

AseI
|
TAGTTATTAATAGTAATCAATTACGGGGTCATTAGTTCATAGCCCATATATGGAGTTCGCGTTACATAA
ATCAATAATTATCATTAGTTAATGCCCCAGTAATCAAGTATCGGGTATATACCTCAAGGCGCAATGTATT
10 20 30 40 50 60 70

Bgl I AatII
| |
CTTACGGTAAATGGCCCGCCTGGCTGACCGCCCAACGACCCCCGCCATTGACGTCAATAATGACGTATG
GAATGCCATTTACCGGGCGGACCGACTGGCGGGTTGCTGGGGGCGGGTAAGTGCAGTTATTACTGCATAC
80 90 100 110 120 130 140

AatII
|
TTCCCATAGTAACGCCAATAGGGACTTTCCATTGACGTCAATGGGTGGAGTATTTACGGTAAACTGCCCA
AAGGGTATCATTGCGGTTATCCCTGAAAGGTAAGTGCAGTTACCCACCTCATAAATGCCATTTGACGGGT
150 160 170 180 190 200 210

Bgl I NdeI AatII
| | |
CTTGGCAGTACATCAAGTGTATCATATGCCAAGTACGCCCCCTATTGACGTCAATGACGGTAAATGGCCC
GAACCGTCATGTAGTTCACATAGTATACGGTTCATGCGGGGGATAACTGCAGTTACTGCCATTTACCGGG
220 230 240 250 260 270 280

Bgl I SnaBI
| |
GCCTGGCATTATGCCCAGTACATGACCTTATGGGACTTTCCTACTTGGCAGTACATCTACGTATTAGTCA
CGGACCGTAATACGGGTCATGTACTGGAATACCCTGAAAGGATGAACCGTCATGTAGATGCATAATCAGT
290 300 310 320 330 340 350

NcoI
|
TCGCTATTACCATGGTGATGCGGTTTTTGGCAGTACATCAATGGGCGTGGATAGCGGTTTGACTCACGGGG
AGCGATAATGGTACCACTACGCCAAAACCGTCATGTAGTTACCCGCACCTATCGCCAAACTGAGTGCCCC
360 370 380 390 400 410 420

AatII
|
ATTTCCAAGTCTCCACCCCATTGACGTCAATGGGAGTTTGTGTTTGGCACCAAAATCAACGGGACTTTCCA
TAAAGGTTTCAAGGTGGGGTAACTGCAGTTACCCTCAAACAAAACCGTGGTTTTAGTTGCCCTGAAAGGT
430 440 450 460 470 480 490

AAATGTCGTAACAACTCCGCCCCATTGACGCAAATGGGCGGTAGGCGTGTACGGTGGGAGGTCTATATAA
TTTACAGCATTGTTGAGGCGGGTAACTGCGTTTACCCGCCATCCGCACATGCCACCCTCCAGATATATT
500 510 520 530 540 550 560

NheI SphI BseRI
| | |
GCAGAGCTGGTTTTAGTGAACCGTCAGATCCGCTAGCATGCTGCTATCCGTGCCGTTGCTGCTCGGCCTCC
CGTCTCGACCAAATCACTTGGCAGTCTAGGCGATCGTACGACGATAGGCACGGCAACGACGAGCCGGAGG
570 580 590 600 610 620 630

SfiI Bgl I BseRI
| | |
TCGGCCTGGCCGTCGCCGTGAGCAAGGGCGAGGAGCTGTTACCGGGGTGGTGCCCATCCTGGTCGAGCT
AGCCGGACCGGCAGCGGCACTCGTTCCCGCTCCTCGACAAGTGGCCCCACCACGGGTAGGACCAGCTCGA
640 650 660 670 680 690 700

EcoRI
HindIII
XhoI
SacI
BstBI
Bgl II
Ecl136 II

BsrGI

GATCACTCTCGGCATGGACGAGCTGTACAAGAAGGACGAGCTGTAAAGATCTCGAGCTCAAGCTTCGAAT
CTAGTGAGAGCCGTACCTGCTCGACATGTTCTTCCTGCTCGACATTTCTAGAGCTCGAGTTCGAAGCTTA

1340 1350 1360 1370 1380 1390 1400

BamHI
Bsp120 I
SacII
SmaI

Sal I
PstI
KpnI
Asp718 I
ApaI
XmaI
XbaI
Bcl I
BsaBI

TCTGCAGTCGACGGTACCGCGGGCCCGGGATCCACCGGATCTAGATAACTGATCATAATCAGCCATACCA
AGACGTCAGCTGCCATGGCGCCCGGGCCCTAGGTGGCCTAGATCTATTGACTAGTATTAGTCGGTATGGT

