



PvuI (7)
SgfI (6)
EcoNI (96)

1 GGATCTGCATCGCTCCGGTGCCCGTCAGTGGCAGAGCGCACATCGCCACAGTCCCCGAGAAGTTGGGGGAGGGGTGGCAATTGAACGGGTGCCTA
101 GAGAAGTGGCGCGGGTAAACTGGAAAGTGATGTCGTACTGGCTCCGCCTTTTCCGAGGGTGGGGGAGAACCCTATATAAGTGCAGTAGTCGCC

Psp1406I (203)
Bsu36I (291)

201 GTGAACGTTCTTTTTTCGCAACGGGTTTCCGCCAGAACACAGCTGAAGCTTCAGAGGGCTCGCATCTCTCTTACCGCCGCCGCCCTACCTGAGGCC
301 GCCATCCACGCCGGTTGAGTCGCGTTCTGCCGCTCCCGCCTGTGGTGCCTCTGAAGTGCCTCCGCCGCTAGGTAAGTTTAAAGCTCAGGTCGAGACC

HindIII (245)
EcoNI (287)

401 GGGCCTTTGTCCGGCGCTCCCTTGGAGCCTACCTAGACTAGCCGGCTCTCCACGCTTTGCTGACCCTGCTTCTCAACTCTACGCTTTTGTTCGTTT

NgoMI (441)
BspLU11I (560)

501 TCTGTTCTGCGCCGTTACAGATCCAAGCTGTGACCGGCCCTACCTGAGATCACCGGTCAACATGTGCAATGGTATTCCACAGACGAGAATTTCCGCTA
1▶MetSerAsnGlyTyrSer ThrAspGluAsnPheArgTy

KasI (535)
AgeI (552)

601 TCTCATCTCGTGCTTTCAGGGCCAGGGTAAAAATGTACATCCAGGTGGAGCCTGTGCTGGACTACCTGACCTTTCTGCCTGCAGAGGTGAAGGAGCAGATT
13▶rLeuIleSerCysPheArgAlaArgValLysMetTyrIleGlnValGluProValLeuAspTyrLeuThrPheLeuProAlaGluValLysGluGlnIle
701 CAGAGGACAGTCCGCACCTCCGGGAACATGCAGGCAGTTGAAGTCTGCTGAGCACCTTGGAGAAGGGAGTCTGGCACCTTGGTTGGACTCGGGAATTCG
47▶GlnArgThrValAlaThrSerGlyAsnMetGlnAlaValGluLeuLeuLeuSerThrLeuGluLysGlyValTrpHisLeuGlyTrpThrArgGluPheV

BsrGI (632)
BsiBI (895)

801 TGGAGGCCCTCCGAGAACCGGCAGCCCTCTGGCCGCCGCTACATGAACCTGAGCTCACGGACTTGCCTCTCCATCGTTTGAACGCTCATGATGA
80▶alGluAlaLeuArgArgThrGlySerProLeuAlaAlaArgTyrMetAsnProGluLeuThrAspLeuProSerProSerPheGluAsnAlaHisAspGlu

BspEI (809)
BsaBI (895)

901 ATATCTCCAAGTCTGACCTCCTTTCAGCCACTCTGGTGACAAAGCTTCTAGTTAGAGAGCTTGGATAAGTGCATGGAGGAGGAAGTGTGACAATT
113▶uTyrLeuGlnLeuLeuAsnLeuLeuGlnProThrLeuValAspLysLeuLeuValArgAspValLeuAspLysCysMetGluGluGluLeuLeuThrIle
1001 GAAGACAGAAACCGGATTGCTGCTGCAGAAAACATGAAATGAATCAGGTGTAAAGAGAGCTACTAAAAAGGATTGTGCAGAAAAGAACTGTTCTCTG
147▶GluAspArgAsnArgIleAlaAlaAlaGluAsnAsnGlyAsnGluSerGlyValArgGluLeuLeuLysArgIleValGlnLysGluAsnTrpPheSerA

HpaI (1149)

1101 CATTTCTGAATGTTCTTCTCGTCAAACAGGAAACAATGAACCTGTCCAAGAGTTAACAGGCTCTGATTGCTCAGAAAACAATGCAGAGATTGAGAATTTATC
180▶IlePheLeuAsnValLeuArgGlnThrGlyAsnAsnGluLeuValGlnGluLeuThrGlySerAspCysSerGluSerAsnAlaGluIleGluAsnLeuSe
1201 ACAAGTTGATGGTCTCAAGTGGAGAGCAACTCTTTCAACCACAGTTACAGCAAATCTGGAGAAGGAGGTCTGGGGCATGGAGAATAACTCATCAGAA
213▶rGlnValAspGlyProGlnValGluGluGluLeuLeuSerThrThrValGlnProAsnLeuGluLysGluValTrpGlyMetGluAsnAsnSerSerGlu

