

1 agctttcaaagttctggcgatggttggtggtactggtggtggcggtggcggttttaaggcggtattcttgccgctgac
80 gttacgtgggttttggtgctggtggttcagatactggcaccggctgtaattaacaacaagggtaaaaggcatcatggc
1 Me tAl

159 ttcagaaaatatgacgccgcaggattacataggacaccacctaataaccttcagctggacctgcgtacattctcgctg
2 aSer Gl uAsnMetThr P roGl nAspTyrI l eGl yHi sHi sLeuAsnAsnLeuGl nLeuAspLeuArgThr PheSer Leu

BamHI PfIMI Sspl

238 gtggatccacaaaacccccagccaccttctggacaatcaatattgactccatggtcttctcgggtggtgctgggtctgt
29 Val AspProGl nAsnP roP roAl aThr PheTrpThr I l eAsnI l eAspSer MetPhePheSer Val Val LeuGl yLeuL

317 tgttctggtttttattccgtagcgtagccaaaaaggcgaccagcggtgtgccaggttaagtttcagaccgcgattgagct
55 euPheLeuVal LeuPheArgSer Val Al aLysLysAl aThr Ser Gl yVal P roGl yLysPheGl nThr Al a l eGl uLe

396 ggtgatcggctttgttaatggttagcgtgaaagacatgtaccatggcaaaagcaagctgattgctccgctggccctgacg
81 uVal I l eGl yPheVal AsnGl ySer Val LysAspMe tTyrHi sGl yLysSer LysLeuI l eAl aP roLeuAl aLeuThr

475 atcttctgctgggtattcctgatgaacctgatggatttactgcctatcgacctgctgccgtacattgctgaacatgtac
108 I l ePheVal TrpVal PheLeuMe tAsnLeuMe tAspLeuLeuP rol l eAspLeuLeuP roTyrI l eAl aGl uHi sVal L

Dralll

554 tgggtctgcctgcactgcgtggttccgtctgcccagctgaacgtaacgctgtctatggcactgggctatttaccct
134 euGl yLeuP roAl aLeuArgVal Val P roSer Al aAspVal l AsnVal l Thr LeuSer Me tAl aLeuGl yVal PheI l eLe

633 gattctgttttacagcatcaaatgaaaggcatcggcggcttcacgaaagagttgacgctgcagccgttcaatcactgg
160 ul l eLeuPheTyrSer I l eLysMe tLysGl yI l eGl yGl yPheThr LysGl uLeuThr LeuGl nP roPheAsnHi sTrp

712 gcgttcattcctgtcaacttaatccttgaaggggtaagcctgctgtccaaaccagtttcactcggtttgcgactgttcg
187 Al aPheI l eP roVal AsnLeuI l eLeuGl uGl yVal Ser LeuLeuSer LysP roVal Ser LeuGl yLeuArgLeuPheG

BamHI

791 gtaacatgtatgccggtgagctgattttcattctgattgctggtctgttccggtgggtggtcacagtggatcctgaatgt
213 l yAsnMetTyrAl aGl yGl uLeuI l ePheI l eLeuI l eAl aGl yLeuLeuP roTrpTrpSer Gl nTrpI l eLeuAsnVa

870 gccgtgggccattttccacatcctgatcattacgctgcaagccttcattctcatggttctgacgatcgtctatctgtcg
239 l P roTrpAl a l ePheHi sI l eLeuI l eI l eThr LeuGl nAl aPheI l ePheMetVal LeuThr I l eVal TyrLeuSer

949 atggcgtctgaagaacattaatttaccaacactactagcttttaactgaaacaaactggagactgtcatggaaaactg
266 Me tAl aSer Gl uGl uHi s 1 Me tGl uAsnLeu

BsrGI

1028 aatatggatctgctgtacatggctgccgctgtgatgatgggtctggcggcaatcggctgctgcgatcggatcggcatcc
5 AsnMe tAspLeuLeuTyrMe tAl aAl aAl aVal l MetMe tGl yLeuAl aAl a l eGl yAl aAl a l eGl yI l eGl yI l eL

