGAGYVTDKGRQKVVTLTETTQKTELQAIHLAL
QDSGLEVNIVTDSQYAIGIIQAQPDKSESELVSQIIIEQLIKKEKVYLAWVPAHKGIGGNE
QVDKLVSNGIRKILFLDGDIDKAQEEHEKYHNNWRAMASDFNIPPVVAKEIVACCDKCQLK
GEALHGQVDCSPRIWQLDCTHLEGKVILVAVHVASGYLEAEVIPAETGQETAYFLLKLAG
RWPVKTIHTDNGSNFTSTTVKAACWWAGIKQEFGI PYNPQSQGVIESMNKELKKIIEQVR
DQAEHLKTAVQMAVFVHNFKRKGGIGDYSAGERIIDIIISTDIQTRELQKQIIKIQNFRVY

YRDSRDPVWKGPAKLLWKGEHAVVIQDNNEIKVVPRRKAKIIRDYGKQMAGDDCVASRQD
ED-

>POL-M.syn6.1

FFREDLAFPQGEARKFPSEQTRANSPTRG-----ELQVWGRDNNSLSEAGD
DR---QGTVS-FNLPQITLWQRPLVTVRIGGQLIEALLDTGADDTVLEDNMNLP GKWKPK
MIGGIGGFIKVRQYEQIPIEICGHKAIGTVLIGPTPVNIIGRNLLTQIGCTLNFPISPID
TVPVTLKPGMDGPKIKQWPLTEEEKIKALTEICTEMEKEGKISRIGPENPYNTPVFAIKKK
NSTRWRKLVDFRELNKRTQDFCEVQLGIPHPAGLKKKRSVTVLDVGDAYFSVPLDENFRK
YTAFTIP SINNETPGVRYQYNVLPQGWKGSPAIFQASMTKILEPFRTKNPELVIYQYRDD
LYVGS DLEIEQHRTKIEELRAHLLSWGFTTPDKKHQKEPPFLWMGYELHPDKWTVQPIEL
PEKDSWTVNDIQKIVGKLNWASQIYPGIKVRQLCRLLRGT KALTDIVPLTAEAELELAEN
REILREP VHGVYYDPSKELIAEIQKQGHQWQTYQIYQDPFKNLKTGKYARKRSAHTNDVR
QLTEAVQKITTESIVIWGKTPKFRLPIQRETWEAWWMEYWQATWIPEWEFINTPPLVKLW
YQLEKDPIVGAETFYVDGAASRETKLGKAGYVTNKRQKVVSLNETTNQKTELHAIHLAL
QDSGSEANIVTDSQYALGIIQAQPDRSESEVVNQIIIEELIKKEKVYLSWVPAHKGIGGNE
QVDKLVSSGIRKVLFLDGDIDKAQEDHERYHSNWRTMASDFNLPPIVAREIVASCDKCQKK
GEAMHGQVDCGPGIWQLDCTHLERKVILVAVHVASGYIEAEVIPAETGQETAYFVLKLAG
RWPVKVIHTDNGSNFTSAAVKAACWWANVTQEFGI PYNPQSQGVVESMNNELKKIIGQVR
EQAEHLKTAVLMAVFIHNFKRKRIGGYSAGERIVDIIASDIQT KELQNQITKIQNFRVY
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EN-

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LARNCKAPRKRGCWKCGKEG HQMKEC-TERQANFLGKIWPSSKG-RPGNF PQSRP-----E
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--NGTWNKN--FNNTWNNTTEGTNDTITLPCRICKQIINRWQEVGKAMYAPPISGQIRCSS
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>ENV-B.syn4.4

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>ENV-B.syn6.3

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IWDNMTWMQWEKEIDNYTGLIYTLLEESQNQQEKNEHELLELDKWASLWNWFNITNWLWY
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RDRSGRLVDGFLTLIWVDLRSCLFSYRRLRDLLLIAARIVELG-----HRGWEALK
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>ENV-B.syn6.4

