



Bsp120I (8)  
EcoO109I (8)  
PstI (7)  
SdaI (7) SpeI (14) EcoNI (94)

1 CCTGCAGGGCCCACTAGTAAGTTTCCAGAGCTTTTCGAGGAAGGTTTCTTCAACTCAAATTCATCCGCTGATAATTTTCTTATTTTCTAAAGAAGGA

101 AGAGAAGCGCATAGAGGAGAAGGAAATAATTTTTAGGAGCCTTTCTACGGCTATGAGGAATTTGGGGCTCAGTTGAAAAGCCTAAACTGCCTCTCGG

Tth111I (244)

201 GAGGTTGGGCGCGGCGAACTACTTTACAGCGGCACGGAGACGGCGTCTACGTGAGGGGTGATAAGTGACGCAACACTCGTTGCATAAATTTGCGCTCCG

BamHI (386)

301 CCAGCCCGAGCATTAGGGGCGGTTGGCTTTGTTGGGTGAGCTTGTGTCCCTGTGGGTGGACGTGGTTGGTGATTGGCAGGATCCTGGTATCCGC

401 TACAGgtactggccacagccgtaaaagacctgccccggcgtagagggggaatgggtgaggtcaagctggaggcttcttgggggtgggtgggcccgctg

500 aggggaggggagggcgaggtgacgcgacacccggcctttctgggagagtgggccttgttgacctaaagggggcgagggcagttggcacgcgcacgcgc

598 cgacagaactaacagacat taaccaacagcgattccgtcgegttaacttgggaggaaggcgaaaagaggtagttgtgtggcttctggaacccta

NruI (758)

696 aatttggaaatcccagtatgagaat ggtgt cccttctgtgtttcaatgggatttttacttcgagctcttgggttgggtttgtttcagtttgctt

BspEI (849) Eco47III (895)

795 aacaccgtgcttaggtttaggagcagattggagttcggtcgggggagttgaaatccgggaacagttagtggggaaagctgtggacgcttggtaagagagc

895 gctctggatcttccgctgttgacgttgaaccttgaatgacgaatttcgtattaagtgacttagccttgaattgaggggaggttggcgaatattaa

995 cgtatattaaggcattttgaaggaatagtgctaattttgaagaatattaggtgtaaaagcaagaatacaatgatcctgaggtgacacgcttatgtttta

NcoI (1112)  
BstEII (1107) NheI (1150)

1095 ctttttaactagGTCACCATGGGGGTTCTCATCATCATCATCATGGTATGGCTAGCATGACTGGTGACAGCAAAATGGGTCGGATCTGTACGACG

1 MetGlyGlySerHisHisHisHisHisHisGlyMetAlaSerMetThrGlyGlyGlnGlnMetGlyArgAspLeuTyrAspA

Acc65I (1206)

1195 ATGACGATAAGGTACCTAAGGATCAGCTTGGAGTTGATCCCGTCTGTTTTACAACGTCGTGACTGGGAAAACCTGGCGTTACCCAACCTAATCGCCTTGC

28 spAspAspLysValProLysAspGlnLeuGlyValAspProValValLeuGlnArgArgAspTrpGluAsnProGlyValThrGlnLeuAsnArgLeuAl

FspI (1366)

1295 AGCACATCCCCCTTTCGCCAGCTGGCGTAATAGCGAAGAGGCCCGCACCGATCGCCCTTCCCAACAGTTGCGCAGCCTGAATGGCGAATGGCGCTTTGCC

61 aAlaHisProProPheAlaSerTrpArgAsnSerGluGluAlaArgThrAspArgProSerGlnGlnLeuArgSerLeuAsnGlyGluTrpArgPheAla

1395 TGGTTTCCGGCACCAGAAGCGGTGCGCGAAAGCTGGCTGGAGTGCAGTCTTCTGAGGCCGATACTGTCTGCTGCCCTCAAACCTGGCAGATGCACGGTT

95 TrpPheProAlaProGluAlaValProGluSerTrpLeuGluCysAspTrpLeuGluAlaAspThrValValValProSerAsnTrpGlnMetHisGlyT

1495 ACGATGGCCCATCTACACCAACGTAACCTATCCATTACGGTCAATCCGCGTTTTGTTCCACGGAGAATCCGACGGGTTGTTACTCGTCCACATTTAA

128 yrAspAlaProl leTyrThrAsnValThrTyrProl leThrValAsnProProPheValProThrGluAsnProThrGlyCysTyrSerLeuThrPheAs