1107 tcgggggtaaatcctggaaggcgcagcgcgtcaacctgatctgattcctctgctgctgactcagttctttatcgttat
31 euGl yGl yLysPheLeuGl uGl yAl aAl aArgGl nP roAspLeuI l eP roLeuLeuArgThr Gl nPhePheI l eVal l Me

1186 gggctggtggatgctatcccgatgatcgtgtaggtctgggtctgtacgtgatgttcgctgctgcgtagtaagcgttg
57 tGl yLeuVal AspAl a l eP roMe tI l eAl aVal l Gl yLeuGl yLeuTyrVal l MetPheAl aVal l Al a

EcoNI

1265 cttttatttaagagcaatatcagaacgttaactaaatagaggcattgtgctgtgaatcttaacgcaacaatcctcggc
1 Val AsnLeuAsnAl aThr I l eLeuGl y

1344 caggccatcgcgtttgtcctgttcgttctgttcgccatgaagtacgtatggccgccattaatggcagccatcgaaaaac
10 Gl nAl a l eAl aPheVal LeuPheVal LeuPheAl aMetLysTyrVal l TrpP roP roLeuMe tAl aAl a l eGl uLysA

PpuMI EcoO109I EcoNI

1423 gtcaaaaagaaattgctgacggccttgcttccgcagaacgagcacataaggaccttgaccttgcaaaggccagcgcgac
36 r gGl nLysGl uI l eAl aAspGl yLeuAl aSer Al aGl uArgAl aHi sLysAspLeuAspLeuAl aLysAl aSer Al aTh

1502 cgaccagctgaaaaagcgaaagcggaagcccaggtaatcatcgagcaggcgaacaaacgccgctcgcagattctggac
62 rAspGl nLeuLysLysAl aLysAl aGl uAl aGl nVal I l eI l eGl uGl nAl aAsnLysArgArgSer Gl nI l eLeuAsp

1581 gaagcgaagctgaggcagaacaggaacgtactaaaatcgtagccaggcgcaggcggaaattgaagccgagcgtaaac
89▶ Gl uAl aLysAl aGl uAl aGl uGl nGl uArgThr Lys I l eVal Al aGl nAl aGl nAl aGl ul l eGl uAl aGl uArgLysA

NarI

1660 gtgcccgtgaagagctgcgtaagcaagttgctatcctggctgttgctggcgccgagaagatcatcgaacgttccgtgga
115▶ r gAl aArgGl uGl uLeuArgLysGl nVal Al a l l eLeuAl aVal Al aGl yAl aGl uLys l l e l l eGl uArgSer Val As

1739 tgaagctgctaacagcgacatcgtggataaacttgtcgtgtaactgtaaggagggaggggctgatgtctgaattatta
141▶ pGl uAl aAl aAsnSerAsp l l eVal AspLysLeuVal Al aGl uLeu 1▶ MetSer Gl uPhe l l eT

1818 cggtagctcgcccctacgccaagcagcttttgactttgccgtcgaacaccaaagtgtagaacgctggcaggacatgct
6▶ hr Val Al aArgProTyrAl aLysAl aAl aPheAspPheAl aVal Gl uHi sGl nSer Val Gl uArgTrpGl nAspMetLe

BssHII

1897 ggcgtttgccgcccaggtaacccaaaacgaacaaatggcagagcttctctctgcccgcgcttgccgagaaacgctcgcc
32▶ uAl aPheAl aAl aGl uVal Thr LysAsnGl uGl nMetAl aGl uLeuLeuSer Gl yAl aLeuAl aProGl uThr LeuAl a

1976 gagtcgtttatcgcagttgctggtagcaactggacgaaaacggtcagaacctgattcgggttatggctgaaaatggct
59▶ Gl uSer Phe l l eAl aVal Al aGl yGl uGl nLeuAspGl uAsnGl yGl nAsnLeu l l eArgVal MetAl aGl uAsnGl yA

