

BGT07_T02a-pET16-DEST

```
5'  ttcttgaagacgaaagggcctcgtgatacgcctatTTTTATAGGTTAATGTCATGATAATAATGGTTTCT
0  +-----+-----+-----+-----+-----+-----+-----+-----+-----+
3'  aagaacttctgcttcccgggagcactatgCGGATAAAAATATCCAATTACAGTACTATTATTACCAAAGA
```

70

Zral
Aatl

```
5'  tagacgtcaggtggcacttttcggggaaatgtgCGCGGAACCCCTATTTGTTATTTTTCTAAATACATT
0  +-----+-----+-----+-----+-----+-----+-----+-----+-----+
3'  atctgcagtcaccCGTGAAGCCCTTTACACGCGCCTTGGGGATAAACAAATAAAAAGATTTATGTA
```

140

```
5'  caaatatgtatccgctcatgagacaataaccctgataaatgcttcaataatattgAAAAGGAAGAGTAT
0  +-----+-----+-----+-----+-----+-----+-----+-----+-----+
3'  gTTTATACATAGGCGAGTACTCTGTTATTGGGACTATTACGAAGTTATTATAACTTTTTCTTCTCATA
```

210

```
5'  gagtattcaacatttccgtgtCGCCCTTATCCCTTTTTGCGGCATTTGCTTCTCTGTTTTGCTCAC
0  +-----+-----+-----+-----+-----+-----+-----+-----+-----+
3'  CTCATAAGTTGTAAGGCACAGCGGGAATAAGGGAAAAAACGCCGTA AACCGGAAGGACAAAAACGAGTG
```

280

Ap

```
5'  ccagaaacgctggtgaaagtaaagatgctgaagatcagttGGGTGCACGAGTGGTTACATCGAAGTGG
0  +-----+-----+-----+-----+-----+-----+-----+-----+-----+
3'  GGTCTTTCGACCACTTTCATTTCTACGACTTCTAGTCAACCACGTGCTCACCCAATGTAGCTTGACC
```

350

Ap

```
5'  atctcaacagcggtaagatccttgagagtttcgccccgaagaacgttttccaatgatgagcacttttaa
0  +-----+-----+-----+-----+-----+-----+-----+-----+-----+
3'  TAGAGTTGTCGCCATTTCTAGGAACTCTCAAAGCGGGGCTTCTTGCAAAGGTACTACTCGTGAAAATT
```

420

Ap

```
5'  agttctgctatgtggcgcggtattatcccgtgTTGACGCCGGGCAAGAGCAACTCGGTGCGCGCATACAC
0  +-----+-----+-----+-----+-----+-----+-----+-----+-----+
3'  TCAAGACGATACACC GCGCCATAATAGGGCACAACCTGCGGCCGTTCTCGTTGAGCCAGCGGCGTATGTG
```

490

Ap

Scal

```
5'  tattctcagaatgacttgggtgagtactcaccagtcacagaaaagcatcttacggatggcatgacagtaa
0  +-----+-----+-----+-----+-----+-----+-----+-----+-----+
3'  ATAAGAGTCTTACTGAACCAACTCATGAGTGGTCAGTGTCTTTTCGTAGAAATGCCTACC GTACTGTCAAT
```

560

Ap

Pvul

```
5'  gagaattatgcagtgctGCCATAACCATGAGTGATAACACTGCGGCCAACTTACTTCTGACAACGATCGG
0  +-----+-----+-----+-----+-----+-----+-----+-----+-----+
3'  CTCTTAATACGTCACGACGGTATTGGTACTCACTATTGTGACGCCGGTTGAATGAAGACTGTTGCTAGCC
```

630

Ap

BGT07_T02a-pET16-DEST

5' aggaccgaaggagctaaccgcttttttgcacaacatgggggatcatgtaactcgccttgatcgttgggaa
 0
 3' tectggcttctcgcattggcgaaaaaacgtggtgtaccccctagtacattgagcggaaactagcaaccctt
 0
 0
 0

700

Ap

PstI

5' ccggagctgaatgaagccataccaaacgacgagcgtgacaccacgatgcctgcagcaatggcaacaacgt
 0
 3' ggccctcgacttacttcgggatggtttgctgctcgcaactgtgggtgctacggacgtcgttaccgttggtgca
 0
 0
 0

