



**PstI (6)**  
**SdaI (6)**      **SpeI (13)**

1 CCTGCAGGGCCCACTAGTGGAGCCGAGAGTAATTATACAAAAAGGAGGGATCGCTTCGCAAGGGGAGAGCCAGGGACCGTCCCTAAATTTCTCAGACAC

101 CCAAATCCCTGTAGCCGCCACGACAGCGGAGGAGCATGCGCCAGGGCTGAGCGCGGTAGATCAGAGCACACAAGCTCACAGTCCCGGGCGGTGGG

201 GGGAGGGGCGCGCTGAGCGGGGCCAGGGAGCTGCGCGGGGCAAACCTGGGAAAGTGGTGTCTGCTGGCTCCGCCCTTTCCCGAGGGTGGGGAGA

**HindIII (371)**

301 ACGGTATATAAGTGCAGTGTAGTTCGGTTCCTTTTTTCGCAACGGGTTTGCCGTGAGAACGAGCTGAAGCTTCGAGGGGCTCGCATCTCTCCTTCA

401 CGCGCCCGCCCTACCTGAGGCGGCCATCCACGCCGGTTGAGTCGCGTTCGCCGCTCCCGCTGTGGTGCCTCCTGAAGTTCGCTCCCGCTTAGG

501 TAAGTTTAAAGCTCAGGTCGAGACCGGGCCTTTGTCCGGCGCTCCCTTGGAGCCTACCTAGACTCAGCGGGCTCTCCACGCTTTGCTGACCCTGCTTGC

**NcoI (656)**      **NheI (694)**

601 TCAACTCTACGCTCTTTGTTTCGTTTTCTGTTCTGCGCCGTTACAGATCCAAGCCACCATTGGGGGGTTCTCATCATCATCATCATGGTATGGCTAGCA

1▶MetGl yGl ySer Hi sHi sHi sHi sHi sHi sGl yMe tAl aSer M

**Acc65I (750)**

701 TGACTGGTGGACAGCAAATGGGTCGGGATCTGTACGACGATGACGATAAGGTACCTAAGGATCAGCTTGGAGTTGATCCCGTCGTTTTACAACGTCGTGA

15▶e Thr Gl yGl yGl nGl nMe tGl yArg AspLeu Tyr Asp Asp Asp Asp Lys Val P roLys Asp Gl nLeu Gl yVal Asp P roVal Val Leu Gl nArg ArgAs

801 CTGGGAAAACCTGGCGTTACCAACTTAATCGCCTTGACGACATCCCCCTTCCGCGAGCTGGCGTAATAGCGAAGAGGCCCGCACCGATCGCCCTCC

48▶p Trp Gl uAsn P roGl yVal Thr Gl nLeu Asn ArgLeu Al aAl aHi s P roP roPhe Al aSer T rpArg Asn Ser Gl uGl uAl aGl uVal P roSer

901 CAACAGTTGCGCAGCTGAATGGCGAATGGCGCTTTGCCTGGTTCCGGCACCAGAAGCGGTGCCGAAAGCTGGTGGAGTGCATCTCTCAGAGCCG

82▶Gl nGl nLeu Arg Ser Leu Asn Gl yGl uT rpArg Phe Al aT rpPhe P roAl aP roGl uAl aVal P roGl uSer T rpLeu Gl uCys AspLeu P roGl uAl aA

1001 ATACTGTCGTCGCCCTCAAACCTGGCAGATGACGCGTTACGATGCGCCATACACCAACGTAACCTATCCATTACGGTCAATCCGCGTTTGTTC

115▶sp Thr Val Val Al P roSer Asn T rpGl nMe tHi s Gl y Tyr Gl y Gl n Asp Ser ArgLeu P roSer Gl uPhe AspLeu Ser Al aPheLeu ArgAl aGl yGl uA