2055 gtcttaacgcgctcccggatgttctggagcagtttattcacctgcgtgccgtgagtgaggctaccgctgaggtagacgt
85▶ r gLeuAsnAl aLeuProAspVal LeuGl uGl nPhe l l eHi sLeuArgAl aVal Ser Gl uAl aThr Al aGl uVal AspVa

DrallI

NruI

2134 catttccgctgccgactgagtgaacaacagctcgcaaaatttctgctgcatggaaaacgtctgtcacgcaaagt
111▶ l l l eSer Al aAl aAl aLeuSer Gl uGl nGl nLeuAl aLys l l eSer Al aAl aMetGl uLysArgLeuSer ArgLysVal

Clal

2213 aagctgaatgccaaaatcgataagtctgtaatggcagggcgttatcatccgagcgggtgatatggctcattgatggcagcg
138▶ LysLeuAsnAl aLys l l eAspLysSer Val MetAl aGl yVal l l e l l eArgAl aGl yAspMetVal l l eAspGl ySer V

AflII

SphI

EcoRI

2292 tacgcggtcgtcttgagcgccttgacagcgtcttgagctcttaaggggactggagcatgcaactgaattccaccgaat
164▶ a l ArgGl yArgLeuGl uArgLeuAl aAspVal LeuGl nSer 1▶ MetGl nLeuAsnSer Thr Gl ul l

2371 cagcgaactgatcaagcagcgcattgctcagttcaatgttgtgagtgaaactcacaacgaaggtactattgtttctgta
8▶ eSer Gl uLeu l l eLysGl nArg l l eAl aGl nPheAsnVal Val Ser Gl uAl aHi sAsnGl uGl yThr l l eVal Ser Val

2450 agtgacggtgttatccgcattcacggcctggccgatgctatgcagggtgaaatgatctccctgccgggtaaccgttacg
35▶ SerAspGl yVal l l eArg l l eHi sGl yLeuAl aAspAl aMetGl nGl yGl uMet l l eSer LeuProGl yAsnArgTyrA

XhoI

2529 ctatcgactgaacctcgagcgcgactctgtaggtgcggttgttatgggtccgtacgctgaccttgccgaaggcatgaa
61▶ l a l l eAl aLeuAsnLeuGl uArgAspSer Val Gl yAl aVal Val MetGl yProTyrAl aAspLeuAl aGl uGl yMetLy

SfiI

ApaLI

2608 agttaaggctactggccgtatcctggaagttccggttggccgtggcctgctgggcccgtgtggttaacactctgggtgca
87▶ sVal LysAl aThr Gl yArg l l eLeuGl uVal ProVal Gl yArgGl yLeuLeuGl yArgVal Val AsnThr LeuGl yAl a

2687 ccaatcgacggtaaaggctccgctggatcacgacggcttctctgctgtagaagcaatcgctccgggcttatcgaacgtc
114▶ Pro l l eAspGl yLysGl yProLeuAspHi sAspGl yPheSer Al aVal Gl uAl a l l eAl aProGl yVal l l eGl uArgG

2766 agtccgtagatcagccggtacagaccggttataaagccgttgactccatgatcccaatcggctcgtggtcagcgtgaatt
140▶ l nSer Val AspGl nProVal Gl nThr Gl yTyrLysAl aVal AspSer Met l l ePro l l eGl yArgGl yGl nArgGl uLe

Clal

2845 gatcatcgggtgaccgtcagacaggtaaaaccgactggctatcgatgccatcatcaaccagcgcgattccggtatcaaa
166▶ ul l e l l eGl yAspArgGl nThr Gl yLysThr Al aLeuAl a l l eAspAl a l l e l l eAsnGl nArgAspSer Gl y l l eLys