770

Ap

5' tgcgcaaactattaactggcgaactacttactctagcttcccggcaacaattaatagactggatggaggc
 0
 3' acgctttgataattgaccgcttgatgaatgagatcgaagggccggttgtaattatctgacctacctccg
 0
 0
 0

840

Ap

5' ggataaagttgcaggaccacttctgcgctcggcccttccggctggctggtttatgctgataaatctgga
 0
 3' cctatttcaacgtcctgggtgaagacgcgagccgggaaggccgaccgaccaataacgactatntagacct
 0
 0
 0

910

Ap

BsaI

5' gccggtgagcgtgggtctcgcggtatcattgcagcactggggccagatggtaagccctcccgtatcgtag
 0
 3' cggccactcgcaccagagcgcctatagtaacgtcgtgaccccggtctaccattcgggagggcatagcatc
 0
 0
 0

980

Ap

AhdI

5' ttatctacacgacggggagtccaggcaactatggatgaacgaaatagacagatcgctgagataggtgcctc
 0
 3' aatagatgtgctgcccctcagtcctgtgatacctacttgctttatctgtctagcactctatccacggag
 0
 0
 0

1050

Ap

5' actgattaagcattggtaactgtcagaccaagtttactcatatatacttttagattgatttaaacttcat
 0
 3' tgactaattcgtaaccattgacagctctggttcaaattgagtatatatgaaatctaactaaatttgaaagta
 0
 0
 0

1120

Ap

5' ttttaatttaaaggatctaggtgaagatccttttgataatctcatgaccaaactccttaacgtgagt
 0
 3' aaaattaaattttcctagatccacttctaggaaaaactattagagtactggtttttagggaattgcactca
 0
 0
 0

1190

5' tttcgttccactgagcgtcagaccccgtagaaaagatcaaaggatcttcttgagatccttttttctgcg
 0
 3' aaagcaaggtgactcgcagctctggggcatcttttctagtttctagaagaactctaggaaaaaaagacgc
 0
 0
 0

1260

Ori

BGT07_T02a-pET16-DEST

```

5'  cgtaatctgctgcttgcaaacaaaaaaaaaccaccgctaccagcgggtggtttgtttgccggatcaagagcta
o  +++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|
3'  gcattagacgacgaacgtttgtttttttggtggcgatggtcgccaccaaaacaaacggcctagttctcgat
o  _____
o  Ori
o  _____

```

1330

```

5'  ccaactcttttccgaaggtaactggcttcagcagagcgcagataccaaatactgtccttctagtgtagc
o  +++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|
3'  ggttgagaaaaaggcttccattgaccgaagtcgtctcgcgtctatggtttatgacaggaagatcacatcg
o  _____
o  Ori
o  _____

```

1400

```

5'  cgtagttaggccaccacttcaagaactctgtagcaccgcctacatacctcgctctgctaactcctgttacc
o  +++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|
3'  gcatcaatccgggtggtgaagttcttgagacatcgtggcggatgtatggagcgcgagacgattaggacaatgg
o  _____
o  Ori
o  _____

```

1470

```

5'  agtggctgctgccagtgggcgataagtcgtgtcttaccgggttgactcaagacgatagttaccggataag
o  +++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|
3'  tcaccgacgacggtcaccgctattcagcacagaatggcccaacctgagttctgctatcaatggcctattc
o  _____
o  Ori
o  _____

```

1540

```

5'  gcgcagcggtcgggctgaacggggggttcgtgcacacagcccagcttgagcgaacgacctacaccgaac
o  +++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|
3'  cgcgctgccagcccagcttgccecccaagcacgtgtgtcgggtcgaacctcgcttgctggatgtggcttg
o  _____
o  Ori
o  _____

```

1610

```

5'  tgagatacctacagcgtgagctatgagaaagcggccagcttcccgaagggagaaagggcggacaggtatcc
o  +++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|
3'  actctatggatgtcgcactcgatactctttcgcgggtgcgaagggcttccctctttccgcctgtccatagg
o  _____
o  Ori
o  _____

```

1680

```

5'  ggtaagcggcagggctcggaacaggagagcgcacgagggagcttccagggggaacgcctgggatctttat
o  +++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|
3'  ccattcgcctgcccagccttgtcctctcgcgtgctccctcgaaggtccccctttgaggacctatagaaata
o  _____
o  Ori
o  _____