XmnI (1424)
HpaI (1149)

1301 TCATCTTTTGCAGATTCTTCTGTAGTTTCAGAATCAGACACAAGTTTGGCAGAAGGAAGTGTGAGCTGCTTAGATGAAAGTCTTGGACATAACAGCAACA
247▶SerSerPheAlaAspSerSerValValSerGluSerAspThrSerLeuAlaGluGlySerValSerCysLeuAspGluSerLeuGlyHisAsnSerAsnM

NcoI (1418)
StuI (1486)

1401 TGGGCAGTGATTCAGGCACCATGGGAAGTGATTCAGATGAAGAGAATGTGGCAGCAAGAGCATCCCCGGAGCCAGAACTCCAGCTCAGGCCTTACCAAT
280▶etGlySerAspSerGlyThrMetGlySerAspSerAspGluGluAsnValAlaAlaArgAlaSerProGluProGluLeuGluLeuArgProTyrGluNMe
1501 GGAAGTTGCCAGCCAGCCTTGGGAAGGGAAGAATATCATCATCTGCCTCCCTACAGGGAGTGGAAAACAGAGTGGCTGTTTACATTGCCAAGGATCAC
313▶tGluValAlaGlnProAlaLeuGluGlyLysAsnIleIleIleCysLeuProThrGlySerGlyLysThrArgValAlaValTyrIleAlaLysAspHis
1601 TTAGACAAGAAAGAAAAGCATCTGAGCCTGAAAAGATTATAGTTCTTGTCAATAAGGTAAGTACTGCTAGTTGAACAGCTCTCCGCAAGGAGTCCAAACAT
347▶LeuAspLysLysLysLysAlaSerGluProGlyLysValIleValLeuValAsnLysValLeuLeuValGluGluLeuPheArgLysGluPheGluNProP
1701 TTTTGAAGAAATGGTATCGTGTATTGGATTAAGTGGTATACCAACTGAAAATATCATTTCCAGAAGTGTCAAGTCTGTGATATTATTATCAGTAC
380▶heLeuLysLysTrpTyrArgValIleGlyLeuSerGlyAspThrGlnLeuLysIleSerPheProGluValValLysSerCysAspIleIleIleSerTh
1801 AGCTCAAATCCTTGAAGAACTCCCTTAAACTTGGAAAATGGAGAAGTGTGGTGTCAATTGTGAGACTTTTCCCTCATTATCATTGATGAATGTCAT
413▶rAlaGlnIleLeuGluAsnSerLeuLeuAsnLeuGluAsnGlyGluAspAlaGlyValGlnLeuSerAspPheSerLeuIleIleAspGluCysHis
1901 CACACCAACAAAGAAGCAGTGTATAATAACATCATGAGGCATTATTTGATGCAGAAGTTGAAAACAATAGACTCAAGAAAGAAAACAACAGTGTATC
447▶HisThrAsnLysGluAlaValTyrAsnAsnIleMetArgHisTyrLeuMetGlnLysLeuLysAsnAsnArgLeuLysLysGluAsnLysProValIleP

DraIII (2030)
Eco147I (1486)

2001 CCCTTCTCAGATACTGGGACTAACAGCTTACCTGGTGTGGAGGGCCACGAAGCAAGCAAGCTGAAGAACACATTTTAAACTATGTGCCAATCT
480▶rLeuProGlnIleLeuGlyLeuThrAlaSerProGlyValGlyGlyAlaThrLysGlnAlaLysAlaGluGlyHisIleLeuLysLeuCysAlaAsnLe

Ppu10I (2102)

2101 TGATGCATTTACTATTAATAACTGTTAAAGAAAACCTTGATCAACTGAAAACCAAATACAGGAGCCATGCAAGAAGTTTGCATTGCAGATGCAACCAGA
513▶uAspAlaPheThrIleLysThrValLysGluAsnLeuAspGluLeuLysAsnGlnIleGlnGluProCysLysLysPheAlaIleAlaAspAlaThrArg

XbaI (2223)

2201 GAAGATCCATTTAAAGAGAACTCTAGAAAATAATGACAAGGATTCAAACCTATTGTCAAATGAGTCCAAATGTGAGATTTTGGAACTCAACCTATGAAC
547▶GluAspProPheLysGluLysLeuLeuGluIleMetThrArgIleGlnThrTyrCysGlnMetSerProMetSerAspPheGlyThrGlnProTyrGluG