2924 gctatctatgtcgtatcggccagaaagcgtccaccatttctaactggttacgtaaaactggaagagcacggcgcactgg
193▶ Al a l l eTyrVal Al a l l eGl yGl nLysAl aSer Thr l l eSerAsnVal Val ArgLysLeuGl uGl uHi sGl yAl aLeuA

3003 ctaacaccatcgttgtggtagcaaccgctctgaatccgctgcactgcaatacctggcaccgtatgccggtgccgcat
219▶ l aAsnThr l l eVal Val Val Al aThr Al aSer Gl uSer Al aAl aLeuGl nTyrLeuAl aProTyrAl aGl yAl aAl aMe

3082 ggggtgaataacttccgtgaccgcggtgaagatgcgctgatcatttacgatgacctgtctaaacaggctgttgcctaccgt
245▶ tGl yGl uTyrPheArgAspArgGl yGl uAspAl aLeu l l e l l eTyrAspAspLeuSer LysGl nAl aVal Al aTyrArg

BglII**SmaI**

3161 *cagatctccctgctgctccgtcgtccgccaggacgtgaagcattcccgggacggttttctacctccactctcgtctgc*
 272▶ Gl nI l eSer LeuLeuLeuArgArgP roP roGl yA rgGl uAl aPheP roGl yAspVal PheTyrLeuHi sSer ArgLeuL

PmlI

3240 *tggagcgtgctgcacgtgttaacgccgaatacgttgaagccttaccaaagggtgaagtgaagggaaaaccggttctct*
 298▶ euGl uArgAl aAl aArgVal AsnAl aGl uTyrVal l Gl uAl aPheThr LysGl yGl uVal l LysGl yLysThr Gl ySer Le

3319 *gaccgcactgccgattatcgaaactcaggcgggtgacgtttctgcttcggtccgaccaacgtaattctccattaccgat*
 324▶ uThrAl aLeuP rol l e l l eGl uThr Gl nAl aGl yAspVal SerAl aPheVal l P roThrAsnVal l l eSer l l eThrAsp

BglII**SmaI**

3398 *ggtcagatcttctggaaaccaacctgttcaacgccggtattcgtcctgcggttaaccgggtatttccgtatcccgtg*
 351▶ Gl yGl nI l ePheLeuGl uThrAsnLeuPheAsnAl aGl y l l eArgP roAl aVal l AsnP roGl y l l eSer Val Ser ArgV

3477 *ttggtggtgcagcacagaccaagatcatgaaaaaactgtccgggtggtatccgtaccgctctggcacagtatcgtgaact*
 377▶ al Gl yGl yAl aAl aGl nThr Lys l l eMetLysLysLeuSer Gl yGl y l l eArgThrAl aLeuAl aGl nTyrArgGl uLe

3556 *ggcagcgttctctcagtttgcacccgaccttgacgatgcaacacgtaaccagcttgaccacggtcagaaagtgaccgaa*
 403▶ uAl aAl aPheSer Gl nPheAl aSerAspLeuAspAspAl aThrArgAsnGl nLeuAspHi sGl yGl nLysVal l Thr Gl u

3635 *ctgctgaaacagaaacagtatgcccgatgtccggttgcgcagcagtctctggttctggttcgcagcagaacgtggttacc*
 430▶ LeuLeuLysGl nLysGl nTyrAl aP roMetSer Val Al aGl nGl nSer LeuVal l LeuPheAl aAl aGl uArgGl yTyrL

BstBI

3714 *tggcggatggtgaaactgtcgaaaattggcagcttcgaagccgctctgctggcttacgtcgaccgtgatcacgctccgtt*
 456▶ euAl aAspVal l Gl uLeuSer Lys l l eGl ySer PheGl uAl aAl aLeuLeuAl aTyrVal l AspArgAspHi sAl aP roLe

