5. pSMUY2+ map (1 > 5436) Site and Sequence
Enzymes : 36 of 587 enzymes (Filtered)
Settings : Circular, Certain Sites Only, Standard Genetic Code

```
GCACTTTTCGGGGAAATGTGCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATG
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
CGTGAAAAGCCCCTTTACACGCGCCTTGGGGATAAACAAATAAAAAGATTTATGTAAGTTTATAC

 A   L   F   G   E   M   C   A   E   P   L   F   V   Y   F   S   K   Y   I   Q   I   C
   H   F   S   G   K   C   A   R   N   P   Y   L   F   I   F   L   N   T   F   K   Y
 G   T   F   R   G   N   V   R   G   T   P   I   C   L   F   F   .   I   H   S   N   M
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
A   S   K   P   S   I   H   A   S   G   R   N   T   .   K   E   L   Y   M   .   I   H
  C   K   E   P   F   H   A   R   F   G   .   K   N   I   K   R   F   V   N   L   Y   T
    V   K   R   P   F   T   R   P   V   G   I   Q   K   N   K   .   I   C   E   F   I

TGAAAAAGGAAGAGTATGAGTATTCAACATTTCCGTGTCGCCCTTATTCCCTTTTTTGCGGCATT
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
ACTTTTTCCTTCTCATACTCATAAGTTGTAAAGGCACAGCGGGAATAAGGGAAAAAACGCCGTAA

    E   K   G   R   V   .   V   F   N   I   S   V   S   P   L   F   P   F   L   R   H
  L   K   K   E   E   Y   E   Y   S   T   F   P   C   R   P   Y   S   L   F   C   G   I
    .   K   R   K   S   M   S   I   Q   H   F   R   V   A   L   I   P   F   F   A   A   F
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
 S   F   P   L   T   H   T   N   L   M   E   T   D   G   K   N   G   K   K   R   C   K
   F   F   S   S   Y   S   Y   E   V   N   G   H   R   G   .   E   R   K   Q   P   M
 Q   F   L   F   L   I   L   I   .   C   K   R   T   A   R   I   G   K   K   A   A   N

AGATGCTGAAGATCAGTTGGGTGCACGAGTGGGTTACATCGAACTGGATCTCAACAGCGGTAAGA
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
TCTACGACTTCTAGTCAACCCACGTGCTCACCCAATGTAGCTTGACCTAGAGTTGTCGCCATTCT

K   M   L   K   I   S   W   V   H   E   W   V   T   S   N   W   I   S   T   A   V   R
  R   C   .   R   S   V   G   C   T   S   G   L   H   R   T   G   S   Q   Q   R   .   D
    D   A   E   D   Q   L   G   A   R   V   G   Y   I   E   L   D   L   N   S   G   K
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
  I   S   F   I   L   Q   T   C   S   H   T   V   D   F   Q   I   E   V   A   T   L
L   H   Q   L   D   T   P   H   V   L   P   N   C   R   V   P   D   .   C   R   Y   S
```

```
 S  A  S  S  .  N  P  A  R  T  P  .  M  S  S  S  R  L  L  P  L  I

CTTTTAAAGTTCTGCTATGTGGCGCGGTATTATCCCGTATTGACGCCGGGCAAGAGCAACTCGGT
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
GAAAATTTCAAGACGATACACCGCGCCATAATAGGGCATAACTGCGGCCCGTTCTCGTTGAGCCA

 L  L  K  F  C  Y  V  A  R  Y  Y  P  V  L  T  P  G  K  S  N  S  V
  F  .  S  S  A  M  W  R  G  I  I  P  Y  .  R  R  A  R  A  T  R
T  F  K  V  L  L  C  G  A  V  L  S  R  I  D  A  G  Q  E  Q  L  G
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
S  K  F  N  Q  .  T  A  R  Y  .  G  T  N  V  G  P  L  L  L  E  T
 K  .  L  E  A  I  H  R  P  I  I  G  Y  Q  R  R  A  L  A  V  R  D
  K  L  T  R  S  H  P  A  T  N  D  R  I  S  A  P  C  S  C  S  P

GTCACAGAAAAGCATCTTACGGATGGCATGACAGTAAGAGAATTATGCAGTGCTGCCATAACCAT
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
CAGTGTCTTTTCGTAGAATGCCTACCGTACTGTCATTCTCTTAATACGTCACGACGGTATTGGTA

  S  Q  K  S  I  L  R  M  A  .  Q  .  E  N  Y  A  V  L  P  .  P
S  H  R  K  A  S  Y  G  W  H  D  S  K  R  I  M  Q  C  C  H  N  H
 V  T  E  K  H  L  T  D  G  M  T  V  R  E  L  C  S  A  A  I  T  M
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
 D  C  F  L  M  K  R  I  A  H  C  Y  S  F  .  A  T  S  G  Y  G  H
  .  L  F  A  D  .  P  H  C  S  L  L  L  I  I  C  H  Q  W  L  W
T  V  S  F  C  R  V  S  P  M  V  T  L  S  N  H  L  A  A  M  V  M
```

```
ACCGAAGGAGCTAACCGCTTTTTTGCACAACATGGGGGATCATGTAACTCGCCTTGATCGTTGGG

TGGCTTCCTCGATTGGCGAAAAAACGTGTTGTACCCCCTAGTACATTGAGCGGAACTAGCAACCC

D  R  R  S  .  P  L  F  C  T  T  W  G  I  M  .  L  A  L  I  V  G
 T  E  G  A  N  R  F  F  A  Q  H  G  G  S  C  N  S  P  .  S  L  G
  P  K  E  L  T  A  F  L  H  N  M  G  D  H  V  T  R  L  D  R  W

  R  L  L  .  G  S  K  Q  V  V  H  P  I  M  Y  S  A  K  I  T  P
V  S  P  A  L  R  K  K  A  C  C  P  P  D  H  L  E  G  Q  D  N  P
 G  F  S  S  V  A  K  K  C  L  M  P  S  .  T  V  R  R  S  R  Q  S

CGATGCCTGTAGCAATGGCAACAACGTTGCGCAAACTATTAACTGGCGAACTACTTACTCTAGCT

GCTACGGACATCGTTACCGTTGTTGCAACGCGTTTGATAATTGACCGCTTGATGAATGAGATCGA

 R  C  L  .  Q  W  Q  Q  R  C  A  N  Y  .  L  A  N  Y  L  L  .  L
  D  A  C  S  N  G  N  N  V  A  Q  T  I  N  W  R  T  T  Y  S  S
T  M  P  V  A  M  A  T  T  L  R  K  L  L  T  G  E  L  L  T  L  A

R  H  R  Y  C  H  C  C  R  Q  A  F  .  .  S  A  F  .  K  S  .  S
 S  A  Q  L  L  P  L  L  T  A  C  V  I  L  Q  R  V  V  .  E  L  K
  I  G  T  A  I  A  V  V  N  R  L  S  N  V  P  S  S  S  V  R  A

GGACCACTTCTGCGCTCGGCCCTTCCGGCTGGCTGGTTTATTGCTGATAAATCTGGAGCCGGTGA

CCTGGTGAAGACGCGAGCCGGGAAGGCCGACCGACCAAATAACGACTATTTAGACCTCGGCCACT

  D  H  F  C  A  R  P  F  R  L  A  G  L  L  L  I  N  L  E  P  V
R  T  T  S  A  L  G  P  S  G  W  L  V  Y  C  .  .  I  W  S  R  .
 G  P  L  L  R  S  A  L  P  A  G  W  F  I  A  D  K  S  G  A  G  E

 S  W  K  Q  A  R  G  K  R  S  A  P  K  N  S  I  F  R  S  G  T  L
  V  V  E  A  S  P  G  E  P  Q  S  T  .  Q  Q  Y  I  Q  L  R  H
P  G  S  R  R  E  A  R  G  A  P  Q  N  I  A  S  L  D  P  A  P  S
```

```
GCCCTCCCGTATCGTAGTTATCTACACGACGGGGAGTCAGGCAACTATGGATGAACGAAATAGAC
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
CGGGAGGGCATAGCATCAATAGATGTGCTGCCCCTCAGTCCGTTGATACCTACTTGCTTTATCTG

S  P  P  V  S  .  L  S  T  R  R  G  V  R  Q  L  W  M  N  E  I  D
 A  L  P  Y  R  S  Y  L  H  D  G  E  S  G  N  Y  G  .  T  K  .  T
  P  S  R  I  V  V  I  Y  T  T  G  S  Q  A  T  M  D  E  R  N  R
