



GCACAATTCTCATGTTTGACAGCTTATCATCGACTGCACGGTGCACCAATGCTTCTGGCGTCAGGCAGCCATCGG  
CGTGTTAAGAGTACAACTGTCTGAATAGTAGCTGACGTGCCACGTGGTTACGAAGACCGCAGTCCGTCGGTAGCC

1275

AAGCTGTGGTATGGCTGTGCAGGTCGTAATCACTGCATAATTCGTGTCGCTCAAGGCGCACTCCCGTTCTGGAT  
TTCGACACCATAACCGACACGTCCAGCATTAGTGACGTATTAAGCACAGCGAGTTCGCGTGTAGGGCAAGACCTA

1350

AATGTTTTTTGCGCCGACATCATAACGGTTCTGGCAAATATTCTGAAATGAGCTGTTGACAATTAATCATCGGCT  
TTACAAAAACGCGGCTGTAGTATTGCCAAGACCGTTTATAAGACTTTACTCGACAACGTTAATTAGTAGCCGA

1425

tac promoter

CGTATAATGTGTGGAATTGTGAGCGGATAACAATTTACACACAGGAAACAGCCAGTCCGTTTAGGTGTTTTACGA  
GCATATTACACACCTTAACACTCGCCTATTGTTAAAGTGTGTCCTTTGTCGGTCAGGCAAATCCACAAAAGTGCT

1500

tac promoter

lac operator

NdeI

GCACTTCACCAACAAGGACCATAGCATATGAAAATCGAAGAAGGTAACCTGGTAATCTGGATTAACGGCGATAAA  
CGTGAAGTGGTTGTTCCCTGGTATCGTATACTTTTAGCTTCTTCCATTTGACCATTAGACCTAATTGCCGCTATTT

1575

1	5	10	15
Met	Lys	Ile	Glu
Gly	Lys	Leu	Val
Ile	Trp	Ile	Asn
Gly	Asp	Lys	

MBP

GGCTATAACGGTCTCGCTGAAGTCGGTAAGAAATTCGAGAAAGATACCGGAATTAAGTCACCGTTGAGCATCCG  
CCGATATTGCCAGAGCGACTTCAGCCATTCTTTAAGCTCTTTCTATGGCCTTAATTTTCAGTGGCAACTCGTAGGC

1650

20	25	30	35	40
Gly	Tyr	Asn	Gly	Leu
Ala	Glu	Val	Gly	Lys
Lys	Lys	Phe	Glu	Lys
Asp	Thr	Gly	Ile	Lys
Val	Thr	Val	Glu	His
Pro				

MBP

GATAAACTGGAAGAGAAATTCCCACAGGTTGCGGCAACTGGCGATGGCCCTGACATTATCTTCTGGGCACACGAC  
CTATTTGACCTTCTCTTTAAGGGTGTCCAACGCCGTTGACCGCTACCGGGACTGTAATAGAAGACCCGTGTGCTG

1725

Asp Lys Leu Glu Glu Lys Phe Pro Gln Val Ala Ala Thr Gly Asp Gly Pro Asp Ile Ile Phe Trp Ala His Asp

MBP

CGCTTTGGTGGCTACGCTCAATCTGGCCTGTTGGCTGAAATCACCCCGGACAAAGCGTTCCAGGACAAGCTGTAT  
GCGAAACCACCGATGCGAGTTAGACCGGACAACCGACTTTAGTGGGGCCTGTTTCGCAAGGTCCTGTTTCGACATA

1800

Arg Phe Gly Gly Tyr Ala Gln Ser Gly Leu Leu Ala Glu Ile Thr Pro Asp Lys Ala Phe Gln Asp Lys Leu Tyr

MBP

CCGTTTACCTGGGATGCCGTACGTTACAACGGCAAGCTGATTGCTTACCGATCGCTGTTGAAGCGTTATCGCTG  
GGCAAATGGACCCTACGGCATGCAATGTTGCCGTTTCGACTAACGAATGGGCTAGCGACAACCTTCGCAATAGCGAC