```

1750

```

5'  agtcctgtcgggttccgccacctctgacttgagcgtcgatttttgtgatgctcgtcaggggggaggagcc
o  +++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|
3'  tcaggacagcccaaagcgggtggagactgaactcgcagctaaaaaactacgagcagtccccccgcctcgg
o  _____
o  Ori
o  _____

```

1820

```

o
o
o
5'  tatggaaaaacgccagcaacgcggccttttacggttcctggccttttgetggccttttgetcacatggt
o  +++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|
3'  ataccttttgcggtcgttgcgccggaataatgccaaggaccggaaaacgaccggaaaacgagtgataca
o  _____
o  Ori
o  _____

```

1890

Pcil

```

5'  ctttcctgcttatcccctgattctgtggataaccgtattaccgcctttgagtgagctgataaccgctcgc
o  +++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|++++|
3'  gaaaggacgcaataggggactaagacacctattggcataatggcggaactcactcgactatggcgagcg
o
o

```

1960

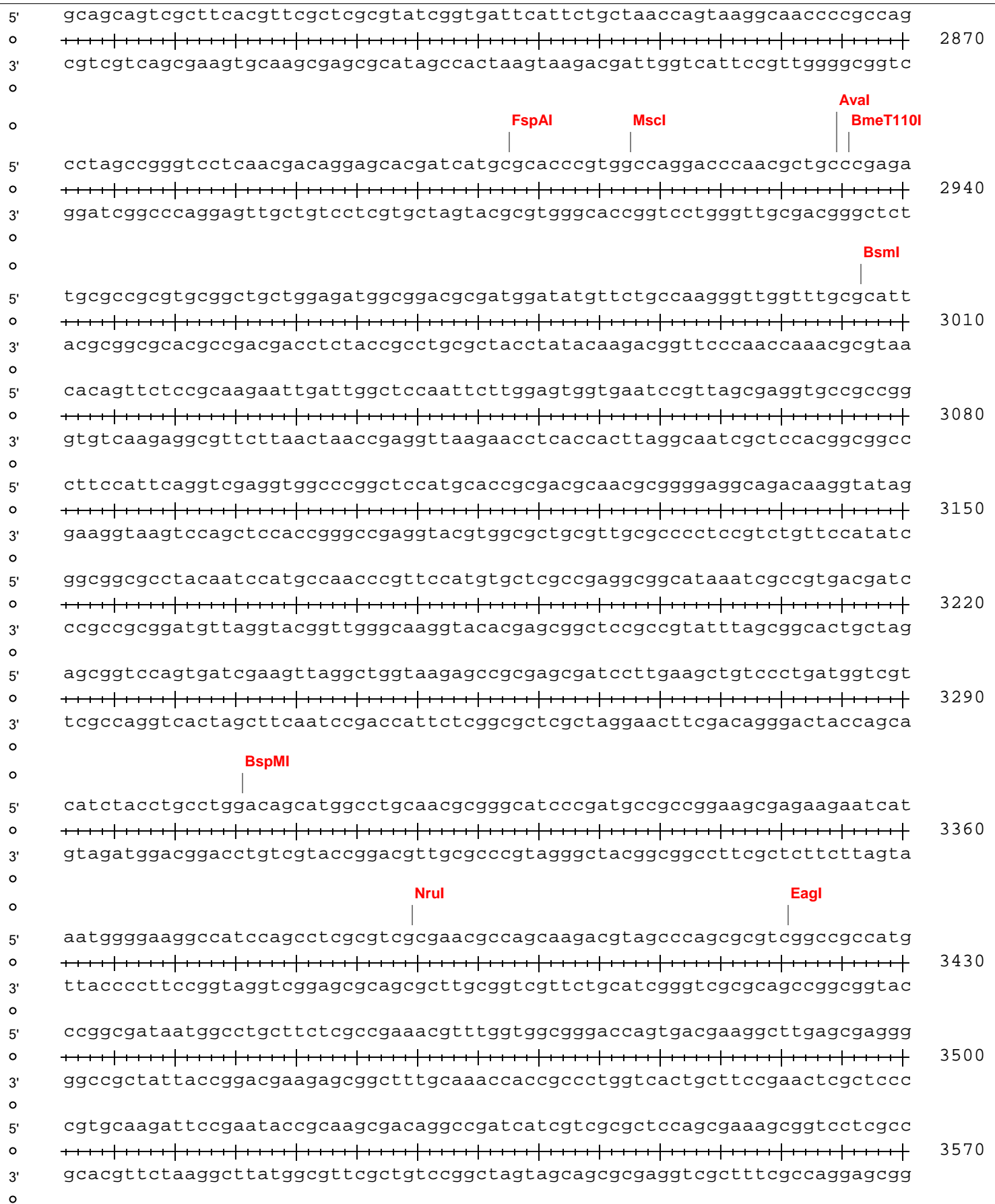
BGT07_T02a-pET16-DEST

```

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o ++++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|
3' gcgctcggccttgctggctcgcgctcgcctcagtcactcgcctccttcgctccttcgcggactacgccataaaag
o
5' tccttacgcatctgtgvcggtat tt cacaccgcatatatgggtgcactctcagtacaaatctgctctgatgcc
o ++++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|
3' aggaatgvcgtagacacgccataaagtgtggcgtatataccacgtgagagtcagtgttagacgagactacgg
o
o
o Accl
o BstZ17I
o
o BsaAI
o Tth111I
5' gcatagttaagccagatatacactccgctatcgctacgtgactgggtcatggctgcgccccgcaccgcc
o ++++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|
3' cgtatcaattcggtcataatgtagggcgatagcgatgcactgaccagtagccgacgcggggctgtgggcg
o
5' aacaccgctgacgcgccctgacgggcttgcctgcctcccggcatccgcttacagacaagctgtgaccgtc