1410 1420 1430 1440 1450 1460 1470

DraI

CATTTGTAGAGGTTTTACTTGCTTTAAAAAACCTCCCACACCTCCCCCTGAACCTGAAACATAAAATGAA
GTAAACATCTCCAAATGAACGAAATTTTTTGAGGGTGTGGAGGGGGACTTGGACTTTGTATTTTACTT

1480 1490 1500 1510 1520 1530 1540

BsmI
MfeI
HpaI

TGCAATTGTTGTTGTTAACTTGTTTATTGCAGCTTATAATGGTTACAAATAAAGCAATAGCATCACAAAT
ACGTTAACAACAACAATTGAACAAATAACGTCGAATATTACCAATGTTTATTTTCGTTATCGTAGTGTTTA

1550 1560 1570 1580 1590 1600 1610

BsmI
Afl II

TTCACAAATAAAGCATTTTTTTCACTGCATTCTAGTTGTGGTTTGTCCAACTCATCAATGTATCTTAAG
AAGTGTATTTTCGTAAAAAAGTGACGTAAGATCAACACCAACAGGTTTGAGTAGTTACATAGAATTC

1620 1630 1640 1650 1660 1670 1680

SspI

GCGTAAATTGTAAGCGTTAATATTTTGTGTTAAATTCGCGTTAAATTTTTGTGTTAAATCAGCTCATTTTTTA
CGCATTTAACATTTCGCAATTATAAAACAATTTTAAGCGCAATTTAAAAACAATTTAGTCGAGTAAAAAAT

1690 1700 1710 1720 1730 1740 1750

ACCAATAGGCCGAAATCGGCAAAATCCCTTATAAATCAAAGAATAGACCGAGATAGGGTTGAGTGTTGT
TGGTTATCCGGCTTTAGCCGTTTTAGGGAATATTTAGTTTTCTTATCTGGCTCTATCCCAACTCACAACA

1760 1770 1780 1790 1800 1810 1820

DrdI

TCCAGTTTGAACAAGAGTCCACTATTAAGAAGCTGGACTCCAACGTCAAAGGGCGAAAAACCGTCTAT
AGGTCAAACCTTGTTCTCAGGTGATAATTTCTTGACCTGAGGTTGCAGTTTCCCGCTTTTTTGCGAGATA

1830 1840 1850 1860 1870 1880 1890

DraIII
|
CAGGGCGATGGCCCACTACGTGAACCATCACCTAATCAAGTTTTTTGGGGTTCGAGGTGCCGTAAAGCAC
GTCCCGCTACCGGGTGATGCACTTGGTAGTGGGATTAGTTCAAAAAACCCAGCTCCACGGCATTTCGTG
1900 1910 1920 1930 1940 1950 1960

NaeI
NcoMI
| |
TAAATCGGAACCCTAAAGGGAGCCCCGATTTAGAGCTTGACGGGGAAAGCCGGCGAACGTGGCGAGAAA
ATTTAGCCTTGGGATTTCCCTCGGGGGCTAAATCTCGAACTGCCCCTTTTCGGCCGCTTGCACCGCTCTTT
1970 1980 1990 2000 2010 2020 2030

BsrBI
|
GGAAGGGAAGAAAGCGAAAGGAGCGGGCGCTAGGGCGCTGGCAAGTGTAGCGGTACGCTGCGCGTAACC
CCTTCCCTTCTTTTCGCTTTCTCGCCCGCGATCCCGCGACCGTTACATCGCCAGTGCGACGCGCATTGG
2040 2050 2060 2070 2080 2090 2100

ACCACACCCGCCGCGCTTAATGCGCCGCTACAGGGCGCGTCAGGTGGCACTTTTTCGGGGAAATGTGCGCG
TGGTGTGGGCGGCGCGAATTACGCGGCGATGTCCCGCGCAGTCCACCGTGAAAAGCCCCTTTACACGCGC
2110 2120 2130 2140 2150 2160 2170

BspHI
BsrBI
| |
GAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAGACAATAACCCTGATA
CTTGGGGATAAACAATAAAAAAGATTTATGTAAGTTTATACATAGGCGAGTACTCTGTTATTGGGACTAT
2180 2190 2200 2210 2220 2230 2240