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
  G  G  T  D  Y  N  D  V  R  R  P  T  L  C  S  H  I  F  S  I  S
A  R  G  Y  R  L  .  R  C  S  P  S  D  P  L  .  P  H  V  F  Y  V
 G  E  R  I  T  T  I  .  V  V  P  L  .  A  V  I  S  S  R  F  L  C

CAGACCAAGTTTACTCATATATACTTTAGATTGATTTAAAACTTCATTTTTAATTTAAAAGGATC
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
GTCTGGTTCAAATGAGTATATATGAAATCTAACTAAATTTTGAAGTAAAAATTAAATTTTCCTAG

 Q  T  K  F  T  H  I  Y  F  R  L  I  .  N  F  I  F  N  L  K  G  S
  R  P  S  L  L  I  Y  T  L  D  .  F  K  T  S  F  L  I  .  K  D
S  D  Q  V  Y  S  Y  I  L  .  I  D  L  K  L  H  F  .  F  K  R  I
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
.  V  L  N  V  .  I  Y  K  L  N  I  .  F  K  M  K  L  K  F  P  D
 L  G  L  K  S  M  Y  V  K  S  Q  N  L  V  E  N  K  I  .  F  S  R
  S  W  T  .  E  Y  I  S  .  I  S  K  F  S  .  K  .  N  L  L  I

CGTGAGTTTTCGTTCCACTGAGCGTCAGACCCCGTAGAAAAGATCAAAGGATCTTCTTGAGATCC
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
GCACTCAAAAGCAAGGTGACTCGCAGTCTGGGGCATCTTTTCTAGTTTCCTAGAAGAACTCTAGG

  V  S  F  R  S  T  E  R  Q  T  P  .  K  R  S  K  D  L  L  E  I
T  .  V  F  V  P  L  S  V  R  P  R  R  K  D  Q  R  I  F  L  R  S
 R  E  F  S  F  H  .  A  S  D  P  V  E  K  I  K  G  S  S  .  D  P
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
 T  L  K  R  E  V  S  R  .  V  G  Y  F  L  D  F  S  R  R  S  I  R
  H  T  K  T  G  S  L  T  L  G  R  L  F  S  .  L  I  K  K  L  D
R  S  N  E  N  W  Q  A  D  S  G  T  S  F  I  L  P  D  E  Q  S  G
```

```
GCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTCTTTTTCCGAAGGTAACTGGCT
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
CGATGGTCGCCACCAAACAAACGGCCTAGTTCTCGATGGTTGAGAAAAAGGCTTCCATTGACCGA

R  Y  Q  R  W  F  V  C  R  I  K  S  Y  Q  L  F  F  R  R  .  L  A
 A  T  S  G  G  L  F  A  G  S  R  A  T  N  S  F  S  E  G  N  W  L
  L  P  A  V  V  C  L  P  D  Q  E  L  P  T  L  F  P  K  V  T  G
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
  .  W  R  H  N  T  Q  R  I  L  L  .  W  S  K  K  R  L  Y  S  A
A  V  L  P  P  K  N  A  P  D  L  A  V  L  E  K  E  S  P  L  Q  S
 S  G  A  T  T  Q  K  G  S  .  S  S  G  V  R  K  G  F  T  V  P  K

AGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAATCCTGTTA
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
TCAATCCGGTGGTGAAGTTCTTGAGACATCGTGGCGGATGTATGGAGCGAGACGATTAGGACAAT

 S  .  A  T  T  S  R  T  L  .  H  R  L  H  T  S  L  C  .  S  C  Y
  V  R  P  P  L  Q  E  L  C  S  T  A  Y  I  P  R  S  A  N  P  V
.  L  G  H  H  F  K  N  S  V  A  P  P  T  Y  L  A  L  L  I  L  L
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
L  .  A  V  V  E  L  V  R  Y  C  R  R  C  V  E  S  Q  .  D  Q  .
 T  L  G  G  S  .  S  S  Q  L  V  A  .  M  G  R  E  A  L  G  T  V
  N  P  W  W  K  L  F  E  T  A  G  G  V  Y  R  A  R  S  I  R  N

GACTCAAGACGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACA
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
CTGAGTTCTGCTATCAATGGCCTATTCCGCGTCGCCAGCCCGACTTGCCCCCCAAGCACGTGTGT

  T  Q  D  D  S  Y  R  I  R  R  S  G  R  A  E  R  G  V  R  A  H
G  L  K  T  I  V  T  G  .  G  A  A  V  G  L  N  G  G  F  V  H  T
 D  S  R  R  .  L  P  D  K  A  Q  R  S  G  .  T  G  G  S  C  T  Q
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
 V  .  S  S  L  .  R  I  L  R  L  P  R  A  S  R  P  T  R  A  C  L
  S  L  V  I  T  V  P  Y  P  A  A  T  P  S  F  P  P  N  T  C  V
S  E  L  R  Y  N  G  S  L  A  C  R  D  P  Q  V  P  P  E  H  V  C
```

```
GCGTGAGCTATGAGAAAGCGCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCG
CGCACTCGATACTCTTTCGCGGTGCGAAGGGCTTCCCTCTTTCCGCCTGTCCATAGGCCATTCGC

S  V  S  Y  E  K  A  P  R  F  P  K  G  E  R  R  T  G  I  R  .  A
 A  .  A  M  R  K  R  H  A  S  R  R  E  K  G  G  Q  V  S  G  K  R
  R  E  L  .  E  S  A  T  L  P  E  G  R  K  A  D  R  Y  P  V  S

  T  L  .  S  F  A  G  R  K  G  F  P  S  L  R  V  P  I  R  Y  A
A  H  A  I  L  F  R  W  A  E  R  L  S  F  P  P  C  T  D  P  L  R
 R  S  S  H  S  L  A  V  S  G  S  P  L  F  A  S  L  Y  G  T  L  P

ACGCCTGGTATCTTTATAGTCCTGTCGGGTTTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGA
TGCGGACCATAGAAATATCAGGACAGCCCAAAGCGGTGGAGACTGAACTCGCAGCTAAAAACACT

 T  P  G  I  F  I  V  L  S  G  F  A  T  S  D  L  S  V  D  F  C  D
  R  L  V  S  L  .  S  C  R  V  S  P  P  L  T  .  A  S  I  F  V
N  A  W  Y  L  Y  S  P  V  G  F  R  H  L  .  L  E  R  R  F  L  .

V  G  P  I  K  I  T  R  D  P  K  A  V  E  S  K  L  T  S  K  Q  S
 R  R  T  D  K  Y  D  Q  R  T  E  G  G  R  V  Q  A  D  I  K  T  I
  A  Q  Y  R  .  L  G  T  P  N  R  W  R  Q  S  S  R  R  N  K  H

GCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACATGTTCTTTCCTGCGTTATCCCC
CGGAAAAATGCCAAGGACCGGAAAACGACCGGAAAACGAGTGTACAAGAAAGGACGCAATAGGGG

  P  F  Y  G  S  W  P  F  A  G  L  L  L  T  C  S  F  L  R  Y  P
G  L  F  T  V  P  G  L  L  L  A  F  C  S  H  V  L  S  C  V  I  P
 A  F  L  R  F  L  A  F  C  W  P  F  A  H  M  F  F  P  A  L  S  P

 G  K  .  P  E  Q  G  K  A  P  R  K  S  V  H  E  K  R  R  .  G  R
  R  K  V  T  G  P  R  K  S  A  K  Q  E  C  T  R  E  Q  T  I  G
A  K  K  R  N  R  A  K  Q  Q  G  K  A  .  M  N  K  G  A  N  D  G
```

```
CGCTCGCCGCAGCCGAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAGAGCGCCCAA
GCGAGCGGCGTCGGCTTGCTGGCTCGCGTCGCTCAGTCACTCGCTCCTTCGCCTTCTCGCGGGTT

P  L  A  A  A  E  R  P  S  A  A  S  Q  .  A  R  K  R  K  S  A  Q
 R  S  P  Q  P  N  D  R  A  Q  R  V  S  E  R  G  S  G  R  A  P  N
  A  R  R  S  R  T  T  E  R  S  E  S  V  S  E  E  A  E  E  R  P

  S  A  A  A  S  R  G  L  A  A  L  .  H  A  L  F  R  F  L  A  W
R  E  G  C  G  F  S  R  A  C  R  T  L  S  R  P  L  P  L  A  G  L
 A  R  R  L  R  V  V  S  R  L  S  D  T  L  S  S  A  S  S  R  G  I
```