o ++++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|
3' ttgtgggcgactgcgvcgggactgcccgaacagacgagggccgtaggcgaatgctgttccgacactggcag
o
5' tccgggagctgcatgtgtcagaggttttcaccgtcatcaccgaaacgcgcgaggcagctgvcggtaaagct
o ++++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|
3' aggccctcgcagctacacagctctccaaaagtgccagtagtggtcttcgvcgctccgtcgcaccatttcga
o
5' catcagcgtggctgctgaagcgattcacagatgtctgcctgttcatccgcgtccagctcgttgagtttctc
o ++++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|
3' gtatgcgaccagcacttcgctaagtgtctacagacggacaagtaggvcgaggtcgagcaactcaaagag
o
5' cagaagvcgtaaagctgctggcttctgataaagcgggcatgtaaagggcgggttttttccctgtttggctcact
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o
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3' ctacggaggcacattccccctaaagacaagtaccccccattactatggctactttgtctctctcctacgagt
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5' cgatacgggttactgatgatgaacatgcccgggttactggaacgttgtgagggtaaacaactggvcggtatg
o ++++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|
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3' ctacgccgccctggctctctt ttttagtgagtcacaggttacggctcgcgaagcaattatgtctacatccacaa
o
5' ccacagggttagccagcagcatcctgcgatgcagatccggaacataatgggtgcagggcgcctgacttccgcg
o ++++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|
3' ggtgtcccatcggctcgtcgttaggacgctacgtctaggccttgtattaccacgtcccgcgactgaaggvcg
o
o
o
o Bpu10I
o
5' tttccagactttacgaaacacggaacccgaagaccattcatggttgttgcctcaggtcgcagacg ttttgca
o ++++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|+++++|
3' aaaggctcgaatgctttgtgcctt tggcttctggtaagtacacaacgcaggtccagvcgctctgcaaacgc
o