1595 TGTGATGAAAGCTGGCTACAGGAAGGCCAGACGCGAATTATTTTTGATGGCGTAACTCGCGTTTTATCTGTGGTGAACGGGCGCTGGGTGGTTAC

161 nValAspGluSerTrpLeuGlnGluGlyGlnThrArgI leI lePheAspGlyValAsnSerAlaPheHisLeuTrpCysAsnGlyArgTrpValGlyTyr

1695 GGCCAGGACAGCTGTTGCGCTGAATTTGACCTGAGCGCATTTTTACGCGCCGGAGAAAACCGCCTCGCGGTGATGGTGTGCGTTGGAGTGACGGCA

195 GlyGlnAspSerArgLeuProSerGluPheAspLeuSerAlaPheLeuArgAlaGlyLeuAsnArgLeuAlaValMetValLeuArgTrpSerAspGlyS

AatII (1847)

1795 GTTATCTGGAAGATCAGGATATGTGGCGGATGAGCGGCATTTTCCGTGACGTCCTGTTGCTGCATAAACCGACTACACAAATCAGCGATTTCCATGTTGC

228 erTyrLeuGluAspGlnAspMetTrpArgMetSerGlyI lePheArgAspValSerLeuHisLysProThrThrGlnI leSerAspPheHisValAl

1895 CACTCGCTTAAATGATGATTTACAGCCGCTGTACTGGAGGCTGAAGTTGAGTGTGCGGCGAGTTGCGTACTACCTACCGGTAACAGPTTCTTTATGG

261 aThrArgPheAsnAspPheSerArgAlaValLeuGluAlaGluValGlnMetCysGlyGluLeuArgAspTyrLeuArgValThrValSerLeuTrp

ClaI (2048)

1995 CAGGGTAAAACGCAAGTCCGACGCGCACCGCCTTTCGGCGGTGAAATATCGATGAGCGTGGTGGTTATGCCGATCGCGTCACACTACGTCTGAACG

295 GlnGlyGluThrGlnValAlaSerGlyThrAlaProPheGlyGlyGluI leI leAspGluArgGlyTyrAlaAspArgValThrLeuArgLeuAsnV

2095 TCGAAAACCCGAAACTGTGGAGCGCCGAAATCCCGAATCTCTACGTCGGTGGTGAAGTGAAGTGCACACCGCCGACGCGTATTGAAGCAGAAGCCTG

328 alGluAsnProLysLeuTrpSerAlaGluI leProAsnLeuTyrArgAlaValValGluLeuHisThrAlaAspGlyThrLeuI leGluAlaGluAlaCy

2195 CGATGTCGGTTTCCGCGAGGTGCGGATTGAAAATGGTCTGCTGCTGTAACGGCAAGCCGTTGCTGATTTCGAGGCGTTAACCGTCACGAGCATCATCT

361 sAspValGlyPheArgGluValArgI leGluAsnGlyLeuLeuLeuLeuAsnGlyLysProLeuLeuI leArgGlyValAsnArgHisGluHisHisPro

EcoRV (2337)

2295 CTGCATGGTCAGGTCATGGATGAGCAGACGATGGTGCAGGATATCTGCTGATGAAGCAGAACAACCTTAAACGCCGTGCGCTGTTTCGATTATCCGAACC

395 LeuHisGlyGlnValMetAspGluGlnThrMetValGlnAspI leLeuLeuMetLysGlnAsnAsnPheAsnAlaValArgCysSerHisTyrProAsnH

DraIII (2414)

2395 ATCCGCTGTGGTACACGCTGTGCGACCGCTACGGCCTGTATGTGGTGGATGAAGCCAATATTGAAACCCACGGCATGGTCCAATGAATCGTCTGACCGA

428 isProLeuTrpTyrThrLeuCysAspArgTyrGlyLeuTyrValValAspGluAlaAsnI leGluThrHisGlyMetValProMetAsnArgLeuThrAs