BstBI (2411)
AseI (2398)

2301 AATGGGCCATTCAAATGGAAAAAAGCTGCAAAAAGAGGAAATCGCAAAAAGACGTGTTTGTGCAGAACATTTGAGGAAGTACAATGAGGCCCTACAAAT
580▶InTrpAlaIleGlnMetGluLysLysAlaAlaLysGluGlyAsnArgLysGluArgValCysAlaGluHisLeuArgLysTyrAsnGluAlaLeuGlnIle

AsuII (2411)
Bst1107I (2427)

2401 TAATGACACAATTCGAATGATAGATGCGTATACATCTTGAACCTTTCTATAATGAAGAGAAAGATAAGAAGTTTGCAGTCATAGAAGATGATAGTGT
613▶eAsnAspThrIleArgMetIleAspAlaTyrThrHisLeuGluThrPheTyrAsnGluGluLysAspLysLysPheAlaValIleGluAspAspSerAsp
2501 GAGGGTGGTGTATGAT
647▶GluGlyGlyAspAspGluTyrCysAspGlyAspGluAspGluAspAspLeuLysLysProLeuLysLeuAspGluThrAspArgPheLeuMetThrLeuP

2601 TTTTGGAAAACAATAAAATGTTGAAAAGGCTGGCTGAAAACCCAGAATATGAAAATGAAAAGCTGACCAAATTAAGAAATACCATAATGGAGCAATATAC
680▶hePheGI uAsnAsnLysMetLeuLysArgLeuAl aGI uAsnP rOgI uTyrGI uAsnGI uLysLeuThr LysLeuArgAsnThr I I eMe tGI uGI nTyrTh
NdeI (2753)

2701 TAGGACTGAGGAATCAGCACGAGGAATAATCTTTACAAAAACACGACAGAGTGATATGCGCTTTCCAGTGGATTACTGAAAATGAAAAATTTGCTGAA
713▶r ArgThr GI uGI uSer Al aArgGI yI I eI I ePheThr LysThrArgGI nSer Al aTyrAl aLeuSer GI nTrpI I eThr GI uAsnGI uLysPheAl aGI u
XcmI (2814)

2801 GTAGGAGTCAAAGCCCACCATCTGATTGGAGCTGGACACAGCAGTGGATTCAAACCCATGACACAGAATGAACAAAAAGAGTCATTAGTAAATTTGCGCA
747▶Val GI yVal LysAl aHi sHi sLeuI I eGI yAl aGI yHi sSer Ser GI uPheLysP roMe tThr GI nAsnGI uGI nLysGI uVal I I eSer LysPheArgT
2901 CTGAAAAATAAATCTGCTTATCGCTACCACAGTGGCAGAGAAGGCTGGATATTAAGAATGTAACATTGTTATCCGTTATGGTCTCGTACCAATGA
780▶hr GI yLys I I eAsnLeuLeuI I eAl aThr Thr Val Al aGI uGI uGI yLeuAspI I eLysGI uCysAsnI I eVal I I eArgTyrGI yLeuVal I ThrAsnGI
NcoI (3005)

3001 AATAGCCATGGTCCAGGCCGCTGGTTCGAGCCAGAGCTGATGAGAGCACCTACGTCCTGGTTGCTCACAGTGGTTCAGGAGTTATCGAACATGAGACAGTT
813▶ul I eAl aMe tVal GI nAl aArgGI yArgAl aArgAl aAspGI uSer Thr TyrVal I LeuVal Al aHi sSer GI ySer GI yVal I I eGI uHi sGI uThr Val I
3101 AATGATTTCCGAGAGAAGATGATGTATAAAGCTATACATTGTGTTCAAATATGAAACAGAGGAGTATGCTCATAAGATTTTGAATTACAGATGCAAA
847▶AsnAspPheArgGI uLysMe tMe tTyrLysAl aI I eHi sCysVal GI nAsnMe tLysP roGI uGI uTyrAl aHi sLys I I eLeuGI uLeuGI nMe tGI nS
SspI (3232) NheI (3297)

3201 GTATAATGGAAAAGAAAATGAAAACCAAGAGAAAATATTGCCAAGCATTACAAGAATAACCCATCACTAATAACTTTCTTTGCAAAAACTGCAGTGTGCT
880▶er I I eMe tGI uLysLysMe tLysThr LysArgAsnI I eAl aLysHi sTyrLysAsnAsnP roSer LeuI I eThr PheLeuCysLysAsnCysSer Val Le
EcoRV (3316) Ppu10I (3337)
Eco32I (3316) NsiI (3337)