Pvu II

```
GCTGGCACGACAGGTTTCCCGACTGGAAAGCGGGCAGTGAGCGCAACGCAATTAATGTGAGTTAG
CGACCGTGCTGTCCAAAGGGCTGACCTTTCGCCCGTCACTCGCGTTGCGTTAATTACACTCAATC

 A  G  T  T  G  F  P  T  G  K  R  A  V  S  A  T  Q  L  M  .  V  S
  L  A  R  Q  V  S  R  L  E  S  G  Q  .  A  Q  R  N  .  C  E  L
S  W  H  D  R  F  P  D  W  K  A  G  S  E  R  N  A  I  N  V  S  .

A  P  V  V  P  K  G  V  P  F  R  A  T  L  A  V  C  N  I  H  T  L
 S  A  R  C  T  E  R  S  S  L  P  C  H  A  C  R  L  .  H  S  N  A
  Q  C  S  L  N  G  S  Q  F  A  P  L  S  R  L  A  I  L  T  L  .

CGTATGTTGTGTGGAATTGTGAGCGGATAACAATTTCACACAGGAAACAGCTATGACCATGATTA
GCATACAACACACCTTAACACTCGCCTATTGTTAAAGTGTGTCCTTTGTCGATACTGGTACTAAT

  V  C  C  V  E  L  .  A  D  N  N  F  T  Q  E  T  A  M  T  M  I
S  Y  V  V  W  N  C  E  R  I  T  I  S  H  R  K  Q  L  .  P  .  L
 R  M  L  C  G  I  V  S  G  .  Q  F  H  T  G  N  S  Y  D  H  D  Y

 T  H  Q  T  S  N  H  A  S  L  L  K  V  C  S  V  A  I  V  M  I  V
```

```
  Y  T  T  H  F  Q  S  R  I  V  I  E  C  L  F  C  S  H  G  H  N
R  I  N  H  P  I  T  L  P  Y  C  N  .  V  P  F  L  .  S  W  S  .

                        Ava I                 Ava I
  Kpn I  Apa I   Nsi I  Xho I     Bgl II        Sma I

ACCGGGCCCTTATGCATGGTCTCGAGGGTAGATCTGGTGCCCGGGGTGGTGCTGGTGCCGGAGCC

TGGCCCGGGAATACGTACCAGAGCTCCCATCTAGACCACGGGCCCCACCACGACCACGGCCTCGG


Y  R  A  L  M  H  G  L  E  G  R  S  G  A  R  G  G  A  G  A  G  A
 T  G  P  L  C  M  V  S  R  V  D  L  V  P  G  V  V  L  V  P  E  F
  P  G  P  Y  A  W  S  R  G  .  I  W  C  P  G  W  C  W  C  R  S

  R  A  R  I  C  P  R  S  P  L  D  P  A  R  P  P  A  P  A  P  A
V  P  G  K  H  M  T  E  L  T  S  R  T  G  P  T  T  S  T  G  S  G
 G  P  G  .  A  H  D  R  P  Y  I  Q  H  G  P  H  H  Q  H  R  L  F

TTCACCGGGGTGGTGCCCATCCTGGTCGAGCTGGACGGCGACGTAAACGGCCACAAGTTCAGCGT

AAGTGGCCCCACCACGGGTAGGACCAGCTCGACCTGCCGCTGCATTTGCCGGTGTTCAAGTCGCA

                                               YFP PCR fragment

 F  T  G  V  V  P  I  L  V  E  L  D  G  D  V  N  G  H  K  F  S  V
  S  P  G  W  C  P  S  W  S  S  W  T  A  T  .  T  A  T  S  S  A
V  H  R  G  G  A  H  P  G  R  A  G  R  R  R  K  R  P  Q  V  Q  R

N  V  P  T  T  G  M  R  T  S  S  S  P  S  T  F  P  W  L  N  L  T
 E  G  P  H  H  G  D  Q  D  L  Q  V  A  V  Y  V  A  V  L  E  A  H
  .  R  P  P  A  W  G  P  R  A  P  R  R  R  L  R  G  C  T  .  R
```

```
GAAGTTCATCTGCACCACCGGCAAGCTGCCCGTGCCCTGGCCCACCCTCGTGACCACCTTCGGCT
CTTCAAGTAGACGTGGTGGCCGTTCGACGGGCACGGGACCGGGTGGGAGCACTGGTGGAAGCCGA
```