BsaBI (2550)

2495 TGATCCGCGCTGGCTACCGCGATGAGCGAACCGTAACCGGAATGGTGCAGCGGATCGTAATCACCCGAGTGTGATCATCTGGTCTGGGGAATGAA

461 pAspProArgTrpLeuProAlaMetSerGluArgValThrArgMetValGlnArgAspArgAsnHisProSerValI leI leTrpSerLeuGlyAsnGlu

2595 TCAGGCCACGGCGCTAATCACGACGCGCTGTATCGCTGGATCAAATCTGTCGATCCTTCCGCGCGGTGCAGTATGAAGCGCGGAGCCGACACCACGG

495 SerGlyHisGlyAlaAsnHisAspAlaLeuTyrArgTrpI leLysSerValAspProSerArgProValGlnTyrGluGlyGlyAlaAspThrThrA

BssHIII (2722)

2695 CCACCGATATTATTTGCCGATGTACGCGCGGTGGATGAAGACCAGCCCTTCCCGCTGTGCCGAAATGGTCCATCAAAAAATGGCTTTCGCTACCTGG

528 laThrAspI leI leCysProMetTyrAlaArgValAspGluAspGlnProPheProAlaValProLysTrpSerI leLysLysTrpLeuSerLeuProGI

2795 AGAGACGCGCCGCTGATCCTTTGCGAATACGCCACGCGATGGGTAAACAGTCTTGGCGGTTTCGCTAAATACTGGCAGGCGTTTCGTCAGTATCCCGT

561 yGluThrArgProLeuI leLeuCysGluTyrAlaHisAlaMetGlyAsnSerLeuGlyGlyPheAlaLysTyrTrpGlnAlaPheGlnTyrArg

2895 TTACAGGGCGGCTTCGTCTGGACTGGGTGGATCAGTCGCTGATTAATATGATGAAAACGGCAACCGTGGTGGCTTACGGCGGTGATTTTGGCGATA  
595▶ LeuGlnGlyGlyPheValTrpAspTrpValAspGlnSerLeuI leLysTyrAspGluAsnGlyAsnProTrpSerAlaTyrGlyGlyAspPheGlyAspT  
Eco47III (3059)

2995 CGCCGAACGATCGCCAGTTCTGTATGAACGGTCTGGTCTTTGCCGACCGCACGCCGATCCAGCGCTGACGGAAAGCAAAACACCAGCAGCAGTTTTTCCA  
628▶ hrProAsnAspArgGlnPheCysMetAsnGlyLeuValPheAlaAspArgThrProHisProAlaLeuThrGluAlaLysHisGlnGlnGlnPhePheG  
SacI (3164)