3301 AGCCTGTTCTGGGGAAGATATCCATGTAATTGAGAAAAATGCATCACGTCAATATGACCCAGAATTCAGGAACTTTACATTGTAAGAGAAAACAAAGCA
913▶uAl aCysSer GI yGI uAspI I eHi sVal I I eGI uLysMe tHi sHi sVal I AsnMe tThr P roGI uPheLysGI uLeuTyr I I eVal I ArgGI uAsnLysAl a
MscI (3453) Ball (3453) ApaLI (3478)

3401 CTGCAAAAGAAAGTGTGCCACTATCAAATAAATGGTGAATCATCTGCAAATGTGGCCAGGCTTGGGGAACAATGATGGTGCACAAAGGCTTAGATTTGC
947▶LeuGI nLysLysCysAl aAspTyrGI nI I eAsnGI yGI uI I eI I eCysLysCysGI yGI nAl aTrpGI yThr Me tMe tVal I Hi sLysGI yLeuAspLeuP
3501 CTTGTCTCAAATAAGGAATTTGTAGTGGTTTTCAAATAAATTCAACAAAGAAACAATACAAAAAGTGGGTAGAATTACCTATCACATTTCCAATCT
980▶r oCysLeuLys I I eArgAsnPheVal Val I PheLysAsnAsnSer Thr LysLysGI nTyrLysLysTrpVal GI uLeuP roI I eThr PheP roAsnLe
MscI (3666) Ball (3666) AvrII (3654)

3601 TGA CTATT CAGAATGCTGTTTATTTAGTGATGAGGATTAGCACTTGATTGAAGACCTAGGACTAGCTGGCCAGACATGATAAGATACATTGATGAGTTTG
1013▶uAspTyrSer GI uCysCysLeuPheSerAspGI uAsp●●●

3701 GACAAACCACAAC TAGAATGCAGTGAAAAAATGCTTTATTTGTGAAATTTGTGATGCTATTGCTTTATTTGTAACCATTATAAGCTGCAATAAAACAAGT
HpaI (3798)

3801 TAACAACAACAATTGCATTCATTTTATGTTTCAGGTTCCAGGGGAGGTGTGGGAGTTTTTTAAAGCAAGTAAAACTCTACAAATGTGGTATGGAATTC
3901 TAAAATACAGCATAGCAAACTTAACTCCAAATCAAGCCTCTACTGAAATCCTTTTCTGAGGGATGAATAAGGCATAGGCATCAGGGGCTGTTGCCAA
4001 TGTGCATTAGCTGTTTGCAGCCTCACCTTCTTTCATGGAGTTTAAAGATATAGTGATTTTTCCCAAGGTTGAACTAGCTCTTCATTTCTTTATGTTTTAA
4101 ATGCACTGACCTCCACATTCCTTTTTAGTAAATATTCAGAAATAATTTAAATACATCATTGCAATGAAAATAAATGTTTTTTATTAGGCAGAATCCA
4201 GATGCTCAAGGCCCTTCATAATATCCCCAGTTTAGTAGTTGACTTAGGGAACAAGGAACCTTTAATAGAATTTGGACAGCAAGAAAGCGAGCTTCTA
4301 GCTTTAGTTCCTGGTGTACTTGAGGGGATGAGTTCCTCAATGGTGGTTTTGACCAGCTTGCCATTCTCTCAATGAGCACAAAGCAGTCAGGAGCATAG
141▶●●●AsnArgThr TyrLysLeuP roI I eLeuGI uGI uI I eThr Thr LysVal I LeuLysGI yAsnMe tGI uI I eLeuVal I PheCysAspP roAl aTyrA
4401 TCAGAGATGAGCTCTCGACATGCCACAGGGGCTGACCACCTGATGGATCTGTCCACCTCATCAGAGTAGGGGTGCCTGACAGCCACAATGGTGTCAA
108▶spSer I I eLeuGI uArgCysMe tGI yCysP roSer Val Val A rgl I eSer ArgAspVal GI uAspSer TyrP roHi sArgVal Al aVal I I eThr AspPh
StuI (4572) Eco147I (4572)