1875

Pro Phe Thr Trp Asp Ala Val Arg Tyr Asn Gly Lys Leu Ile Ala Tyr Pro Ile Ala Val Glu Ala Leu Ser Leu

MBP

ATTTATAACAAAGATCTGCTGCCGAACCCGCCAAAAACCTGGGAAGAGATCCCGGCGCTGGATAAAGAACTGAAA  
TAAATATTGTTTCTAGACGACGGCTTGGGCGGTTTTTGGACCTTCTCTAGGGCCGCGACCTATTTCTTGACTTT

1950

Ile Tyr Asn Lys Asp Leu Leu Pro Asn Pro Pro Lys Thr Trp Glu Glu Ile Pro Ala Leu Asp Lys Glu Leu Lys

MBP

GCGAAAGGTAAGAGCGCGCTGATGTTCAACCTGCAAGAACCGTACTTCACCTGGCCGCTGATTGCTGCTGACGGG  
CGCTTTCCATTCTCGCGGACTACAAGTTGGACGTTCTTGGCATGAAGTGGACCGGCGACTAACGACGACTGCC

2025

Ala Lys Gly Lys Ser Ala Leu Met Phe Asn Leu Gln Glu Pro Tyr Phe Thr Trp Pro Leu Ile Ala Ala Asp Gly

MBP

GGTTATGCGTTCAAGTATGAAAACGGCAAGTACGACATTAAGACGTGGGCGTGGATAACGCTGGCGCGAAAGCG  
CCAATACGCAAGTTCATACTTTTGGCGTTCATGCTGTAATTTCTGCACCCGCACCTATTGCGACCGCGCTTTTCG

2100

Gly Tyr Ala Phe Lys Tyr Glu Asn Gly Lys Tyr Asp Ile Lys Asp Val Gly Val Asp Asn Ala Gly Ala Lys Ala

MBP

GGTCTGACCTTCTGTTGACCTGATTA AAAACAAACACATGAATGCAGACACCGATTACTCCATCGCAGAAGCT  
CCAGACTGGAAGGACCAACTGGACTAATTTTTGTTTGTACTTACGTCTGTGGCTAATGAGGTAGCGTCTTCGA

2175

Gly Leu Thr Phe Leu Val Asp Leu Ile Lys Asn Lys His Met Asn Ala Asp Thr Asp Tyr Ser Ile Ala Glu Ala

MBP

GCCTTTAATAAAGGCGAAACAGCGATGACCATCAACGGCCCGTGGGCATGGTCCAACATCGACACCAGCAAAGTG  
CGGAAATTATTTCCGCTTTGTCGCTACTGGTAGTTGCCGGGCACCCGTACCAGGTTGTAGCTGTGGTCGTTTCAC

2250

Ala Phe Asn Lys Gly Glu Thr Ala Met Thr Ile Asn Gly Pro Trp Ala Trp Ser Asn Ile Asp Thr Ser Lys Val

MBP

AATTATGGTGTAAACGGTACTGCCGACCTTCAAGGGTCAACCATCAAACCGTTTCGTTGGCGTGCTGAGCGCAGGT  
TTAATACCACATTGCCATGACGGCTGGAAGTTCACAGTTGGTAGGTTTGGCAAGCAACCGCAGACTCGCGTCCA

2325

Asn Tyr Gly Val Thr Val Leu Pro Thr Phe Lys Gly Gln Pro Ser Lys Pro Phe Val Gly Val Leu Ser Ala Gly

MBP

ATTAACGCCGCCAGTCCGAACAAAGAGCTGGCAAAGAGTTCTCGAAAACCTATCTGCTGACTGATGAAGGTCTG  
TAATTGCGGCGGTCAGGCTTGTCTCGACCGTTTTCTCAAGGAGCTTTTGATAGACGACTGACTACTTCCAGAC