1101 CACGGAGAATCCGACGGGTTGTTACTCGCTCACATTTAATGTTGATGAAAGCTGGCTACAGGAAGGCCAGACGCGAATTATTTTTGATGGCGTTAACTCG

148▶o Thr Gl uAsn P roThr Gl yCys Tyr Ser Leu Thr Phe Asn Val Asp Gl uSer T rpLeu Gl nGl uGl yGl nThr Arg I le I ePhe Asp Gl yVal Asn Ser

1201 GCGTTTCATCTGTGGTGCAACGGGCGCTGGGTCGGTTACGGCCAGGACAGTCGTTTCCGCTGTAATTTGACCTGAGCGCATTTTTACGCGCCGGAGAAA

182▶u Hi sLys P roThr Thr Gl nI eSer AspPhe Hi sVal Al aThr ArgPhe Asn AspPhe Ser ArgAl aVal Leu Gl uAl aGl uVal Gl nMe tCys Gl y

1301 ACCGCTCGCGGTGATGGTGTGCTGGAGTGACGGCAGTTATCTGGAAGATCAGGATATGTGGCGATGAGCGGCATTTTTCCGTGACGCTCGTTGCT

215▶sn ArgLeu Al aVal Me tVal Leu Arg Trp Ser Asp Gl ySer TyrLeu Gl uAsp Gl n Asp Me tT rpArg Me tSer Gl yI l ePhe Arg AspVal Ser LeuLe

1401 GCATAAACCGACTACAAAATCAGCGATTTCCATGTTGCCACTCGCTTAATGATGATTTAGCCGCGCTGACTGGAGGCTGAAGTTAGATGTGGCG

248▶u Hi sLys P roThr Thr Gl nI eSer AspPhe Hi sVal Al aThr ArgPhe Asn AspPhe Ser ArgAl aVal Leu Gl uAl aGl uVal Gl nMe tCys Gl y

1501 GAGTTGCGTGACTACCTACGGTAACAGTTTCTTTATGGCAGGTTGAAACGAGGTCGCCAGCGGCACCGCCTTTCCGGGTTGAAATTATCGATGAGC

282▶Gl uLeu Arg Asp TyrLeu ArgVal Thr Val Ser Leu Trp Gl nGl yGl uThr Gl nVal Al aSer Gl yThr Al aP roPhe Gl yGl yGl uI l eI eAsp Gl uA

1601 GTGGTGGTTATGCCGATCGCGTCACACTACGCTCTGAACGTCGAAACCCGAAACTGTGGAGCGCCGAAATCCCGAATCTCTATCGTGGGTTGTAAGT

315▶r Gl yGl yTyr Al aAsp ArgVal Thr Leu ArgLeu AsnVal I Gl uAsn P roLysLeu T rpSer Al aGl uI l eP roAsnLeu Tyr ArgAl aVal Gl uLe

1701 GCACACCGCCGACGGCAGCTGATTGAAGCAGAAGCCTGCGATGTGGTTTCCGCGAGGTGCGGATTGAAATGGTCTGCTGCTGCTGACGGCAAGCCG

348▶u Hi sThr Al aAsp Gl yThr LeuI l eGl uAl aGl uAl aCys AspVal Gl yPhe Arg Gl uVal A rgl I eGl uAsn Gl yLeuLeuLeuLeuAsn Gl yLys P ro

**EcoRV (1881)**

1801 TTGCTGATTCGAGGCGTTAACCGTCACGAGCATCATCTCTGCATGGTCAGGTCATGGATGAGCAGACGATGGTGCAGGATTCCTGCTGATGAAGCAGA

382▶LeuLeuI l eArg Gl yVal Asn ArgHi sGl uHi sHi sP roLeuHi sGl yGl nVal Me tAsp Gl uGl nThr Me tVal Gl nAspI l eLeuLeuMe tLys Gl nA

1901 ACAACTTAACGCCGTGCGCTGTTCCGATTATCCGAACCATCCGCTGTGGTACACGCTGTGCGACCCTACGGCCTGTATGGTGGATGAAGCCAATAT

415▶snAsnPheAsnAl aVal A rgCysSer Hi sTyrP roAsnHi sP roLeuT rpTyrThr LeuCysAspArgTyrGl yLeuTyrVal Val AspGl uAl aAsnI l