YFP PCR fragment

```
  K  F  I  C  T  T  G  K  L  P  V  P  W  P  T  L  V  T  T  F  G
.  S  S  S  A  P  P  A  S  C  P  C  P  G  P  P  S  .  P  P  S  A
 E  V  H  L  H  H  R  Q  A  A  R  A  L  A  H  P  R  D  H  L  R  L
 F  N  M  Q  V  V  P  L  S  G  T  G  Q  G  V  R  T  V  V  K  P  .
  L  E  D  A  G  G  A  L  Q  G  H  G  P  G  G  E  H  G  G  E  A
S  T  .  R  C  W  R  C  A  A  R  A  R  A  W  G  R  S  W  R  R  S

ACGACTTCTTCAAGTCCGCCATGCCCGAAGGCTACGTCCAGGAGCGCACCATCTTCTTCAAGGAC
TGCTGAAGAAGTTCAGGCGGTACGGGCTTCCGATGCAGGTCCTCGCGTGGTAGAAGAAGTTCCTG
```

YFP PCR fragment

```
H  D  F  F  K  S  A  M  P  E  G  Y  V  Q  E  R  T  I  F  F  K  D
 T  T  S  S  S  P  P  C  P  K  A  T  S  R  S  A  P  S  S  S  R  T
  R  L  L  Q  V  R  H  A  R  R  L  R  P  G  A  H  H  L  L  Q  G
  S  K  K  L  D  A  M  G  S  P  .  T  W  S  R  V  M  K  K  L  S
V  V  E  E  L  G  G  H  G  F  A  V  D  L  L  A  G  D  E  E  L  V
 R  S  R  .  T  R  W  A  R  L  S  R  G  P  A  C  W  R  R  .  P  R
```

```
ACCCTGGTGAACCGCATCGAGCTGAAGGGCATCGACTTCAAGGAGGACGGCAACATCCTGGGGCA
TGGGACCACTTGGCGTAGCTCGACTTCCCGTAGCTGAAGTTCCTCCTGCCGTTGTAGGACCCCGT
```

YFP PCR fragment

```
 T  L  V  N  R  I  E  L  K  G  I  D  F  K  E  D  G  N  I  L  G  H
  P  W  .  T  A  S  S  .  R  A  S  T  S  R  R  T  A  T  S  W  G
H  P  G  E  P  H  R  A  E  G  H  R  L  Q  G  G  R  Q  H  P  G  A

V  R  T  F  R  M  S  S  F  P  M  S  K  L  S  S  P  L  M  R  P  C
 G  Q  H  V  A  D  L  Q  L  A  D  V  E  L  L  V  A  V  D  Q  P  V
  G  P  S  G  C  R  A  S  P  C  R  S  .  P  P  R  C  C  G  P  A

CGACAAGCAGAAGAACGGCATCAAGGTGAACTTCAAGATCCGCCACAACATCGAGGACGGCAGCG
GCTGTTCGTCTTCTTGCCGTAGTTCCACTTGAAGTTCTAGGCGGTGTTGTAGCTCCTGCCGTCGC
```

YFP PCR fragment

```
  D  K  Q  K  N  G  I  K  V  N  F  K  I  R  H  N  I  E  D  G  S
P  T  S  R  R  T  A  S  R  .  T  S  R  S  A  T  T  S  R  T  A  A
 R  Q  A  E  E  R  H  Q  G  E  L  Q  D  P  P  Q  H  R  G  R  Q  R

 S  L  C  F  F  P  M  L  T  F  K  L  I  R  W  L  M  S  S  P  L  T
  V  L  L  L  V  A  D  L  H  V  E  L  D  A  V  V  D  L  V  A  A
R  C  A  S  S  R  C  .  P  S  S  .  S  G  G  C  C  R  P  R  C  R
```

```
GCCCCGTGCTGCTGCCCGACAACCACTACCTGAGCTACCAGTCCGCCCTGAGCAAAGACCCCAAC
CGGGGCACGACGACGGGCTGTTGGTGATGGACTCGATGGTCAGGCGGGACTCGTTTCTGGGGTTG
```

YFP PCR fragment

```
G  P  V  L  L  P  D  N  H  Y  L  S  Y  Q  S  A  L  S  K  D  P  N
 A  P  C  C  C  P  T  T  T  T  .  A  T  S  P  P  .  A  K  T  P  T
  P  R  A  A  A  R  Q  P  L  P  E  L  P  V  R  P  E  Q  R  P  Q
```

```
  G  T  S  S  G  S  L  W  .  R  L  .  W  D  A  R  L  L  S  G  L
A  G  H  Q  Q  G  V  V  V  V  Q  A  V  L  G  G  Q  A  F  V  G  V
 G  R  A  A  A  R  C  G  S  G  S  S  G  T  R  G  S  C  L  G  W  R
```

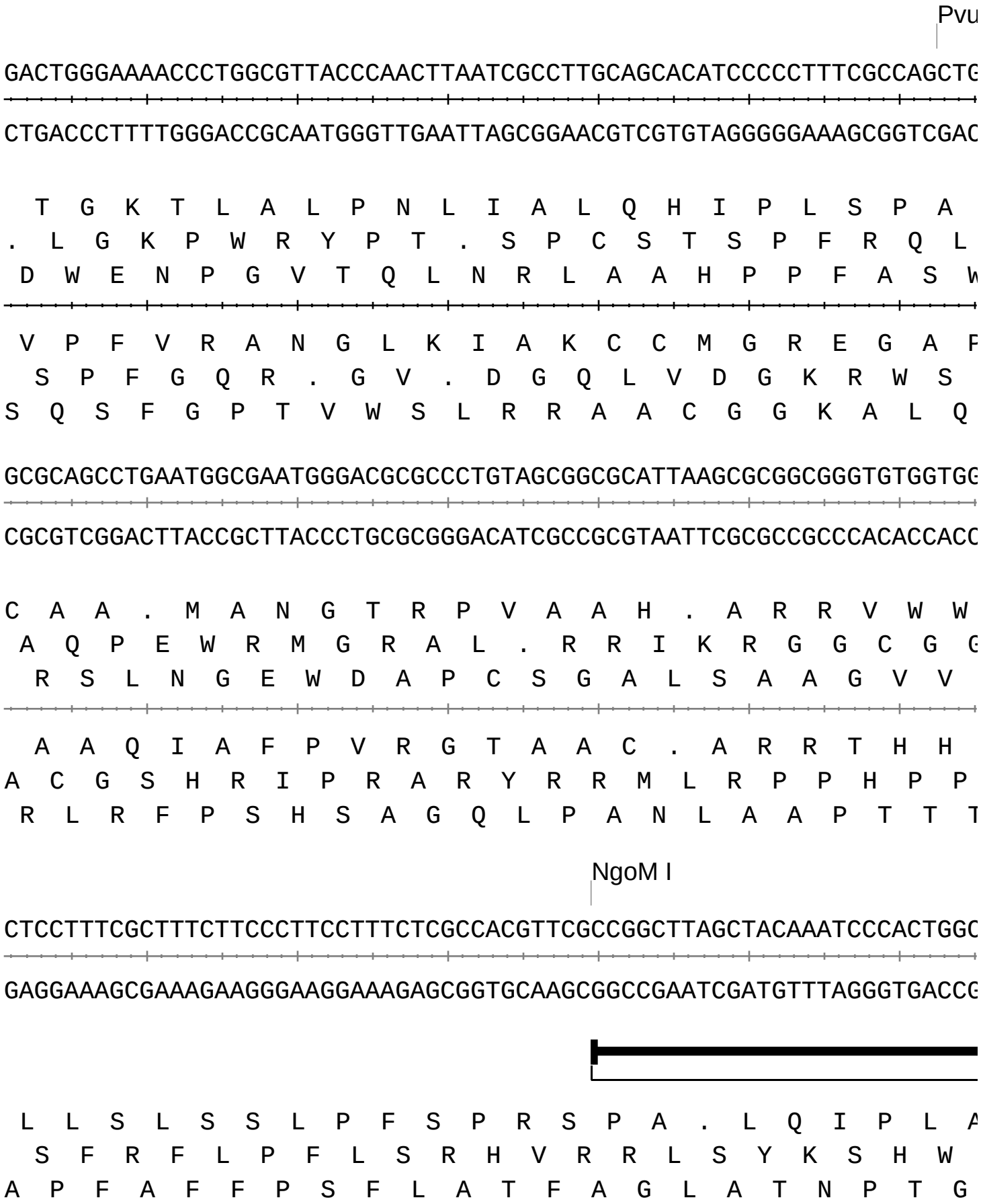
Sal I BamH I Sac I

```
GGGATCACTCTCGGCATGGACGAGCTGTACAAGGTCGACGGATCCTGAGCTCCAATTCGCCCTAT
CCCTAGTGAGAGCCGTACCTGCTCGACATGTTCCAGCTGCCTAGGACTCGAGGTTAAGCGGGATA
```