4501 AGTCCTTCTGCCGTTGCTCACAGCAGACCCAATGGCAATGGCTTCAGCACAGACAGTACCCTGCCAATGTAGGCCCTCAATGTGGACAGCAGAGATGAT
75▶eAspLysGI nGI yAsnSer Val Al aSer GI yI I eAl aI I eAl aGI uAl aCysVal I Thr Val A rgl GI yI I eTyrAl aGI uI I eHi sVal Al aSer I I eI I e
4601 CTCCCCAGTCTTGGTCTGATGGCCGCCGACATGGTGTGTTGTCCTCATAGAGCATGGTATCTTCTCAGTGGCGACCTCCACCAGCTCCAGATCC
42▶GI uGI yThr LysThrArgI I eAl aAl aGI yVal I Hi sHi sLysAsnAspGI uTyrLeuMe tThr I I eLysGI uThr Al aVal GI uVal I LeuGI uLeuAspG
XmnI (4714) AseI (4780)

4701 TGCTGAGAGATGTTGAAGTCTTCATGATGGCCCTCTATAGTGAGTCTATTATACTATGCCGATATACTATGCCGATGATTAATTGTCAAAACAGCGT
8▶I nGI nSer I I eAsnPheThr LysMe t
4801 GGATGGCTCTCCAGCTTATCTGACGGTTCATAAACGAGCTCTGCTTATATAGACCTCCACCCTACACGCTACCGCCCAATTTGCGTCAATGGGGCGG

4901 AGTTGTTACGACATTTTGGAAAGTCCCGTTGATTTACTAGTCAAACAAACTCCATTGACGTCAATGGGGTGGAGACTTGGAAATCCCGTGAGTCAA
SpeI (4935)

5000 ACCGCTATCCAGCCCATTGATGTACTGCCAAAACCGCATCATCATGGTAATAGCGATGACTAATACGTAGATGTACTGCCAAGTAGGAAAGTCCCATAA
SnaBI (5063) Eco105I (5063)

5100 GGTCATGACTGGGCATAATGCCAGGGGCCATTTACCGTCATTGACGTCAATAGGGGGCGTACTTGGCATATGATACACTTGATGTACTGCCAAGTGG
NdeI (5168)

5200 GCAGTTTACGTAATACTCCACCCATTGACGTC AATGGAAAGTCCCTATTGGCGTTACTATGGGAACATACGTCATTATTGACGTC AATGGGCGGGGT

5300 CGTTGGGCGGTCAGCCAGGCGGGCCATTTACCGTAAGTTATGTAACGCC T G C A G G T T A A T T A A G A A C A T G T G A G C A A A A G G C C A G C A A A A G G C C A G G A

SdaI (5346) PacI (5354) BspLU11I (5364)

5398 ACCGTAAAAGGCCGCGTTGCTGGCGTTTTTCCATAGGCTCCGCCCCCTGACGAGCATC AAAAAATCGACGCTCAAGTCAGAGGTGGCGAAACCCGAC

5498 AGGACTATAAAGATACCAGGCGTTTCCCCTGGAAGCTCCCTCGTGCGCTCTCCTGTTCCGACCCTGCCGCTTACCGGATACCTGTCCGCCTTCTCCCT

5598 TCGGGAAGCGTGGCGCTTCTCATAGCTCACGCTGTAGGTATCTCAGTTCGGTGTAGGTGCTTCGCTCCAAGCTGGGCTGTGTGCACGAACCCCGTTC

ApaLI (5678)

5698 AGCCCGACCGCTGCGCCTTATCCGGTA ACTATCGTCTTGAGTCCAACCCGGTAAGACACGACTTATCGCCACTGGCAGCAGCCACTGGTAACAGGATTAG

5798 CAGAGCGAGGTATGTAGGCGGTGCTACAGAGTTCTTGAAGTGGTGGCCTAACTACGGTACACTAGAAGAACAGTATTTGGTATCTGCGCTCTGCTGAAG

5898 CCAGTTACCTTCGGAAAAAGAGTTGGTAGCTCTTGATCCGGCAAAACAAACCACCGCTGGTAGCGGTGGTTTTTTTGTGCAAGCAGCAGATTACGCGCA

5998 GAAAAAAGGATCTCAAGAAGATCCTTTGATCTTTTCTACGGGTCTGACGCTCAGTGAACGAAAAC TACGTTAAGGGATTTTGGTCATGGCTAGTTA

PacI (6094)

EagI (6114)

6098 ATTAACATTTAAATC AGCGGCCGCAATAAAATATCTTTATTTTTCATTACATCTGTGTGTTGGTTTTTTTGTGTAATCGTAACTAACATACGCTCTCCATC

SwaI (6103) NotI (6113)

6198 AAAACAAAACGAAACAAAACAAACTAGCAAATAGGCTGTCCCCAGTGAAGTGCAGGTGCCAGAACATTTCTCTATCGAA