2001 TGAACCCACGGCATGAGCGCGGAGCCGACACCCAGCGCCGCTTACAGGCGCTTCCGTCGAGTACCGCGATGAGCGAAGCGCTAACCGCAATGGTGCAGCGCAT

448▶eGl uThr Hi sGl yMe tVal P roMe tAsnArgLeu Thr AspAspP roArgT rpLeuP roAl aMe tSer Gl uArgVal Thr ArgMe tVal Gl nArgAspArg

2101 AATCACCGAGTGTGATCATCTGGTCGCTGGGAATGAATCAGGCCACGGCCTAATCACGACGCGCTGTATCGCTGGATCAAATCTGTGCATCCTTCCC

482▶AsnHi sP roSerVal I l eI l eT rpSerLeuGl yAsnGl uSer Gl yHi sAl aAl aAsnHi sAspAl aLeuTyrArgT rpI l eLysSerVal AspP roSerA

2201 GCCCGTGCAGTATGAGCGCGGAGCCGACACCCAGCGCCGCTTACAGGCGCTTCCGTCGAGTACGCGCGCTGATGAGCGCGCTGAGCGCAATCCCGCTG

515▶r gP roVal Gl nTyrGl uGl yGl yAl aAspThr Thr Al aThr AspI l eI l eCysP roMe tTyrAl aArgVal AspGl uAspGl nP roPheP roAl aVa

2301 GCCGAAATGGTCCATCAAAAAATGGCTTTCGCTACTGGAGAGACGCGCCGCTGATCCTTTCGCAATACGCCACGGATGGGTAACAGTCTTGGCGGT

548▶I P roLysT rpSer I l eLysLysT rpLeuSerLeuP roGl yGl uThr ArgP roLeuI l eLeuCysGl uTyrAl aHi sAl aMe tGl yAsnSerLeuGl yGl y

2401 TTCGCTAAATACGCAAGCGGTTTCTGCAGTATCCCCGTTTACAGGCGCTTCCGTCGAGTGTGCTGCGACTGGTGGATGATGAAATATGATGAAAC

582▶PheAl aLysTyrT rpGl nAl aPheArgGl nTyrP roArgLeuGl nGl yGl yPheVal T rpAspT rpVal AspGl nSerLeuI l eLysTyrAspGl uAsnG

2501 GCAACCCGTGCTCGCTTACGGCGGTGATTTTGGCGATACGCCGAACGATCGCCAGTTCTGTATGAACGGTCTGGTCTTTGGCGACCGCAGCCGCATCC

615▶I yAsnP roT rpSerAl aTyrGl yGl yAspPheGl yAspThr P roAsnAspArgGl nPheCysMe tAsnGl yLeuVal PheAl aAspArgThr P roHi sP r

2601 AGCGCTGAGGAAACCAACACAGCAGCAGTTTTTCCAGTTCAGGCTTTCGCGGCAACCATCGAAGTGACCGCAATACCTGTTCCGTCATAGCGAT

648▶oAl aLeuThr Gl uAl aLysHi sGl nGl nGl nPhePheGl nPheArgLeuSer Gl yGl nThr I l eGl uVal Thr Ser Gl uTyrLeuPheArgHi sSerAsp

2701 AACGAGCTCCTGCACTGGATGTTGGCGCTGGATGGTAAGCCGCTGGCAAGCGGTGAAGTGCCTCTGGATGTGCTCCACAAGGTAACAGTTGATTGAAC

682▶AsnGl uLeuLeuHi sT rpMe tVal Al aLeuAspGl yLysP roLeuAl aSer Gl yGl uVal P roLeuAspVal Al aP roGl nGl yLysGl nLeuI l eGl uL

2801 TGCTGAACTACCGCAGGAGCGCGGCAACTTGGCTCACAGTACGCTGAGTGAACCAACCGCAGCGCATGGTGGTGGATGAGCGCAATGGTGGATGAGCGCAAT

715▶euP roGl uLeuP roGl nP roGl uSerAl aGl yGl nLeuT rpLeuThr Val A rglVal Val Gl nP roAsnAl aThr Al aT rpSer Gl uAl aGl yHi sI l eSe