```

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5' gaaaatgacccagagcgctgccggcacctgtcctacgagttgcatgataaagaagacagtcataagtgcg 3640
 +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
 3' cttttactgggtctcgcgacggccgtggacaggatgctcaacgtactatcttctctgtcagatttcacgc

PshAI
 |

5' gcgacgatagtcacatgccccgcgccaccggaaggagctgactgggttgaaggctctcaaggcatcggtc 3710
 +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
 3' cgctgctatcagtacggggcgcgggtggccttcctcgcactgacccaacttccgagagttcccgtagccag

5' gagatcccgggtgcctaataatgagtgagctaacttacattaattgcggtgcgctcactgcccgtttccagtc 3780
 +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
 3' ctctagggccacggattactcactcgattgaatgtaattaacgcaacgcgagtgacggggcgaagggtcag

Lac I
 ←-----

BsaXI'
 |

5' gggaaacctgtcgtgccagctgcattaatgaatcggccaacgcgcggggagaggcggtttgcgatttggg 3850
 +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
 3' cccttggacagcacggctcgacgtaataacttagccggttgcgcgccctctccgccaacgcataacc

Lac I

BsaXI
 |

5' cgccaggggtgggtttttcttttcaccagtgagacgggcaacagctgattgccttcaccgcctggccctga 3920
 +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
 3' gcggtcccaccaaagaaaagtggtcactctgcccgttgtcgactaacgggaagtggcggaccgggact

Lac I

HpaI
 |

5' gagagttgcagcaagcgggtccacgctgggttgccccagcaggcgaaaatcctgttgatgggtggttaacg 3990
 +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
 3' ctctcaacgctggttcgccaggtgacgacaaacggggctcgctccgcttttaggacaaactaccaccaattgc

Lac I

5' gcgggatataacatgagctgtcttcggtatcgtcgtatcccactaccgagatatccgcaccaacgcgcag 4060
 +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
 3' cgccctatattgtactcgacagaagccatagcagcatagggatgatggctctataggcgtgggtgcgcgctc

Lac I

BssHII
 |

5' cccggactcggtaatggcgcgcattgcgccagcgcacatctgatcgttggcaaccagcatcgcagtgggga 4130
 +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
 3' gggcctgagccattaccgcgcgtaacgcgggtcgcggtagactagcaaccgcttggtcgtagcgtcacct

Lac I

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 3' tgctacgggagtaagtcgtaaacgtaccaaacacttttggcctgtaccgtgaggtcagcgggaagggcaa

Lac I

BGT07_T02a-pET16-DEST

5' cgcctatcggctgaatttgattgctgagtgagatatttatgccagccagccagacgcagacgcgcccagagac 4270