2400

Ile Asn Ala Ala Ser Pro Asn Lys Glu Leu Ala Lys Glu Phe Leu Glu Asn Tyr Leu Leu Thr Asp Glu Gly Leu

MBP

GAAGCGGTTAATAAAGACAAACCGCTGGGTGCCGTAGCGCTGAAGTCTTACGAGGAAGAGTTGGTGAAGATCCG  
CTTCGCCAATTATTTCTGTTTGGCGACCCACGGCATCGCGACTTCAGAATGCTCCTTCTCAACCACTTTCTAGGC

2475

295 300 305 310 315  
Glu Ala Val Asn Lys Asp Lys Pro Leu Gly Ala Val Ala Leu Lys Ser Tyr Glu Glu Glu Leu Val Lys Asp Pro  
MBP

CGGATTGCCGCCACTATGGAAAACGCCAGAAAGGTGAAATCATGCCGAACATCCCGCAGATGTCCGCTTTCTGG  
GCCTAACGGCGGTGATACCTTTTGGCGGTCTTTCCACTTTAGTACGGCTTGTAGGGCGTCTACAGGCGAAAGACC

2550

320 325 330 335 340  
Arg Ile Ala Ala Thr Met Glu Asn Ala Gln Lys Gly Glu Ile Met Pro Asn Ile Pro Gln Met Ser Ala Phe Trp  
MBP

TATGCCGTGCGTACTGCGGTGATCAACGCCGCCAGCGGTCGTCAGACTGTCGATGAAGCCCTGAAAGACGCGCAG  
ATACGGCACGCATGACGCCACTAGTTGCGGGCGGTCGCCAGCAGTCTGACAGCTACTTCGGGACTTTCTGCGCGTC

2625

345 350 355 360 365  
Tyr Ala Val Arg Thr Ala Val Ile Asn Ala Ala Ser Gly Arg Gln Thr Val Asp Glu Ala Leu Lys Asp Ala Gln  
MBP

**SacI**

**EcoRI**

ACTAATTCGAGCTCGAACAACAACAATAACAATAACAACAACCTCGGGATCGAGGGAAGGATTTTCAGAATTC  
TGATTAAGCTCGAGCTTGTGTTGTTGTTATTGTTATTGTTGTTGGAGCCCTAGCTCCCTTCTAAAGTCTTAAG

2700

Thr Asn Ser Ser Ser Asn Asn Asn Asn Asn Asn Asn Asn Leu Gly 1 Ile Glu Gly Arg Ile Ser Glu Phe  
MBP (in frame with MBP) Factor Xa site MCS

**BamHI**

**XbaI**

**SalI**

**HindIII**

GGATCCTCTAGAGTCGACCTGCAGGCAAGCTTGGCACTGGCCGTCGTTTTACAACGTCGTGACTGGGAAAACCT  
CCTAGGAGATCTCAGCTGGACGTCCGTTTGAACCGTGACCGGCAGCAAAATGTTGCAGCACTGACCCCTTTTGGGA

2775

Gly Ser Ser Arg Val Asp Leu Gln Ala Ser Leu Ala Leu Ala Val Val Leu Gln Arg Arg Asp Trp Glu Asn Pro  
(in frame with Factor Xa site)

MCS

M13 fwd

GGCGTTACCCAACCTTAATCGCCTTGCAGCACATCCCCCTTTCGCCAGCTGGCGTAATAGCGAAGAGGCCCGCACC  
CCGCAATGGGTTGAATTAGCGGAACGTCGTGTAGGGGAAAGCGGTCGACCGCATTATCGCTTCTCCGGGCGTGG

2850

Gly Val Thr Gln Leu Asn Arg Leu Ala Ala His Pro Pro Phe Ala Ser Trp Arg Asn Ser Glu Glu Ala Arg Thr  
(in frame with Factor Xa site)