3095 GTTCCGTTTATCCGGGCAAACCATCGAAGTGACCAGCGAATACCTGTTCCGTCATAGCGATAACGAGCTCCTGCACTGGATGGTGGCGCTGGATGGTAA  
661▶ nPheArgLeuSerGlyGlnThrI leGluValThrSerGluTyrLeuPheArgHisSerAspAsnGluLeuLeuHisTrpMetValAlaLeuAspGlyLys  
3195 CCGCTGGCAAGCGGTGAAGTGCCTCTGGATGTCGCTCCACAAGGTAACAGTTGATTGAACTGCCTGAACTACCGCAGCCGGAGAGCGCCGGCACTCT  
695▶ ProLeuAlaSerGlyGluValProLeuAspValAlaProGlnGlyLysGlnLeuI leGluLeuProGluLeuProGlnProGluSerAlaGlyGlnLeuT  
3295 GGCTCACAGTACGCGTAGTGCAACCGAACCGACCGCATGGTCAGAAGCCGGGCACATCAGCGCCTGGCAGCAGTGGCGTCTGGCGAAAACCTCAGTGT  
728▶ rpLeuThrValArgValValGlnProAsnAlaThrAlaTrpSerGluAlaGlyHisI leSerAlaTrpGlnGlnTrpArgLeuAlaGluAsnLeuSerVa  
3395 GACGCTCCCCGCGCTCCACGCCATCCCGCATCTGACCACCGCAAAATGGATTTTTGCATCGAGCTGGTAATAAGCGTTGGCAATTTAACCGCCAG  
761▶ IThrLeuProAlaAlaSerHisAlaI leProHisLeuThrThrSerGluMetAspPheCysI leGluLeuGlyAsnLysArgTrpGlnPheAsnArgGln  
3495 TCAGGCTTTCTTTCACAGATGTGGATTGGCGATAAAAAACAACCTGCTGACCGCTGCGCGATCAGTTACCCGTGCACCGCTGGATAACGACATTTGGC  
795▶ SerGlyPheLeuSerGlnMetTrpI leGlyAspLysLysGlnLeuLeuHisThrProGluArgAspGlnPheThrArgAlaProLeuAspAsnAlaI leGlyV  
3595 TAAGTGAAGCGACCCGATTGACCTAACGCCTGGTTCGAACGCTGGAAGCGCGGGCCATTACCAGGCCAAGCAGCGTTGTTGCAGTGCACGGCAGA  
828▶ alSerGluAlaThrArgI leAspProAsnAlaTrpValGluArgTrpLysAlaAlaGlyHisTyrGlnAlaGluAlaAlaLeuLeuGlnCysThrAlaAs  
3695 TACACTTGCTGATGCGGTGCTGATTACGACCGCTCACGCTGGCAGCATCAGGGGAAAACCTTATTTATCAGCCGAAAACCTACCGGATTGATGGTAGT  
861▶ pThrLeuAlaAspAlaValLeuI leThrThrAlaHisAlaTrpGlnHisGlnGlyLysThrLeuPheI leSerArgLysThrTyrArgI leAspGlySer  
3795 GGTCAAATGGCGATTACCGTTGATGTTGAAGTGGCGAGCGATACCCGCATCCGGCGGATTGGCCTGAACTGCCAGCTGGCGCAGGTAGCAGAGCGGG  
895▶ GlyGlnMetAlaI leThrValAspValGluValAlaSerAspThrProHisProAlaArgI leGlyLeuAsnCysGlnLeuAlaGlnValAlaGluArgV  
Bst1107I (3986)  
BspLU11I (3983) BsiWI (3994)

3895 TAAACTGGCTCGGATTAGGGCCGAAGAAAATATCCCGACCGCCTTACTGCCGCTGTTTTGACCGCTGGGATCTGCCATTGTCAGACATGTATACCCC  
928▶ alAsnTrpLeuGlyLeuGlyProGlnGluAsnTyrProAspArgLeuThrAlaAlaCysPheAspArgTrpAspLeuProLeuSerAspMetTyrThrPr  
3995 GTACGCTTCCCGAGCGAAAACGGTCTGCGCTGCGGGACCGCGAATTGAATTATGGCCACACCAGTGGCGCGGGACTTCCAGTTCAACATCAGCCGC  
961▶ oTyrValPheProSerGluAsnGlyLeuArgCysGlyThrArgGluLeuAsnTyrGlyProHisGlnTrpArgGlyAspPheGlnPheAsnI leSerArg  
NdeI (4181)

4095 TACAGTCAACAGCAACTGATGGAACAGCCATCGCCATCTGCTGCACGCGGAAGAAGGCACATGGCTGAATATCGACGGTTTCCATATGGGAGATTGGTG  
995▶ TyrSerGlnGlnGlnLeuMetGluThrSerHisArgHisLeuLeuHisAlaGluGluGlyThrTrpLeuAsnI leAspGlyPheHisMetGlyI leGlyG  
4195 GCACGACTCCTGGAGCCCGTCAATCGCGGAAATACAGCTGAGCGCCGCTGCTACCATTACCAGTTGGTCTGGTGTCAAAAATAATAACTAGTGC  
1028▶ lyAspAspSerTrpSerProSerValSerAlaGluLeuGlnLeuSerAlaGlyArgTyrHisTyrGlnLeuValTrpCysGlnLys•••  
NheI (4303)  
EcoRI (4297)