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YCTPAGFAILKCRDKKFNGTGPCKNVSTVQCTHGIRPVVPTQLLLNGSLAEIIIIRSEN
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--NGTWNKN--FNNTWNNTTEGTNDTITLPCRIKQIINMWQKVGKAMYAPPISGQIRCTS
NITGLLLLTRDGGN--DT--SGTEIFRPGGGNMKDNWRSELYKYKVVQIEPLGVAPTEAK
RRVVQREKRAVG-IGAVFLGFLGAAGSTMGAAVTLTVQARLLLSGIVQQQNNLLKAIEA
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RDTSGRLVDGFLAIIWVDLRSFLFSYHRLRDLILLIVTRIVELLG-----RRGWEILK
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LL-

>ENV-B.syn6.5

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KMQKEYALFYRLDVVPI-DNDNTS-----YRLISCNTSVITQACPKISFEPIPIH
YCVFAGFAILKCNKTFNGTGPCNTVSTVQCTHGIKPVVSTQLLNGLSLAEEDVIRSEN
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LL-

>ENV-B.syn6.6

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NITGLILTRDGGNNDT----RGTEIFRPGGGDMKDNWRSELYRYKVVKIEPLGIAPTKAK
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>ENV-C.syn1.1

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>ENV-C.syn3.1

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KKKQVYALFYKLDIVPL-NSNSSE-----YRLINCNTSAITQACPKVSFDPIPIH
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RDRSIRLVSGFLALAWDDLRLSLCLFSYHRLRDFILIAARAAELLGRSSLKGLQRGWEILK
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LQ-

>ENV-C.syn3.2

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KKQNVYALFYRLDIVPL-NENNDNSS-----YRLINCNTSTITQACPKVTFDPIPIH
YCTPAGYAILKCNDKTFNGTGPCNVSTVQCTHGKPKVISTQLLLNGSLAEKEIIIRSEN
LTNNVKTIIIVHLNKSVEIVCTRPGNNTRKSVRIGPGQTFYATGDIIGDIRQAHCNISRTA
WNKTLQEVGKKLAEHFP-NKTIEFKPSSGGDLEVTTTHSFNCRGEFFYCNTSKLFNSTYNS
TYNSTYNSN--STNSNSNST-----ITLQCRIKQIINMWQKVGRAIYAPPIAGNITCRS
NITGLLLTRDGGNNNDTGNNNDTEIFRPGGGDMKDNWRNELYKYKVVEVKPLGIAPTAK
RRVVEREKRAVG-LGAVFLGFLGAAGSTMGAASMTLTVQARQLLSGIVQQQNNLLRAIEA
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KDRSIRLVNGFLALAWDDLRLNLCLFSYHQLRDFILIVARAVELLGHSSLRGLQRGWEALK
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>ENV-C.syn3.3

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QSLKPCVKLTPLCVTLNCT-----NANVTVNATSDGS--IKEEIKNCSFNTTTEIRD
KKQKVYALFYRPDIVPLSGSNSSE-----YILINCNTSTVTQACPKVSFEPIPIH
YCAPASYAILKCNNKTFNGTGPCQNVSTVQCTHGIKPVVSTQLLLNGSLAEGEIIIRSEN
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WNKTLQEVSRLKREHFP-NKTIIFNSSSGGDLEITTHSFNCGGEFFYCNTTKLFNDS---
-----ALSAFNKTS--NETITLPCRICKQIINMWQGVGRAMYAPPIAGNITCNS
SITGLLLLTRDGGT-----NNTIEIFRPGGGMKDNWRSELYKYKVVEIKPLGVAPTEAK
RRVVEREKRAVG-IGAVLLGFLGAAGSTMGAASITLTAQARQLLSGIVQQQSNLLKAIEA
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>ENV-C.syn4.1

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ESLKPCVKLTPLCVTLKCTNVTST---GNTTRGNNTS-EN---REEMKNCSFNTTTEIRD
KKQKVYALFYKPDVPL-KENSSE-----YILINCNTSTVTQACPKVSFDPIPIH
YCAPAGFAILKCNNKTFNGTGPCNNVSTVQCTHGIKPVVSTQLLLNGSLAEIIIIRSEN
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-----LNNTADNST---STITLQCRICKQIINMWQGVGQAMYAPPIAGNITCKS
NITGLLLLLRDGGDTST---NGTEIFRPGGGMKDNWRSELYKYKVVEVKPLGIAPTGA
RRVVEREKRAVG-IGAVLLGFLGAAGSTMGAASITLTAQARQVLSGTVQQQSNLLRAVEA
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>ENV-C.syn4.2