0 ++++++

3' ggcgatagccgacttaaactaacgctcactctataaatacggctcggtcggtctgctgctgctgcgcggtctg

0 ----- Lac I -----

0

0

0 PspOMI Apal BstEII

5' agaacttaatgggcccgctaacagcgcgatttgctggtgacccaatgcgaccagatgctccacgcccagt 4340

0 ++++++

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0 ----- Lac I -----

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0

0

5' cgcgtaccgtcttcatgggagaaaataactggttgatgggtgctggtcagagacatcaagaataacg 4410

0 ++++++

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0 ----- Lac I -----

0

0

0

0 BclI

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0 ++++++

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0 MluI

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0 ++++++

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0 ----- Lac I -----

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0

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0 ++++++

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0 ----- Lac I -----

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0

0

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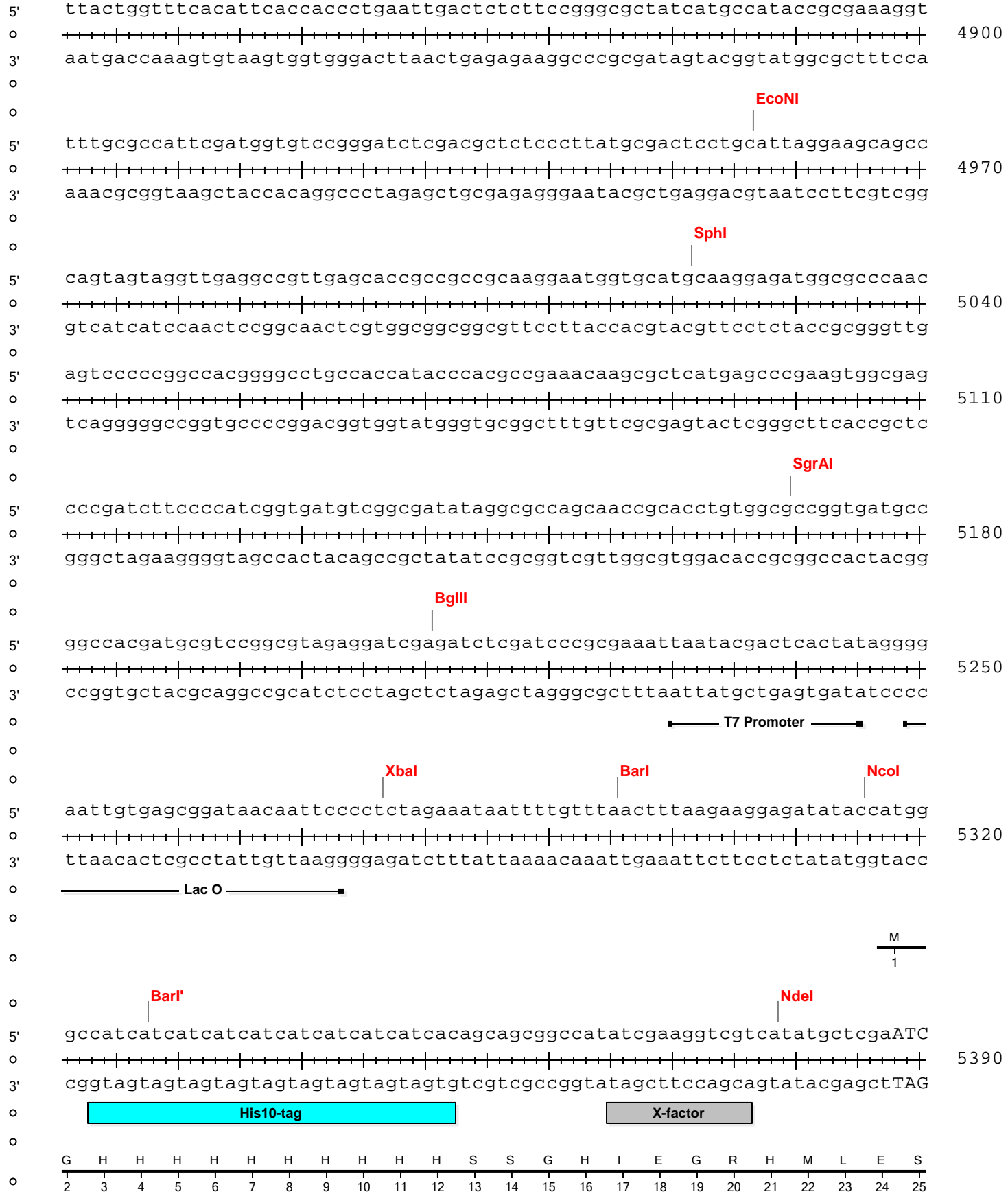
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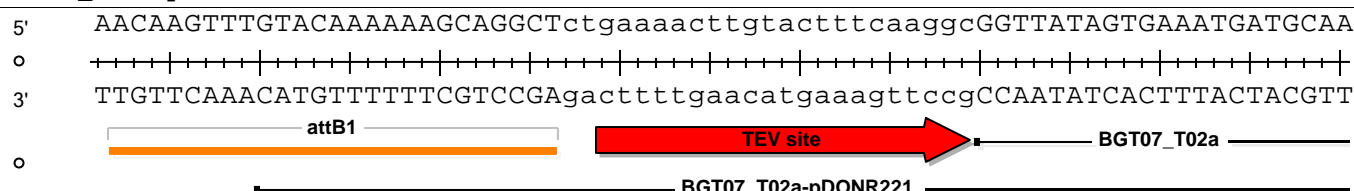
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BGT07_T02a-pET16-DEST



G	H	H	H	H	H	H	H	H	H	S	S	G	H	I	E	G	R	H	M	L	E	S	
2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

BGT07_T02a-pET16-DEST



T S L Y K K A G S E N L Y F Q G G Y S E M M Q
 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48

5460

5' AAGATGGCTCTTATCATTCCCTTATCGTAATCGAGAAGAGCATCTAAAAATATTTCTCACAGAGTTCCCAG
 0
 3' TTCTACCGAGAATAGTAAGGAATAGCATTAGCTCTTCTCGTAGATTTTTATAAAGAGTGTCTCAAGGGTC

5530

K M A L I I P Y R N R E E H L K I F L T E F P
 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71

BseRI

5' AGAAGATTCAAAAAATATCTCCTCATGTTCAATATACTATTTTTATCATTGAGCAAGCGGAGGGCAA
 0
 3' TCTTCTAAGTTTTTTATAGAGGAGTACAAGTTATATGATAAAAAATAGTAACTCGTTCGCCTCCCGTTTGA

5600

E K I Q K I S P H V Q Y T I F I I E Q A E G K L
 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95

5' TTTTAATCGAGGTAACCTTTTAAATGTTGGATATACATTAACACAAGAACTTTTGATTATTTCTGCTTT
 0
 3' AAAATTAGCTCCATTTGAAAAATTACAACCTATATGTAATTGTGTTCTTTGAAAACATAAAGACGAAA

5670

F N R G K L L N V G Y T L T Q E T F D Y F C F
 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118