4295 AGAATTCGCTAGCTCGACATGATAAGATACATTGATGAGTTTGGACAACCCACAACCTAGAATGCAGTGAAAAAATGCTTTATTTGTGAAATTTGTGATG  
MfeI (4477)

4395 CTATTGCTTTATTTGTGAAATTTGTGATGCTATTGCTTTATTTGTAACCATTATAAGCTGCAATAAACCAAGTTAACACAACCAATTGCATTCTTTTATG  
SwaI (4568)

4495 TTTCAAGTTTCAAGGGGAGGTGTGGGAGGTTTTTAAAGCAAGTAAAACCTCTACAAATGTGGTAGATCCATTTAAATGTTAATTAACCTAGCCATGACCAA  
AATCCCTTAACGTGAGTTTTCTTCCACTGAGCGTCAGACCCGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTCTGCGCGTAATCTGCTGC  
TTGCAAAACAAAAAACCCGCTACCAGCGGTGTTTTGTTGCGGATCAAGAGCTACCAACTCTTTTTCCGAAGGTAAGTGGCTTACGAGAGCGCAGA  
TACCAAATACTGTTCTTCTAGTGTAGCCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAATCCTGTTACCAGT  
GGCTGCTGCCAGTGGCGATAAGTCGTGCTTACCAGGTTGGACTCAAGACGATAGTTACCGGATAAGGCGCAGCGGTGCGGCTGAACGGGGGTTCTGTC  
ACACAGCCAGCTTGGAGCGAACGACCTACCCGAACCTGAGATACCTACAGCGTGAGCTATGAGAAAGCGCCACGCTTCCGAAGGGAGAAAGCGGACA  
GGTATCCGGTAAGCGGAGGCTCGAACAGGAGAGCGCACGAGGGAGCTTCCAGGGGAAACGCCTGGTATCTTTATAGTCTGTGCGGTTTCGCCACCT  
CTGACTTGAGCGTGCATTTTTGTGATGCTCGTCAAGGGGGCGGAGCCTATGGAAAAACGCCAGCAACCGCGCCTTTTTACGGTTCCTGGCCTTTTGTG  
BspLU11I (5306) AseI (5344)

5295 CTTTTGCTCACTGTTCTTAATTAATTTTTCAAAGTAGTTGACAATTAATCATCGGCATAGTATATCGGCATAGTATAACGACTCACTATAGGAG  
SfiI (5395) MscI (5406)

5395 GGCCATCATGGCCAAAGTTGACCAGTGTGTCAGTGTCCAGTGTCCAGCCAGGGATGTGGCTGGAGCTGTTGAGTTCTGGACTGACAGGTTGGGGTCTCCAGA  
1▶ MetAlaLysLeuThrSerAlaValProValLeuThrAlaArgAspValAlaGlyAlaValGluPheTrpThrAspArgLeuGlyPheSerArg  
5495 GATTTTGTGGAGGATGACTTTGCAAGTGTGGTCCAGAGATGATGTACCCTGTTTATCTCAGCAGTCCAGGACCAGGTGGTGCCTGACAACCCCTGGCTT  
32▶ AspPheValGluAspAspPheAlaGlyValValArgAspAspValThrLeuPheI leSerAlaValGlnAspGlnValValProAspAsnThrLeuAlaT  
5595 GGGTGTGGGTGAGAGGACTGGATGAGCTGATGCTGAGTGGAGTGGGTGCTCCACCACTTCCAGGATGCCAGTGGCCCTGCCATGACAGAGATTGG  
65▶ rpValTrpValArgGlyLeuAspGluLeuTyrAlaGluTrpSerGluValValSerThrAsnPheArgAspAlaSerGlyProAlaMetThrGluI leG  
DraIII (5756)

5695 AGAGCAGCCTGGGGAGAGATTTCCCTGAGAGACCCAGCAGGCAACTGTGTGCACTTTGTGGCAGAGGAGCAGGACTGAGGATAAGAATTGAGTTTC  
98▶ yGluGlnProTrpGlyArgGluPheAlaLeuArgAspProAlaGlyAsnCysValHisPheValAlaGluGluGlnAsp•••  
SfiI (5804)  
EcoO109I (5804)

5795 AGAAAAGGGGGCCTGAGTGGCCCTTTTTTCAACTTAATTA