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YCTPAGYAILKCNCKTFNGTGPCHNVSTVQCTHGIRPVVSTQLLLNGSLAEGEIMIRSEN
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NITGLLLVRDGGNDNKT--NDTETFRPGGDMRDNRSELYKYKVVEVKPLGVAPTKAK
RRVVQREKRAVG-IGAVFLGFLGVAGSTMGAASMTLTVQARQVLSGIVQQQSNLLRAIEA
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>ENV-C.syn4.3

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>ENV-C.syn4.4

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KKQQVYALFYKLDIVPL-NSNSSE-----YRLINCNTSTITQACPKVNFDP IPIH
YCAPAGYAILKCNKTFNGTGPCQNVSTVQCTHRIKPVVSTQLLINGSLAEGEI I IRSEN
LTDNVKTI I VHLNESVEIVCTRPNNNTRKSMRIGPGQTFYATGEI I GDIRQAHCNISKEK
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RDRSVRLVSGFLALAWDDL RSLCLFCYHRLRDFILVTARAVELLGRSSLKGLQRGWEALK
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>ENV-C.syn6.1

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KKQKAYALFYRPDIVPL-NENSSSENNSSE----YILINCNTSTITQACPKVSFDPIPIH
YCAPASYAILKCNNETFNGTGPCQNVSTVQCTHGIKPVISTQLLLNGSLAEEDI I IRSEN
LTNNAKTI I VHLNQSV EIVCTRPGNNTRKSMRIGPGQTFYATNDI I GNIRQAHCNISEGK
WNETLLRVKKKLEEHFP-NKTIKFEPSSGGDLEITHTTFNCRGEFFYCDTSTL FNHTY--
--VSAYMNNTDVSADRKNDTQ-SNSTITLPCRIRQI INMWQEVGRAIYAPPIAGNITCRS
NITGLLLVRDGGNTT-----NSTETFRPEGGNMKDNWRSELYKYKVVEIRPLGIAPT GAK
RRVVEREKRAVG-IGAVFLGFLGVAGSTMGAASMTLTVQARQVLSGVVQQQSNLLQAIEA
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RDRSVRLVNGFLALVWDDL RSLCLFCYHRLRDFILVTARVVELLGRSSLRGLQKGWEALK

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>ENV-C.syn6.2

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GTY---MPTYMPN---GTESNSNST-----ITIPCRIKQIINMWQEVGRAMYAPPIEGNITCNS
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>ENV-C.syn6.3

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NITGILLTRDGGNLT---NGTETFRPGGGDMKDNWRSELYRYRVVEIKPLGIAPTKAK
RRVVQREKRAVG-IGALFLGFLGTAGSTMGAASLTTLTVQARQLLSIVQQQSNLLRAIEA
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LQ-

>ENV-C.syn6.4

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KKQQVYALFYKPDVVPL-NGGEHNETGE-----YILINCNSSTITQACPKVSFEPIPIH
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>ENV-C.syn6.5

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LL-

>ENV-C.syn6.6

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NITGLLLLTRDGGT-----NNTEIFRPGGGMKDNWRNELYKYKVVEVKPLGVAPTKAK
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>ENV-M.syn1.1

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RDRSIRLVSGFLALAWDDLRLSLCLFSYHRLRDL LLI VTRIVELLG-----RRGWEALK
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>ENV-M.syn3.1

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RDRSIRLVSGFLALAWDDLRLSLCLFSYHQLRDFILIVARAVELLGRSSLRGLQRGW EALK
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>ENV-M.syn3.2

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FTNNAKTIMVQLNVSVEINCTRPNNNTRKSIHIGPGRAFYT TGDII GDIRQAHCNISRAQ
WNNTLKHIVEKL GKQFGNNKTIVFNHSSGGDPEITTHSFNCGGEFFYCNSTKLFNSTWTR
N-NGTWTRN---DTERS NSTE---EHITLPCRIKQIVNMWQRVGQAMYAPPIRGQIRCSS

NITGLLLTRDGGNDT-----SGTEIFRPGGGDMRNNWRNELYKYKVVRIEPLGVAPTRAK
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RDRSIRLVNGFLALAWDDLRLNLCFSYHRLRDLILLIVTRIVELLG-----RRGWEALK
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LL-