Mfel

5' CATGATGTAGATATGTTACCAACTACCTCAGACTATTCCTTATCCAATTGTTCCCTACTCATCTTGCAGCTG
 0
 3' GTACTACATCTATAACAATGGTTGATGGAGTCTGATAAGAATAGGTTAACAAGGATGAGTAGAACGTCGAC

5740

H D V D M L P T T S D Y S Y P I V P T H L A A
 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141

BGT07_T02a-pET16-DEST

BmgBI

5' ACGTGAGCCAGTTTCGAGAATGGATGGGTAATGGACTTGCCTATAAAAATTATTTTGGCGGAGTTGTTTT
 3' TGCACCTCGGTCAAAGCTCTTACCTACCCATTACCTGAACGGATATTTTTAATAAAACCGCCTCAACAAA

5810

BGT07_T02a

BGT07_T02a-pDONR221

D V S Q F R E W M G N G L A Y K N Y F G G V V L
 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165

5' ATTCAACAAAGCAGATTTTGTAAAGTTAATGGGTATTCTAATCGTTATTGGGGATATGGAGTTGAAGAC
 3' TAAGTTGTTTCGTCTAAAACAATTTCAATTACCCATAAGATTAGCAATAACCCCTATACCTCAACTTCTG

5880

BGT07_T02a

BGT07_T02a-pDONR221

F N K A D F V K V N G Y S N R Y W G Y G V E D
 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188

SexAI

5' GATGATTTAATAGTTCGTGTGGTTGAAAATAACTTAAATTGGGTTTCGTAAACCAGGTGTGTATGAAAGCC
 3' CTACTAAATTATCAAGCACACCAACTTTTATTGAATTTAACCCAAGCATTGTTCCACACATACTTTTCGG

5950

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D D L I V R V V E N N L N W V R K P G V Y E S
 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211

5' TCACTCACGCTTATTCAGGAGTACTCCAGAACATCAAGCAAATAAACTCGCTTCATCAATCTTTTAAA
 3' AGTGAGTGCGAATAAGTCCTCCATGAGGTCTTGTAGTTCGTTTATTTTGAGCGAAGTAGTTAGAAAATTT

6020

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L T H A Y S G G T P E H Q A N K T R F I N L L K
 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235

5' AAATTTAGAAGAAGATTTGTCAGGTTTATCTGATCTCAATTATCAGGTTTTAAACAGCAAAATATTTTCT
 3' TTTAAATCTTCTTCTAAACAGTCCAAATAGACTAGAGTTAATAGTCCAAAATTTGTCGTTTTATAAAAGA

6090

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N L E E D L S G L S D L N Y Q V L N S K I F S
 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258

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o
 5' AATTATACCCAATATTTAGTAGATATTTAGGACCCAGCTTTCTTGTACAAAGTGGTTGATt**Bam**H**I**cgaggatcc
 o
 6160
 3' TTAATATGGGTTATAAATCATCTATAAATCCTGGGTCGAAAGAACATGTTTCACCAACTAagctcctagg
 o
 BGT07_T02a attB2
 o
 BGT07_T02a-pDONR221

N Y T Q Y L V D I .
 259 260 261 262 263 264 265 266 267 268

o
 5' ggctgctaacaagcccgaaaggaagctgagttggctgctgccaccgctgagcaataactagcataacc
 o
 6230
 3' ccgacgattgtttcgggctttccttcgactcaaccgacgacggggtggcgactcgttattgatcgtattggg
 o
 T7 Terminator

o
 5' cttggggcctctaaacgggtcttgaggggttttttggctgaaaggaggaactatatccggatatcccgcaa
 o
 6300
 3' gaaccccgagatttgcccagaactccccaaaaacgactttcctccttgatataggcctatagggcggt
 o
 T7 Terminator

o
 5' gaggccggcagtagtaccggcataaccaagcctatgcctacagcatccagggtgacgggtgccgaggatgacg
 o
 6370
 3' ctccgggccggtcatggccgtattgggtcggatacggatgtcgttaggtcccactgccacggctcctactgc

o
 5' atgagcgcattgtagatttcatacacggtgccctgactgcgtagcaatttaactgtgataaactaccgc
 o
 6440
 3' tactcgcgtaacaatctaaagtatgtgccacggactgacgcaatcgtaaattgacactatttgatggcg

o
 HindIII Clal EcoRI
 5' attaaagcttatcgatgataagctgtcaaacaatgagaa
 o
 6478
 3' taatttcgaatagctactattcgacagtttgactctt