3793 *gatgcaagagatcaaccagaccgggtggctacaacgacgaaatcgaaggcaagctgaaaggcatcctcgattccttcaaa*
 482▶ uMetGl nGl u l l eAsnGl nThr Gl yGl yTyrAsnAspGl u l l eGl uGl yLysLeuLysGl y l l eLeuAspSer PheLys

KpnI Bsu36I**NaeI**

3872 *gcaaccaatcctggtaacgtctggcgggtacccttagggcaggccgcaaggcattgaggagaagctcatggccggcgc*
 509▶ Al aThr Gl nSer Trp 1▶ Me tAl aGl yAl

3951 *aaaagacatacgtagtaagatcgcaagcgtccagaacacgcaaaagatcactaaagcgatggagatggtcggcgttcc*
 4▶ aLysAsp l l eArgSer Lys l l eAl aSer Val l Gl nAsnThr Gl nLys l l eThr LysAl aMe tGl uMe tVal l Al aAl aSer

4030 *aaaatgctgtaaatcgaggatcgcatggcggccagccgtccttatgcgaaacctatgcgcaaaagtgattggtcaccttg*
 31▶ LysMe tArgLysSer Gl nAspArgMe tAl aAl aSer ArgP roTyrAl aGl uThr Me tArgLysVal l l eGl yHi sLeuA

MluI**SexAI**

4109 *cacacggtaatctggaatataagcacccttacctggaagaccgcgacgttaaaccgctgggctacctggtggtgctgcac*
 57▶ l aHi sGl yAsnLeuGl uTyrLysHi sP roTyrLeuGl uAspArgAspVal l LysArgVal l Gl yTyrLeuVal l Val Ser Th

4188 *cgaccgtggtttggcgggtggtttgaacattaacctgttcaaaaaactgctggcggaatgaagacctggaccgacaaa*
 83▶ rAspArgGl yLeuAl aGl yGl yLeuAsn l l eAsnLeuPheLysLysLeuLeuAl aGl uMe tLysThr TrpThrAspLys

4267 *ggcgttcaagccgacctcgcaatgatcggctcgaaggcgtgtcgttcttcaactccgtggcggaatggttgggtgcc*
 110▶ Gl yVal l Gl nAl aAspLeuAl aMe t l l eGl ySer LysGl yVal l Ser PhePheAsnSer Val l Gl yGl yAsnVal l Val Al aG

RsrII**StuI**

4346 *aggtcaccggcatgggggataacccttccctgtccgaactgatcggctccggtaaaagtgatggttcaggcctacgacga*
 136▶ l nVal l Thr Gl yMe tGl yAspAsnP roSer LeuSer Gl uLeu l l eGl yProVal l LysVal l Me tLeuGl nAl aTyrAspGl

4425 *aggccgtctggacaaactttacattgtcagcaacaaatttattaacaccatgtctcaggttccgaccatcagccagctg*
 162▶ uGl yA rgLeuAspLysLeuTyr l l eVal SerAsnLysPhe l l eAsnThr Me tSer Gl nVal l P roThr l l eSer Gl nLeu

Bcgl-2**Bcgl-1**

4504 *ctgccgttaccggcatcagatgatgatgatctgaaacataaatcctgggattacctgtacgaaccggatccgaaggcgt*
 189▶ LeuP roLeuP roAl aSerAspAspAspAspLeuLysHi sLysSer TrpAspTyrLeuTyrGl uP roAspP roLysAl aL

4583 *tgctggataccctgctgcgtcgttatgtcgaatctcaggtttatcagggcgtgggttgaaaacctggccagcagcagcgc*
 215▶ euLeuAspThr LeuLeuArgArgTyrVal l Gl uSer Gl nVal l TyrGl nGl yVal l Val l Gl uAsnLeuAl aSer Gl uGl nAl