SspI EarI Bsu36 I PvuII
| | | |
AATGCTTCAATAATATTGAAAAAGGAAGAGTCCTGAGGCGGAAAGAACCAGCTGTGGAATGTGTGTCAGT
TTACGAAGTTATTATAACTTTTTCTTCTCAGGACTCCGCCTTTCTTGGTCGACACCTTACACACAGTCA
2250 2260 2270 2280 2290 2300 2310

NsiI
SphI
Ppu10 I
| | |
TAGGGTGTGGAAAGTCCCCAGGCTCCCCAGCAGGCAGAAAGTATGCAAAGCATGCATCTCAATTAGTCAGC
ATCCACACCTTTCAGGGGTCCGAGGGGTCTGTCCTTCATACGTTTCGTACGTAGAGTTAATCAGTCG
2320 2330 2340 2350 2360 2370 2380

NsiI
SphI
Ppu10 I
| | |
AACCAGGTGTGGAAAGTCCCCAGGCTCCCCAGCAGGCAGAAAGTATGCAAAGCATGCATCTCAATTAGTCA
TTGGTCCACACCTTTCAGGGGTCCGAGGGGTCTGTCCTTCATACGTTTCGTACGTAGAGTTAATCAGT
2390 2400 2410 2420 2430 2440 2450

SexAI
|
GCAACCATAGTCCCGCCCCTAACTCCGCCCATCCCGCCCCTAACTCCGCCCAGTTCCGCCCATTCTCCGC
CGTTGGTATCAGGGCGGGGATTGAGGCGGGTAGGGCGGGGATTGAGGCGGGTCAAGGCGGGTAAGAGGCG
2460 2470 2480 2490 2500 2510 2520

NcoI
|
CCCATGGCTGACTAATTTTTTTTATTTATGCAGAGGCCGAGGCCGCCTCGGCCTCTGAGCTATTCCAGAA
GGGTACCGACTGATTAATAAAAAAATAAATACGTCTCCGGCTCCGGCGGAGCCGGAGACTCGATAAGGTCTT
2530 2540 2550 2560 2570 2580 2590

SfiI
|
Bgl I
|

AvrII
|
StuI
|
BseRI
|
ClaI
|
BsaBI
|
GTAGTGAGGAGGCTTTTTTGGAGGCCTAGGCTTTTGCAAAGATCGATCAAGAGACAGGATGAGGATCGTT
CATCACTCCTCCGAAAAACCTCCGGATCCGAAAAACGTTTCTAGCTAGTTCTCTGTCCTACTCCTAGCAA
2600 2610 2620 2630 2640 2650 2660

BspMI
|
EagI
|
TCGCATGATTGAACAAGATGGATTGCACGCAGGTTCTCCGGCCGCTTGGGTGGAGAGGCTATTCGGCTAT
AGCGTACTAATTGTTCTACCTAACGTGCGTCCAAGAGGCCGGCGAACCCACCTCTCCGATAAGCCGATA
2670 2680 2690 2700 2710 2720 2730

BbeI
|
EheI
|
NarI
|
KasI
|
|
|
GACTGGGCACAACAGACAATCGGCTGCTCTGATGCCGCCGTGTTCCGGCTGTCAGCGCAGGGGCGCCCGG
CTGACCCGTGTTGTCTGTTAGCCGACGAGACTACGGCGGCACAAGGCCGACAGTCGCGTCCCCGCGGGCC
2740 2750 2760 2770 2780 2790 2800

DrdI
|
TTCTTTTTGTCAAGACCGACCTGTCCGGTGCCCTGAATGAACTGCAAGACGAGGCAGCGCGGCTATCGTG
AAGAAAAACAGTTCTGGCTGGACAGGCCACGGGACTTACTTGACGTTCTGCTCCGTCGCGCCGATAGCAC
2810 2820 2830 2840 2850 2860 2870

PvuII
|
MscI
|
FspI
|
Tth111 I
|
Eco57 I
|
GCTGGCCACGACGGGCGTTTCCTTGCGCAGCTGTGCTCGACGTTGTCACTGAAGCGGGAAGGGACTGGCTG
CGACCGGTGCTGCCCAGGAACGCGTCGACACGAGCTGCAACAGTGACTTCGCCCTTCCCTGACCGAC
2880 2890 2900 2910 2920 2930 2940

CTATTGGGCGAAGTGCCGGGGCAGGATCTCCTGTCATCTCACCTTGCTCCTGCCGAGAAAGTATCCATCA
GATAACCCGCTTCACGGCCCCGTCTAGAGGACAGTAGAGTGGAACGAGGACGGCTCTTTCATAGGTAGT
2950 2960 2970 2980 2990 3000 3010