>ENV-M.syn3.3

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KVQKQYALFYKLDIVPI-DNDNTS-----YRLINCNTSTITQACPKVSFDPIPIH
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>ENV-M.syn4.1

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QSLKPCVELTPLCVTLHCTDL-----GNATNT-----MEKGEIKNCSFNMTTELRLD
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NITGILLTRDGGNNGNET--NGTEIFRPGGGNMRDNWRNELYKYKVVEIKPLGVAPTEAK
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>ENV-M.syn4.2

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KVQKQYALFYKLDVVQM-DEDNTS-----YRLISCNTSTITQACPKVTFDPIPIH
YCAPAGFAILKCNNKTFNGTGPCTNVSTVQCTHGIKPVVSTQLLLNGSLAEIIIIRSEN
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--NGTWNKN---FNNTWNNTTEGTNDTITLPCIKQIINMWQRVGQAMYAPPISGQIRCSS
NITGLILTRDGGN---DT--SGTEIFRPGGGDMRDNRSELYKYKVVKIEPLGVAPTKAK
RRVVQREKRAVG-IGALFLGFLGAAGSTMGAASMTLTVQARQLLSGIVQQQSNLLKAIEA
QQHLLQLTVWGIKQLQARILAVEYLKDQQLLGIWGCSGKLICTTTVPWNASWSNKSLE
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RDRSGRLVDGFLAIIWVDLRLSLCFSYHRLRDLILLIVTRIVELLG-----RRGWEVLK
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>ENV-M.syn4.3

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ESLKPCVKLTPLCVTLNCTDDVRNVT-NNATNTNSSW-GEPMEKGEIKNCSFNITTSIRD
KVQKEYALFYKLDVVPIDNDSNNTN-----YRLISCNTSVITQACPKVSFEPIPIH
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ITNNAKTIIVQLNESVVINCTRPNNNTRKSIRIGPGQAFYATGDIIGNIRQAHCNISRAN
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N-NGTWTRN---DTERSNSTE---EHITLPCRICKQIINMWQEVGKAMYAPPIRGQIRCSS
NITGLLLLTRDGGNNN-----STNETFRPGGGMKDNWRSELYKYKVVQIEPLGIAPTKAK
RRVVEREKRAVG-LGAVFLGFLGTAGSTMGAASLTTLTVQARQVLSGIVQQQRNLLRAIEA
QQHLLKLTVWGIKQLQARVLAIERYLQDQQLLGMWGC SGKLICTTNVPWNSSWSNKSQTD
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>ENV-M.syn4.4

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QSLKPCVQLTPLCVTLNCTN-VNVTNLKNETNTKSSSGGEKMEEGEMKNCSFNITTEIRD
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YCTPAGYAILKCNKKFNGTGPCKNVSSVQCTHGIKPVISTQLLLNGSLAE EEEVIRSEN
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>ENV-M.syn6.1

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KKQKVYALFYKLDVVP I -DNDSNNTN-----YRLISCNTSAVTQACPKVTFDPIPIH
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RRVVQREKRAVG-IGAVFLGFLSAAGSTMGAASITLTVQARQLLTGIVQQQSNLLKAIEA
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>ENV-M.syn6.2

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ESLKPCVKLTPLCVTLHCTDL-----GNATNT-----MEKGEIKNCSFN TTTEIRD
KKQKVHALFYRLDVVP I -DNDNTS-----YTLINCNTSVITQACPKVTFEPIPIH
YCAPAGFAILKCNKKKFNGTGPCTNVSTVQCTHGIRPVVSTQLLLNGSLAEGEI IIRSEN
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--NGTWNKN--FNNTWNNT EGTNDTITLPC KIKQIINMWQGVGRAMYAPPISGQIRC SS
NITG LLLTRDGGT-----NNT EIFRPGGGNMRDNWRSELYKYKVVKIEPLGVAPT KAK
RRVVQREKRAVG-IGALFLGFLGAAGSTMGAASMTLTVQARQVLSGIVQQQRNLLRAIEA
QQHLLQLTVWGIKQLQARIL AVERYLRDQKFLGLWGCSGKIICTTAVPWNASWSNKS LDD
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LL-