Tth1111

6242 ttaacgccttaatcggagggtgatatggcaatgacttaccacctggacgtcgtcagcgcagagcaacaaatgttctctg
471▶ u●●● 1▶ MetAl aMetThr TyrHisLeuAspVal Val SerAl aGl uGl nGl nMetPheSer G
6321 gtctggtcagaaaaatccaggaacgggtagcgaaggtgaactggggatctaccctggccacgcaccgctgctcaccgc
19▶ l yLeuVal Gl uLys l l eGl nVal Thr Gl ySer Gl uGl yGl uLeuGl y l l eTyrProGl yHisAl aProLeuLeuThr Al
6400 cattaagcctggtatgattcgcacgtgaaacagcacgggtcacgaagagtttatctatctgtctggcggcattcttgaa
45▶ a l l eLysProGl yMet l l eArg l l eVal LysGl nHisGl yHisGl uGl uPhe l l eTyrLeuSer Gl yGl y l l eLeuGl u
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72▶ Val Gl nProGl yAsnVal Thr Val LeuAl aAspThrAl a l l eArgGl yGl nAspLeuAspGl uAl aArgAl aMetGl uA
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98▶ l aLysArgLysAl aGl uGl uHis l l eSer Ser Ser HisGl yAspVal AspTyrAl aGl nAl aSerAl aGl uLeuAl aLy

Sgfl

6637 agcgatcgcgcagctgcgcgttatcgagttgacaaaaaagcgatgtaacaccggcttgaaaagcacaagaagccagtct
124▶ sAl a l l eAl aGl nLeuArgVal l l eGl uLeuThr LysLysAl aMet
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6795 ctgttttctgtttattcattgatcgaataagagcaaaaacatccacctgacgcttaaatgaaggtactgccttaatt
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Xbal

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Xmnl

SgrAl

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7427 gtttaccgggtgtcattccgctgttatggccgcgtttgtctcattccacgcctgacactcagttccgggtaggcagttcg
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BstBI

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8138 gaccacgctcaccggctccagatttatcagcaataaaccagccagccggaagggccgagcgcagaagtggctcctgcaa
239▶ er Gl yArgGl uGl yAl aGl ySer LysAspAl a l l ePheTrpGl yAl aProLeuAl aSerArgLeuLeuProGl yAl aVa
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213▶ l LysAspAl aGl uMetTrpAsp l l eLeuGl nGl nArgSerAl aLeuThr LeuLeuGl uGl yThr LeuLeuLysArgLeu

8296 cgttgttgccattgctgcaggcatcgtggtgtcacgctcgtcgttttggtatggcttcattcagctccggttcccaacga
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Scal

Bcgl-2

Bcgl-1

8533 ttctgtgactggtgagtactcaaccaagtcattctgagaatagtgtatgcggcgaccgagttgctcttgcggcgctca
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XmnI

8612 acacgggataataccgcgccacatagcagaactttaaaagtgctcatcattggaaaacgttcttcggggcgaaaactct
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ApaLI

8691 caaggatcttaccgctgttgagatccagttcgatgtaaccactcgtgcaccaactgatcttcagcatcttttacttt
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8770 caccagcgtttctgggtgagcaaaaacaggaaggcaaaatgccgcaaaaagggaataagggcgacacggaatgttga
29 ValLeuThrGluProHisAlaPheValProLeuCysPheAlaAlaPhePheProIleLeuAlaValArgPheHisGlnI

SspI

8849 atactcatactcttcctttttcaatattattgaagcatttatcagggttattgtctcatgagcggatacatatttgaat
2 IleSerMet

8928 gtatttagaaaaataaacaataggggttccgcgcacatttccccgaaaagtgccacctgacgtctaagaaccattat

EcoO109I

9007 tatcatgacattaacctataaaaataggcgtatcacgaggccctttcgtcttcaagaattttataaacctggagcggg

9086 caatactgagctgatgagcaatttccggttcaccagtgcccttctgatgaagcgtcagcacgacgttcctgtccacggt

HindIII

9165 acgcctgcccgaatttgattcctttcagctttgcttctgtcggccctcattcgtgcgctctaggatca