BsrDI
|
BspMI
|
TGGCTGATGCAATGCGGCGGCTGCATACGCTTGATCCGGCTACCTGCCCATTCGACCACCAAGCGAAACA
ACCGACTACGTTACGCCGCGGACGTATGCGAACTAGGCCGATGGACGGGTAAGCTGGTGGTTTCGCTTTGT
3020 3030 3040 3050 3060 3070 3080

TCGCATCGAGCGAGCACGTACTCGGATGGAAGCCGGTCTTGTTCGATCAGGATGATCTGGACGAAGAGCAT
AGCGTAGCTCGCTCGTGCATGAGCCTACCTTCGGCCAGAACAGCTAGTCTACTAGACCTGCTTCTCGTA
3090 3100 3110 3120 3130 3140 3150

EarI
SapI
|

CAGGGGCTCGCGCCAGCCGAAGTTCGCCAGGCTCAAGGCGAGCATGCCCGACGGCGAGGATCTCGTCG
GTCCCCGAGCGCGGTTCGGCTTGACAAGCGGTCCGAGTTCCGCTCGTACGGGCTGCCGCTCCTAGAGCAGC
3160 3170 3180 3190 3200 3210 3220

SphI
|

TGACCCATGGCGATGCCTGCTTGCCGAATATCATGGTGGAAAATGGCCGCTTTTCTGGATTCATCGACTG
ACTGGGTACCGCTACGGACGAACGGCTTATAGTACCACCTTTTACGGGCGAAAAGACCTAAGTAGCTGAC
3230 3240 3250 3260 3270 3280 3290

NcoI
|

TGGCCGGCTGGGTGTGGCGGACCGCTATCAGGACATAGCGTTGGCTACCCGTGATATTGCTGAAGAGCTT
ACCGGCCGACCCACACCGCCTGGCGATAGTCCTGTATCGCAACCGATGGGCACTATAACGACTTCTCGAA
3300 3310 3320 3330 3340 3350 3360

NaeI
NcoMI
| |

RsrII
|

EarI
SapI
|

GGCGGCGAATGGGCTGACCGCTTCCTCGTGCTTTACGGTATCGCCGCTCCCGATTTCGCAGCGCATCGCCT
CCGCCGCTTACCCGACTGGCGAAGGAGCACGAAATGCCATAGCGGCGAGGGCTAAGCGTCGCGTAGCGGA
3370 3380 3390 3400 3410 3420 3430

Eco57 I
|

BssSI
|

BsrBI
|

TCTATCGCCTTCTTGACGAGTTCTTCTGAGCGGGACTCTGGGGTTTCGAAATGACCGACCAAGCGACGCCC
AGATAGCGGAAGAAGTCTCAAGAAGACTCGCCCTGAGACCCCAAGCTTTACTGGCTGGTTTCGCTGCGGG
3440 3450 3460 3470 3480 3490 3500

BsrBI
|

BstBI
|

AACCTGCCATCACGAGATTTTCGATTCCACCGCCGCCTTCTATGAAAGGTTGGGCTTCGGAATCGTTTTCC
TTGGACGGTAGTGCTCTAAAGCTAAGGTGGCGGCGGAAGATACTTTCCAACCCGAAGCCTTAGCAAAAGG
3510 3520 3530 3540 3550 3560 3570

BssSI
BspMI
|

NaeI
NcoMI
BpmI
| |

BpmI
|

AvrII
|

GGGACGCCGGCTGGATGATCCTCCAGCGCGGGGATCTCATGCTGGAGTTCTTCGCCCACCCCTAGGGGGAG
CCCTGCGGCCGACCTACTAGGAGGTGCGGCCCTAGAGTACGACCTCAAGAAGCGGGTGGGATCCCCCTC
3580 3590 3600 3610 3620 3630 3640

GCTAACTGAAACACGGAAGGAGACAATACCGGAAGGAACCCGCGCTATGACGGCAATAAAAAGACAGAAT
CGATTGACTTTGTGCCTTCCTCTGTTATGGCCTTCCTTGGGCGCGATACTGCCGTTATTTTTCTGTCTTA
3650 3660 3670 3680 3690 3700 3710

AAAACGCACGGTGTGGGTGCGTTTGTTCATAAACGCGGGGTTTCGGTCCCAGGGCTGGCACTCTGTGCGATA
TTTTGCGTGCCACAACCCAGCAAACAAGTATTTGCGCCCCAAGCCAGGGTCCCAGCGTGAGACAGCTAT