YFP PCR fragment

```
 G  I  T  L  G  M  D  E  L  Y  K  V  D  G  S  .  A  P  I  R  P  I
  G  S  L  S  A  W  T  S  C  T  R  S  T  D  P  E  L  Q  F  A  L
R  D  H  S  R  H  G  R  A  V  Q  G  R  R  I  L  S  S  N  S  P  Y
```

```
P  I  V  R  P  M  S  S  S  Y  L  T  S  P  D  Q  A  G  I  R  G  I
 P  D  S  E  A  H  V  L  Q  V  L  D  V  S  G  S  S  W  N  A  R  Y
  S  .  E  R  C  P  R  A  T  C  P  R  R  I  R  L  E  L  E  G  .
```


Pvu
GACTGGGAAAACCCTGGCGTTACCCAACTTAATCGCCTTGCAGCACATCCCCCTTTCGCCAGCTG
CTGACCCTTTTGGGACCGCAATGGGTTGAATTAGCGGAACGTCGTGTAGGGGGAAAGCGGTCGAC
T G K T L A L P N L I A L Q H I P L S P A
. L G K P W R Y P T . S P C S T S P F R Q L
D W E N P G V T Q L N R L A A H P P F A S W
V P F V R A N G L K I A K C C M G R E G A P
S P F G Q R . G V . D G Q L V D G K R W S
S Q S F G P T V W S L R R A A C G G K A L Q
GCGCAGCCTGAATGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGG
CGCGTCGGACTTACCGCTTACCCTGCGCGGGACATCGCCGCGTAATTCGCGCCGCCCACACCACC
C A A . M A N G T R P V A A H . A R R V W W
A Q P E W R M G R A L . R R I K R G G C G G
R S L N G E W D A P C S G A L S A A G V V
A A Q I A F P V R G T A A C . A R R T H H
A C G S H R I P R A R Y R R M L R P P H P P
R L R F P S H S A G Q L P A N L A A P T T T
NgoM I
CTCCTTTCGCTTTCTTCCCTTCCTTTCTCGCCACGTTCGCCGGCTTAGCTACAAATCCCACTGGC
GAGGAAAGCGAAAGAAGGGAAGGAAAGAGCGGTGCAAGCGGCCGAATCGATGTTTAGGGTGACCG
L L S L S S L P F S P R S P A . L Q I P L A
S F R F L P F L S R H V R R L S Y K S H W
A P F A F F P S F L A T F A G L A T N P T G

```
S  R  E  S  E  E  R  G  K  E  G  R  E  G  A  .  S  C  I  G  S  A
 E  K  R  K  R  G  K  R  E  R  W  T  R  R  S  L  .  L  D  W  Q  S
  G  K  A  K  K  G  E  K  R  A  V  N  A  P  K  A  V  F  G  V  P

TCTACTCAGCATTCTTTCTCTAAATAGGAATTTGTTACTTAATGGAGAAAAAAATGTTTCGATTT
AGATGAGTCGTAAGAAAGAGATTTATCCTTAAACAATGAATTACCTCTTTTTTTACAAAGCTAAA
```

URA4

```
  L  L  S  I  L  S  L  N  R  N  L  L  L  N  G  E  K  N  V  S  I
I  Y  S  A  F  F  L  .  I  G  I  C  Y  L  M  E  K  K  M  F  R  F
 S  T  Q  H  S  F  S  K  .  E  F  V  T  .  W  R  K  K  C  F  D  L

 R  S  L  M  R  E  R  F  L  F  K  N  S  L  P  S  F  F  T  E  I  .
  .  E  A  N  K  R  .  I  P  I  Q  .  K  I  S  F  F  I  N  R  N
D  V  .  C  E  K  E  L  Y  S  N  T  V  .  H  L  F  F  H  K  S  K

ATTCTATCTTGTGTAATTTTTGGCATGGTGAAAAAGATAATCAGCCTTATAATCTTTACAAAAGT
TAAGATAGAACACATTAAAAACCGTACCACTTTTTCTATTAGTCGGAATATTAGAAATGTTTTCA
```

URA4

```
H  S  I  L  C  N  F  W  H  G  E  K  D  N  Q  P  Y  N  L  Y  K  S
 I  L  S  C  V  I  F  G  M  V  K  K  I  I  S  L  I  I  F  T  K  V
  F  Y  L  V  .  F  L  A  W  .  K  R  .  S  A  L  .  S  L  Q  K

  E  I  K  H  L  K  Q  C  P  S  F  S  L  .  G  .  L  R  .  L  L
M  R  D  Q  T  I  K  P  M  T  F  F  I  I  L  R  I  I  K  V  F  T
 N  .  R  T  Y  N  K  A  H  H  F  L  Y  D  A  K  Y  D  K  C  F  Y
```

```
ATGGTTCTTTTTCATGATAATGTTTGCACTTTGTGAATATATTTTAGATAGTTCTGTGAGGTATA
TACCAAGAAAAAGTACTATTACAAACGTGAAACACTTATATAAAATCTATCAAGACACTCCATAT
```