2901 CGCTGGCAGCAGTGGCGTCTGGCGGAAAACCTCAGTGTGACGCTCCCCCGCGCTCCACGCCATCCCGCATCTGACCACAGCGAAATGGATTTTTGC

748▶r Al aT rpGl nGl nT rpArgLeuAl aGl uAsnLeuSerVal ThrLeuP roAl aThrLeuP roAl aSerHi sAl aI l eP roHi sLeuThr Thr Ser Gl uMe tAspPheCys

3001 ATCGACTGGGTAATAGCGTTTGGCAATTTAACCGCCAGTCAGGCTCTTTTACAGATTCAGAGTATGGCGATAAAAAACCACTGCTGAGCGCAATGGGTA

782▶I l eGl uLeuGl yAsnLysArgT rpGl nPheAsnArgGl nSer Gl yPheLeuSer Gl nMe tT rpI l eGl yAspLysLysGl nLeuLeuThr P roLeuArgA

3101 ATCAGTTACCCGTCACCGCTGGATAACGACATTTGGCGTAAGTGAAGCGACCCGCAATGACCTAACCCGCTGGTTCGAACGCTGGAAGGCGCGGGGCCA

815▶spGl nPheThrArgAl aP roLeuAspAsnAspI l eGl yAl aSer Gl uAl aThr A rgl I eAspP roAsnAl aT rpVal Gl uArgT rpLysAl aAl aGl yHi

3201 TTACCGCTGAGGAAACCGGTTTTCAGTGCACGCGACATACACTGCTGATGCGGTGCTGATTACGACCGCTCAGCGTGGCAGCATCAGGGGAAACCC

848▶sTyrGl nAl aGl uAl aAl aLeuLeuGl nCysThrAl aAspThrLeuAl aAspAl aVal LeuI l eThr ThrAl aHi sAl aT rpGl nHi sGl nGl yLysThr

3301 TTATTTATCAGCCGAAAACCTACCGGATTGATGGTAGTGGTCAAATGGCGATTACCTTGTGTTGAAAGTGGCGAGCGATACACCGCATCCGGCGCGGA

882▶LeuPheI l eSerArgLysThr TyrArgI l eAspGl ySer Gl yGl nMe tAl aI l eThr Val AspVal Gl uVal Al aSerAspThr P roHi sP roAl aArgI

3401 TTGGCTGAACCTGGCGAGTGGCGCAGTAGCAGGCGGGTAACTGCTGGATAGGCGCGCAAGAAAACCTATCCGACCGCTTACTCCGCTGCTGTT

915▶I eGl yLeuAsnCysGl nLeuAl aGl nVal Al aGl uArgVal AsnT rpLeuGl yLeuGl yP roGl nGl uAsnTyrP roAspArgLeuThr Al aAl aCysPh

BspLU11I (3527)  
3501 TGACCGCTGGGATCTGCCATTGTCAGACATGTATACCCCGTACGCTCTCCCGAGCGAAAACGGTCTGCGCTGCGGGACGCGGAATTGAATTATGGCCCA  
948▶eAspArgTrpAspLeuProLeuSerAspMetTyrThrProTyrValPheProSerGluAsnGlyLeuArgCysGlyThrArgGluLeuAsnTyrGlyPro  
3601 CACCAGTGGCGCGGCGACTTCCAGTTC AACATCAGCCGCTACAGTCAACAGCAACTGATGGAAACCAGCCATCGCCATCTGCTGCACGCGGAAGAAGGCA  
982▶HisGlnTrpArgGlyAspPheGlnPheAsnIleSerArgTyrSerGlnGlnGlnLeuMetGluThrSerHisArgHisLeuLeuHisAlaGluGlyTyr  
3701 CATGGCTGAATATCGACGGTTCCATATGGGGATTGGTGGCGACGACTCCTGGAGCCCGTCAGTATCGGCGGAATTACAGCTGAGCGCCGGTCTGCTACCA  
1015▶hrTrpLeuAsnIleAspGlyPheHisMetGlyIleGlyGlyAspAspSerTrpSerProSerValSerAlaGluLeuGlnLeuSerAlaGlyArgTyrHis