3720

3730

3740

3750

3760

3770

3780

BsaI

CCCCACCGAGACCCCAATTGGGGCCAATACGCGCGTTCCTTTTCCCCACCCACCCCCCAAGTTC
GGGGTGGCTCTGGGGTAACCCCGGTTATGCGGGCGCAAAGAAGGAAAAGGGGTGGGGTGGGGGGTTCAAG

3790

3800

3810

3820

3830

3840

3850

AlwNI

Bsu36 I

GGGTGAAGGCCAGGGCTCGCAGCCAACGTCGGGGCGGCAGGCCCTGCCATAGCCTCAGGTTACTCATAT
CCCCTTCCGGGTCCCGAGCGTCGGTTGCAGCCCCGCGTCCGGGACGGTATCGGAGTCCAATGAGTATA

3860

3870

3880

3890

3900

3910

3920

DraI

DraI

ATACTTTAGATTGATTTAAACTTTCATTTTTAATTTAAAGGATCTAGGTGAAGATCCTTTTTGATAATC
TATGAAATCTAACTAAATTTTGAAGTAAATTAATTTTCTAGATCCACTTCTAGGAAAACTATTAG

3930

3940

3950

3960

3970

3980

3990

BspHI

TCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCCCGTAGAAAAGATCAAAGG
AGTACTGGTTTTAGGGAATTGCACTCAAAGCAAGGTGACTCGCAGTCTGGGGCATCTTTTCTAGTTTCC

4000

4010

4020

4030

4040

4050

4060

ATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGCAAACAAAAAAACCACCGCTACCAGCG
TAGAAGAACTCTAGGAAAAAAGACGCGCATTAGACGACGAACGTTTGTTTTTTGGTGGCGATGGTCGC

4070

4080

4090

4100

4110

4120

4130

Eco57 I

GTGGTTTGTGGCCGGATCAAGAGCTACCAACTCTTTTTCCGAAGGTAAGTGGCTTCAGCAGAGCGCAGA
CACCAAACAAACGGCCTAGTTCTCGATGGTTGAGAAAAAGGCTTCCATTGACCGAAGTCGTCTCGCGTCT

4140

4150

4160

4170

4180

4190

4200

TACCAAATACTGTCCTTCTAGTGTAGCCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTAC
ATGGTTTATGACAGGAAGATCACATCGGCATCAATCCGGTGGTGAAGTTCTTGAGACATCGTGGCGGATG

4210

4220

4230

4240

4250

4260

4270

AlwNI

ATACCTCGCTCTGCTAATCCTGTTACCAAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTG
TATGGAGCGAGACGATTAGGACAATGGTCACCGACGACGGTCACCGCTATTGAGACAGAAATGGCCCAAC

4280

4290

4300

4310

4320

4330

4340

ApaLI

GACTCAAGACGATAGTTACCGGATAAGGCGCAGCGGTTCGGGCTGAACGGGGGGTTCGTGCACACAGCCCA
CTGAGTTCTGCTATCAATGGCCTATTCCGCGTCGCCAGCCCGACTTGCCCCCAAGCACGTGTGTCGGGT

4350

4360

4370

4380

4390

4400

4410

GCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGCGCCACGCTTCC
CGAACCTCGCTTGCTGGATGTGGCTTGACTCTATGGATGTCGCACTCGATACTCTTTCGCGGTGCGAAGG
4420 4430 4440 4450 4460 4470 4480

BssSI

CGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACAGGAGAGCGCACGAGGGAGCTT
GCTTCCCTCTTTCGCGCTGTCCATAGGCCATTGCGCGTCCAGCCTTGTCTCTCGCGTGCTCCCTCGAA
4490 4500 4510 4520 4530 4540 4550

DrdI

CCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCTGGGTTTCGCCACCTCTGACTTGAGCGTCGATTTT
GGTCCCCCTTTGCGGACCATAGAAATATCAGGACAGCCCAAAGCGGTGGAGACTGAACTCGCAGCTAAAA
4560 4570 4580 4590 4600 4610 4620

TGTGATGCTCGTCAGGGGGGCGGAGCCTATGGAAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGC
ACACTACGAGCAGTCCCCCGCCTCGGATACCTTTTTGCGGTCTGTCGCCGGAATAATGCCAAGGACCG
4630 4640 4650 4660 4670 4680 4690

BspLU11 I

CTTTTGCTGGCCTTTTGCTCACATGTTCTTTCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACC
GAAAACGACCGGAAAACGAGTGTACAAGAAAGGACGCAATAGGGGACTAAGACACCTATTGGCATAATGG
4700 4710 4720 4730 4740 4750 4760

NsiI

Ppu10 I

GCCATGCAT
CGGTACGTA
4770