URA4

```
 M  V  L  F  H  D  N  V  C  T  L  .  I  Y  F  R  .  F  C  E  V  .
  W  F  F  F  M  I  M  F  A  L  C  E  Y  I  L  D  S  S  V  R  Y
N  G  S  F  S  .  .  C  L  H  F  V  N  I  F  .  I  V  L  .  G  I
I  T  R  K  .  S  L  T  Q  V  K  H  I  Y  K  L  Y  N  Q  S  T  Y
 H  N  K  K  M  I  I  N  A  S  Q  S  Y  I  K  S  L  E  T  L  Y  L
  P  E  K  E  H  Y  H  K  C  K  T  F  I  N  .  I  T  R  H  P  I
```

```
TTAATTGATTTTACCATCCCAGTTTAACTATGCTTCGTCGGCATCTCTGCACATGTCGTGTTTTC
AATTAACTAAAATGGTAGGGTCAAATTGATACGAAGCAGCCGTAGAGACGTGTACAGCACAAAAG
```

URA4

```
  .  L  I  L  P  S  Q  F  N  Y  A  S  S  A  S  L  H  M  S  C  F
L  N  .  F  Y  H  P  S  L  T  M  L  R  R  H  L  C  T  C  R  V  F
 L  I  D  F  T  I  P  V  .  L  C  F  V  G  I  S  A  H  V  V  F  S
 .  N  I  K  G  D  W  N  L  .  A  E  D  A  D  R  C  M  D  H  K  R
  L  Q  N  .  W  G  L  K  V  I  S  R  R  C  R  Q  V  H  R  T  K
K  I  S  K  V  M  G  T  .  S  H  K  T  P  M  E  A  C  T  T  N  E
```

```
ATTAAAGGTTTAAAAGCAAAGTTATGGATGCTAGAGTATTTCAAAGCTATTCAGCTAGAGCTGAG
TAATTTCCAAATTTTCGTTTCAATACCTACGATCTCATAAAGTTTCGATAAGTCGATCTCGACTC
```

URA4

```
N . R F K S K V M D A R V F Q S Y S A R A E
 I K G L K A K L W M L E Y F K A I Q L E L R
  L K V . K Q S Y G C . S I S K L F S . S .

  . L N L L L T I S A L T N . L . E A L A S
I L P K F A F N H I S S Y K L A I . S S S L
 N F T . F C L . P H . L I E F S N L . L Q P

GAAAAGCAAAGCAACTTGTCAGTCGCGGTCGATTTGACGAAGAAATCCGAAATCTTAGAATTGGT
CTTTTCGTTTCGTTGAACAGTCAGCGCCAGCTAAACTGCTTCTTTAGGCTTTAGAATCTTAACCA
```

URA4

```
 E K Q S N L S V A V D L T K K S E I L E L V
  K S K A T C Q S R S I . R R N P K S . N W
R K A K Q L V S R G R F D E E I R N L R I G

S F C L L K D T A T S K V F F D S I K S N T
 F L L A V Q . D R D I Q R L F G F D . F Q Y
  F A F C S T L R P R N S S S I R F R L I P
```

```
CGTTGTCGAGGATTTCGACCAGGATATGGTAGAAAAACTGGTGGCCTTAGGTAAAAAGCATCGTT
GCAACAGCTCCTAAAGCTGGTCCTATACCATCTTTTTGACCACCGGAATCCATTTTTCGTAGCAA
```

URA4

```
  V  V  E  D  F  D  Q  D  M  V  E  K  L  V  A  L  G  K  K  H  R
T  L  S  R  I  S  T  R  I  W  .  K  N  W  W  P  .  V  K  S  I  V
 R  C  R  G  F  R  P  G  Y  G  R  K  T  G  G  L  R  .  K  A  S  F
```

```
 T  T  S  S  K  S  W  S  I  T  S  F  S  T  A  K  P  L  F  C  R  K
  N  D  L  I  E  V  L  I  H  Y  F  F  Q  H  G  .  T  F  L  M  T
R  Q  R  P  N  R  G  P  Y  P  L  F  V  P  P  R  L  Y  F  A  D  N
```

Nsi I

```
TCAAGCTACAATATGCATCTGGTGTGTACAAAATTGCTTCTTGGGCTCATATCACAAATTGCCAT
AGTTCGATGTTATACGTAGACCACACATGTTTTAACGAAGAACCCGAGTATAGTGTTTAACGGTA
```

URA4

```
V  K  L  Q  Y  A  S  G  V  Y  K  I  A  S  W  A  H  I  T  N  C  H
 S  S  Y  N  M  H  L  V  C  T  K  L  L  L  G  L  I  S  Q  I  A  I
  Q  A  T  I  C  I  W  C  V  Q  N  C  F  L  G  S  Y  H  K  L  P
```

```
  L  S  C  Y  A  D  P  T  Y  L  I  A  E  Q  A  .  I  V  F  Q  W
D  L  .  L  I  C  R  T  H  V  F  N  S  R  P  S  M  D  C  I  A  M
 .  A  V  I  H  M  Q  H  T  C  F  Q  K  K  P  E  Y  .  L  N  G  Y
```

```
TTACCTTTGGGACGTGGTCTCTTGCTTTTGGCTGAAATGTCTTCCAAAGGCTCTTTGGCTACTGG
AATGGAAACCCTGCACCAGAGAACGAAAACCGACTTTACAGAAGGTTTCCGAGAAACCGATGACC
```

URA4

```
  L  P  L  G  R  G  L  L  L  L  A  E  M  S  S  K  G  S  L  A  T  G
   Y  L  W  D  V  V  S  C  F  W  L  K  C  L  P  K  A  L  W  L  L
F  T  F  G  T  W  S  L  A  F  G  .  N  V  F  Q  R  L  F  G  Y  W
K  G  K  P  R  P  R  K  S  K  A  S  I  D  E  L  P  E  K  A  V  P
 .  R  Q  S  T  T  E  Q  K  Q  S  F  H  R  G  F  A  R  Q  S  S  T
  V  K  P  V  H  D  R  A  K  P  Q  F  T  K  W  L  S  K  P  .  Q

TTTTTGCTTTGGCTTTATAGCTGGTCGTCGATTTCCTAACCTTCAAAGCGACTACATAACTATGT
AAAAACGAAACCGAAATATCGACCAGCAGCTAAAGGATTGGAAGTTTCGCTGATGTATTGATACA
```

URA4

```
  F  C  F  G  F  I  A  G  R  R  F  P  N  L  Q  S  D  Y  I  T  M
I  F  A  L  A  L  .  L  V  V  D  F  L  T  F  K  A  T  T  .  L  C
 F  L  L  W  L  Y  S  W  S  S  I  S  .  P  S  K  R  L  H  N  Y  V
 K  Q  K  P  K  I  A  P  R  R  N  G  L  R  .  L  S  .  M  V  I  D
  K  A  K  A  K  Y  S  T  T  S  K  R  V  K  L  A  V  V  Y  S  H
N  K  S  Q  S  .  L  Q  D  D  I  E  .  G  E  F  R  S  C  L  .  T
```

EcoR V

```
AATATCGTACTCCTGAAGAAGTGATTGTAAACTGCGGTAGCGATATCATCATTGTTGGTCGTGGA
TTATAGCATGAGGACTTCTTCACTAACATTTGACGCCATCGCTATAGTAGTAACAACCAGCACCT
```