NheI (3847)

EcoRI (3841)  
3801 TTACAGTTGGTCTGGTGTCAAAAATAATAATCTAGTCGAGAATTCGCTAGCTCGACATGATAAGATACATTGATGAGTTTGGACAAACCACAAC TAGAA  
1048▶sTyrGlnLeuValTrpCysGlnLys●●●  
3901 TGCAGTGAAAAAATGCTTTATTTGTGAAATTTGTGATGCTATTGCTTTATTTGTGAAATTTGTGATGCTATTGCTTTATTTGTAACCATTATAAGCTGC  
4001 AATAAACAAGTTAACAACAACAATTGCATTCATTTTATGTTTCAGGTTTCAGGGGAGGTGTGGGAGGTTTTTTAAAGCAAGTAAACCTCTACAAATGTG

PaeI (4122)

SwaI (4112)  
4101 GTAGATCCATTTAAATGTTAATTAAGTACGCATGACCAAAATCCCTTAACGTGAGTTTTCTGTTCCACTGAGCGTCAGACCCCGTAGAAAAGATCAAAGGA  
4201 TCTTCTTGAGATCCTTTTTTCTGCGCGTAATCTGCTGCTTGCAAACAAAAAACCCCGCTACCAGCGGTGTTTTGTTTGCCGGATCAAGAGCTACCAA  
4301 CTCTTTTTCCGAAGGTAAGTGGCTTTCAGCAGAGCGCAGATACAAATACTGTTCTTAGTGAGCCGTAGTTAGGCCACCACCTTCAAGAAGCTGTGAGC  
4401 ACCGCCTACATACCTCGCTCTGCTAATCCTGTTACCAGTGGCTGCTGCCAGTGCCGATAAGTCGTGTCTTACCAGGTTGGACTCAAGACGATAGTTACCG  
4501 GATAAGGCGCAGCGGTGGGCTGAACGGGGGTTCTGTCACACAGCCAGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTAT  
4601 GAGAAAGCGCCACGCTTCCCGAAGGGAGAAAGCGGACAGGTATCCGGTAAGCGGAGGGTCGGAACAGGAGAGCGCACGAGGGAGCTTCCAGGGGAAAA  
4701 CGCCTGGTATCTTTATAGTCTGCGGGTTTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGCGGAGCCTATGGAAAAACGCC

PaeI (4862)

BspLU11I (4850)

AseI (4888)

4801 AGCAACGCGGCTTTTTACGGTTCCTGGCCTTTTGTGGCCTTTTGTCTCACATGTTCTTAATTAATTTTTCAAAGTAGTTGACAATTAATCATCGGCA  
4901 TAGTATATCGGCATAGTATAATACGACTCACTATAAGGAGGCCATCATGGCCAAGTTGACCAGTGCTGTCCAGTGCTCACAGCCAGGGATGTGGCTGGA  
5001 GCTGTTGAGTTCTGACTGACAGGTTGGGTTCTCCAGAGATTTTGTGGAGGATGACTTTCAGGTGTGGTCAGAGATGATGCACCCTGTTTCATCTCAG  
5101 CAGTCCAGGACCAGTGGTGCCTGACAACACCTGGCTTGGGTGGGTGAGAGGACTGGATGAGCTGTATGCTGAGTGGAGTGAGGTGGTCTCCACCAA  
5201 CTTCAGGGATGCCAGTGGCCTGCCATGACAGAGATTGGAGAGCAGCCCTGGGGAGAGAGTTTGCCTGAGAGACCCAGCAGGCAACTGTGTGCACTTT

PaeI (5371)

5301 GTGGCAGAGGAGCAGGACTGAGGATAAGAATTGTAACAAAAACCCCGCCCGGGGGTTTTTTGTTAATTAA