>ENV-M.syn6.3

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N-NGTWTRN---DTERSNSTE---EHITLPCRICKQIINMWQRVGQAMYAPPIAGNITCNS
SITGLLLTRDGGN---DT---SGTEIFRPGGGNIKDNWRSELYKYKVQIEPLGVAPTRAK
RRVVEREKRAVG-IGAMIFGFLGAAGSTMGAASMLTVQARQLLSGIVQQQSNLLMAIEA
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LQ-

>ENV-M.syn6.4

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YCAPAGFAILKCKDKKFNGTGPCQNVSTVQCTHRIKPVVSTQFLLNGSLAEEDIIIRSEN
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RRVVEREKRAIG-LGAMFLGFLGTAGSTMGAASLTTLTVQARQLMSGIVQQQNLLRAIEA
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RDRSIRLVNGFLALIWVDLRLSLFLFSYHRLRDLILLIVTRIVELLG-----RRGWEALK
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LL-

>ENV-M.syn6.5

MRVKGIRKNYQHLWKWGTM-----LGMLMICSATEKLWVTVYYGVPVWKEATTTLF

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QSLKPCVKLTPI CVTLNCTDYVKNIT-NNATSTNSSW-GKPM EKGEIKNCSFNMTTEL RD
KKQKVYSLFYKLDVVQM-DEDNTS-----YRLISCNTSVITQACPKISFEPIPIH
YCTPAGYAILKCN DKNFNGTGPCKNVSSVQCTHGIKPVI STQLLLNGSLAE EEEI IIRSEN
LTNNVKTIIVHLNKSVEINCTRPSNNTRTSIRIGPGQAFYATGDIIGDIRKAHCNISRAN
WNNTLRQIVEKLGEQFGN NKTIVFNHSSGGDPEITTHSFNCGGEFFYCNTTKLFNSTWTW
N-NSTW--N---N TKRSNDTE---EIITLPCR IKQI INMWQEVGKAMYAPPIQGVIRCES
NITGLILTRDGGNNN-----STNETFRPGGGDMRDNWRSELYKYKVVRIEPLGVAPTEAK
RRVVQREKRAVG TIGAMFLGFLGAAGSTMGAASVTLTVQARLLLSGIVQQQNLLKAIEA
QQHLLRLTVWGIKQLQARVLA IERYLQDQQLLGIWGCSGKLICTTNVPWN TSWSNRSLNE
IWNNMTWMEWEKEIDNYTNLIYNLLEESQIQQEKNEQELLALDKWANLWNWFDISNWLWY
IRIFIIIVGGLVGLRIVFAVLSIVNKVRQGYSPLSFQTHLPAQRGPDRPEGIEEGGGEQD
RDRSVRLVDGFLAIIWVDLRSLCLFSYHHLRDLLLIVARIVELLG-----RRGWEVLK
YWWNLLKYWSQELKNSAVSLNATAIAVAEGTDRIIELIQRICRAICNIPRRIRQGFERA
LL-

>ENV-M.syn6.6

MRVKETRKNYQHLWRWGIML-----LGMLMICSAAEQLWVTVYYGVPVWKEAKTTLF
CASNAKAYDTEAHNVWATHACIPTDPNPQEIVLENTESFNMWKNDMVDQM HEDVISLWD
QSLKPCVQLTPLCVTLNCTN-VNVTNLKNETNTKSSSGGEKMEEGEMKNCSFNVTTEL RD
KKKKEYALFYRLDIVPL-NEGNNNSSSY-----YRLINCNTSTITQACPKVSFEPIPIH
FCAPAGFAILKCN DKKFNGTGPCKNVSTVQCTHGIKPVVSTQLLLNGSLAEKEI IIRSEN
LTNNAKIIIVQLNESVEINCTRPGNNTRKSIRIGPGQTFYATGDIIGNIRQAHCNISRTQ
WNNTLKQIAIKLREQFG-NKTII FNQSSGGDPEIVTHSFNCGGEFFYCKSTKLFNSTW--
-----N---STSLFNSTN---GTITLQCR IKQI INRWQEVGKAMYAPPIEGNITCKS
NITGLLLLVRDGGINVTNN--TGTEVFRPGGGDMKDNWRNELYKYKVVEIKPLGVAPTRAR
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YLGSLVQYWGLELKKSAISLLDTIAIAVANWTD RVIEWVQRAYRAILHIPTRIRQGF EAA
LQ-