URA4

```
Q  Y  R  T  P  E  E  V  I  V  N  C  G  S  D  I  I  I  V  G  R  G
 N  I  V  L  L  K  K  .  L  .  T  A  V  A  I  S  S  L  L  V  V  E
  I  S  Y  S  .  R  S  D  C  K  L  R  .  R  Y  H  H  C  W  S  W

  Y  R  V  G  S  S  T  I  T  F  Q  P  L  S  I  M  M  T  P  R  P
L  I  T  S  R  F  F  H  N  Y  V  A  T  A  I  D  D  N  N  T  T  S
 I  D  Y  E  Q  L  L  S  Q  L  S  R  Y  R  Y  .  .  Q  Q  D  H  L

AGAGAAGCTGGTTGGAAGGCATATCAGCAAAGACTTTCTCAGCATTAAAAAAAGACTAATGTAAA
TCTCTTCGACCAACCTTCCGTATAGTCGTTTCTGAAAGAGTCGTAATTTTTTTCTGATTACATTT
```

URA4

```
 R  E  A  G  W  K  A  Y  Q  Q  R  L  S  Q  H  .  K  K  T  N  V  K
  E  K  L  V  G  R  H  I  S  K  D  F  L  S  I  K  K  R  L  M  .
.  R  S  W  L  E  G  I  S  A  K  T  F  S  A  L  K  K  D  .  C  K

L  S  A  P  Q  F  A  Y  .  C  L  S  E  .  C  .  F  F  V  L  T  F
 S  F  S  T  P  L  C  I  L  L  S  K  R  L  M  L  F  L  S  I  Y  F
  L  L  Q  N  S  P  M  D  A  F  V  K  E  A  N  F  F  S  .  H  L
```

Sca I

```
TGTTTTCCTAGGCGTTTTATGTCAGAAGGCATTTAGAATTAGTATACAAGTACTCTTTGGTAAAA
ACAAAAGGATCCGCAAAATACAGTCTTCCGTAAATCTTAATCATATGTTCATGAGAAACCATTTT
```

URA4

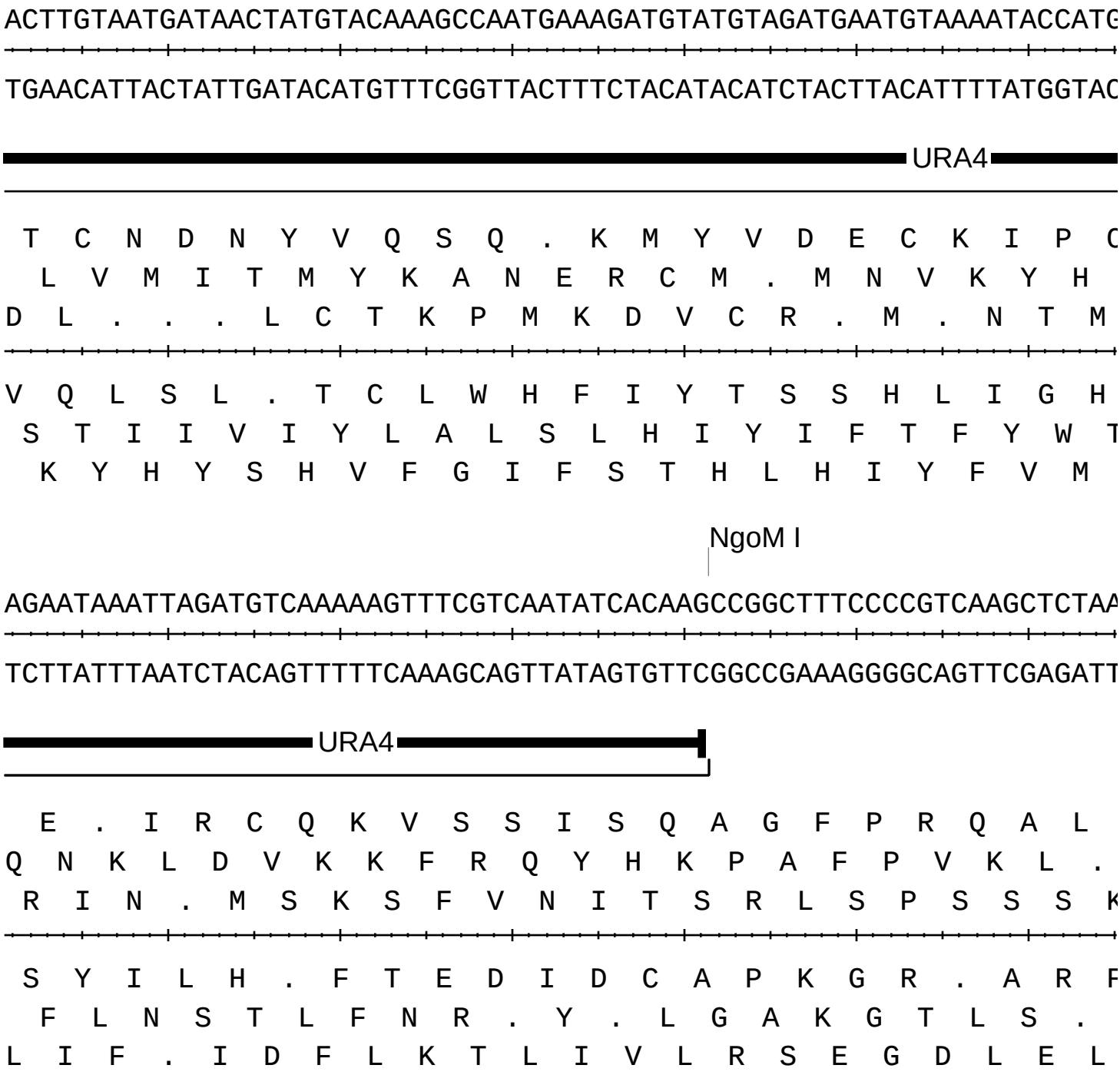
```
  V  F  L  G  V  L  C  Q  K  A  F  R  I  S  I  Q  V  L  F  G  K
L  F  S  .  A  F  Y  V  R  R  H  L  E  L  V  Y  K  Y  S  L  V  K
 C  F  P  R  R  F  M  S  E  G  I  .  N  .  Y  T  S  T  L  W  .  N
```

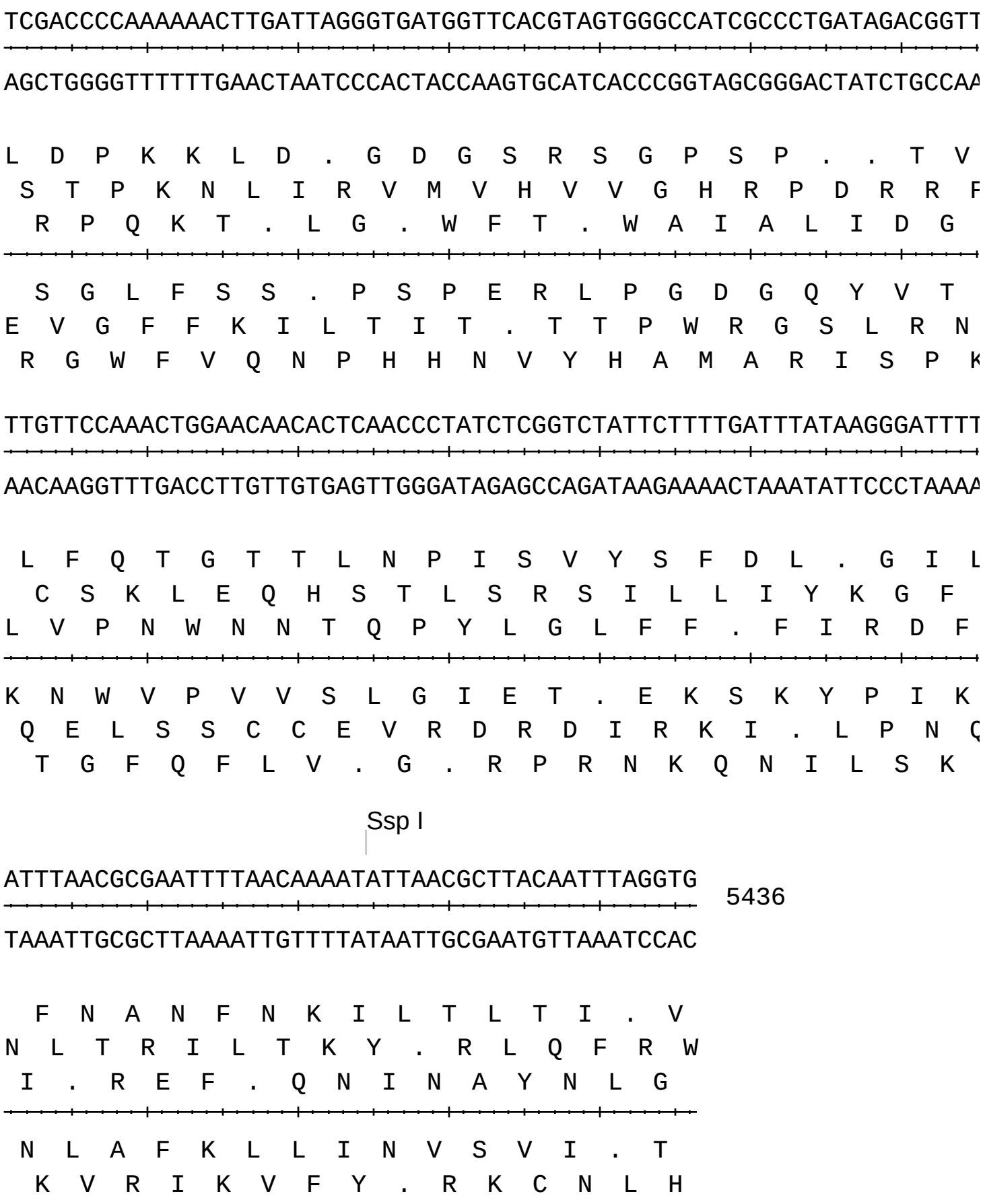
```
 T  K  R  P  T  K  H  .  F  A  N  L  I  L  I  C  T  S  K  P  L  I
  N  E  .  A  N  .  T  L  L  C  K  S  N  T  Y  L  Y  E  K  T  F
Q  K  G  L  R  K  I  D  S  P  M  .  F  .  Y  V  L  V  R  Q  Y  F

GGGAATAAAAAGTAATTTGCTATAGTAATTTATTAAACATGCTCCTACAACATTACCACAATCTT
CCCTTATTTTTCATTAAACGATATCATTAAATAATTTGTACGAGGATGTTGTAATGGTGTTAGAA
```

URA4

```
W  E  .  K  V  I  C  Y  S  N  L  L  N  M  L  L  Q  H  Y  H  N  L
 G  N  K  K  .  F  A  I  V  I  Y  .  T  C  S  Y  N  I  T  T  I  F
  G  I  K  S  N  L  L  .  .  F  I  K  H  A  P  T  T  L  P  Q  S
```

```
  S  Y  F  T  I  Q  .  L  L  K  N  F  M  S  R  C  C  .  W  L  R
P  F  L  F  Y  N  A  I  T  I  .  .  V  H  E  .  L  M  V  V  I  K
 P  I  F  L  L  K  S  Y  Y  N  I  L  C  A  G  V  V  N  G  C  D  K
```


ACTTGTAATGATAACTATGTACAAAGCCAATGAAAGATGTATGTAGATGAATGTAAAATACCATG
TGAACATTACTATTGATACATGTTTCGGTTACTTTCTACATACATCTACTTACATTTTATGGTAC
URA4
T C N D N Y V Q S Q . K M Y V D E C K I P C
L V M I T M Y K A N E R C M . M N V K Y H
D L . . . L C T K P M K D V C R . M . N T M
V Q L S L . T C L W H F I Y T S S H L I G H
S T I I V I Y L A L S L H I Y I F T F Y W T
K Y H Y S H V F G I F S T H L H I Y F V M
NgoM I
AGAATAAATTAGATGTCAAAAAGTTTCGTCAATATCACAAGCCGGCTTTCCCCGTCAAGCTCTAA
TCTTATTTAATCTACAGTTTTTCAAAGCAGTTATAGTGTTCGGCCGAAAGGGGCAGTTCGAGATT
URA4
E . I R C Q K V S S I S Q A G F P R Q A L
Q N K L D V K K F R Q Y H K P A F P V K L .
R I N . M S K S F V N I T S R L S P S S S K
S Y I L H . F T E D I D C A P K G R . A R F
F L N S T L F N R . Y . L G A K G T L S .
L I F . I D F L K T L I V L R S E G D L E L


TCGACCCCAAAAAACTTGATTAGGGTGATGGTTCACGTAGTGGGCCATCGCCCTGATAGACGGTT
AGCTGGGGTTTTTTGAACTAATCCCACTACCAAGTGCATCACCCGGTAGCGGGACTATCTGCCAA
L D P K K L D . G D G S R S G P S P . . T V
S T P K N L I R V M V H V V G H R P D R R F
R P Q K T . L G . W F T . W A I A L I D G
S G L F S S . P S P E R L P G D G Q Y V T
E V G F F K I L T I T . T T P W R G S L R N
R G W F V Q N P H H N V Y H A M A R I S P K
TTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGATTTATAAGGGATTTT
AACAAGGTTTGACCTTGTTGTGAGTTGGGATAGAGCCAGATAAGAAAACTAAATATTCCCTAAAA
L F Q T G T T L N P I S V Y S F D L . G I L
C S K L E Q H S T L S R S I L L I Y K G F
L V P N W N N T Q P Y L G L F F . F I R D F
K N W V P V V S L G I E T . E K S K Y P I K
Q E L S S C C E V R D R D I R K I . L P N Q
T G F Q F L V . G . R P R N K Q N I L S K
Ssp I
ATTTAACGCGAATTTTAACAAAATATTAACGCTTACAATTTAGGTG
5436
TAAATTGCGCTTAAAATTGTTTTATAATTGCGAATGTTAAATCCAC
F N A N F N K I L T L T I . V
N L T R I L T K Y . R L Q F R W
I . R E F . Q N I N A Y N L G
N L A F K L L I N V S V I . T
K V R I K V F Y . R K C N L H

I . R S N . C F I L A . L K P P