SEQUENCE LISTING

<110> SANGAMO THERAPEUTICS, INC.

<120> REGULATION OF GENE EXPRESSION USING ENGINEERED NUCLEASES

<130> 8328-0163.40

<140> PCT/US2017/048397
<141> 2017-08-24

<150> 62/545,778
<151> 2017-08-15

<150> 62/443,981
<151> 2017-01-09

<150> 62/378,978
<151> 2016-08-24

<160> 34

<170> PatentIn version 3.5

<210> 1
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
oligonucleotide

<400> 1
aaagcaactg ttagcttgca ctagacta 28

<210> 2
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<213> Artificial Sequence

<220>
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oligonucleotide

<400> 2
cacaggctcc aggaagggtt tggcctct 28

<210> 3
<211> 407

<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polypeptide

<220>
<221> NON_CONS
<222> (214)..(215)
<223> Residues at these positions are separated by any linker sequence known in the art

<400> 3

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Met Asp Tyr Lys Asp His Asp Gly Asp Tyr Lys Asp His Asp Ile Asp
1               5                  10                  15

Tyr Lys Asp Asp Asp Asp Lys Met Ala Pro Lys Lys Lys Arg Lys Val
            20                  25                  30

Gly Ile His Gly Val Pro Ala Ala Met Ala Glu Arg Pro Phe Gln Cys
        35                  40                  45

Arg Ile Cys Met Gln Asn Phe Ser Asp Gln Ser Asn Leu Arg Ala His
    50                  55                  60

Ile Arg Thr His Thr Gly Glu Lys Pro Phe Ala Cys Asp Ile Cys Gly
65                  70                  75                  80

Arg Lys Phe Ala Arg Asn Phe Ser Leu Thr Met His Thr Lys Ile His
                85                  90                  95

Thr Gly Ser Gln Lys Pro Phe Gln Cys Arg Ile Cys Met Gln Asn Phe
            100                 105                 110

Ser Ser Thr Gly Asn Leu Thr Asn His Ile Arg Thr His Thr Gly Glu
        115                 120                 125

Lys Pro Phe Ala Cys Asp Ile Cys Gly Arg Lys Phe Ala Thr Ser Gly
    130                 135                 140

Ser Leu Thr Arg His Thr Lys Ile His Thr His Pro Arg Ala Pro Ile
```

```
145                 150                 155                 160

Pro Lys Pro Phe Gln Cys Arg Ile Cys Met Gln Asn Phe Ser Asp Gln
                165                 170                 175

Ser Asn Leu Arg Ala His Ile Arg Thr His Thr Gly Glu Lys Pro Phe
            180                 185                 190

Ala Cys Asp Ile Cys Gly Arg Lys Phe Ala Ala Gln Cys Cys Leu Phe
        195                 200                 205

His His Thr Lys Ile His Glu Leu Glu Glu Lys Lys Ser Glu Leu Arg
    210                 215                 220

His Lys Leu Lys Tyr Val Pro His Glu Tyr Ile Glu Leu Ile Glu Ile
225                 230                 235                 240

Ala Arg Asn Ser Thr Gln Asp Arg Ile Leu Glu Met Lys Val Met Glu
                245                 250                 255

Phe Phe Met Lys Val Tyr Gly Tyr Arg Gly Lys His Leu Gly Gly Ser
            260                 265                 270

Arg Lys Pro Asp Gly Ala Ile Tyr Thr Val Gly Ser Pro Ile Asp Tyr
        275                 280                 285

Gly Val Ile Val Asp Thr Lys Ala Tyr Ser Gly Gly Tyr Asn Leu Pro
    290                 295                 300

Ile Gly Gln Ala Asp Glu Met Glu Arg Tyr Val Glu Glu Asn Gln Thr
305                 310                 315                 320

Arg Asp Lys His Leu Asn Pro Asn Glu Trp Trp Lys Val Tyr Pro Ser
                325                 330                 335

Ser Val Thr Glu Phe Lys Phe Leu Phe Val Ser Gly His Phe Lys Gly
            340                 345                 350

Asn Tyr Lys Ala Gln Leu Thr Arg Leu Asn His Ile Thr Asn Cys Asn
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355 360 365

Gly Ala Val Leu Ser Val Glu Glu Leu Leu Ile Gly Gly Glu Met Ile
370 375 380

Lys Ala Gly Thr Leu Thr Leu Glu Glu Val Arg Arg Lys Phe Asn Asn
385 390 395 400

Gly Glu Ile Asn Phe Arg Ser
405

<210> 4
<211> 372
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polypeptide

<220>
<221> NON_CONS
<222> (181)..(182)
<223> Residues at these positions are separated by any linker sequence known in the art

<400> 4
Met Asp Tyr Lys Asp His Asp Gly Asp Tyr Lys Asp His Asp Ile Asp
1 5 10 15

Tyr Lys Asp Asp Asp Asp Lys Met Ala Pro Lys Lys Lys Arg Lys Val
20 25 30

Gly Ile His Gly Val Pro Ala Ala Met Ala Glu Arg Pro Phe Gln Cys
35 40 45

Arg Ile Cys Met Gln Lys Phe Ala Arg Asn Asp His Arg Thr Thr His
50 55 60

Thr Lys Ile His Thr Gly Glu Lys Pro Phe Gln Cys Arg Ile Cys Met
65 70 75 80

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Gln Asn Phe Ser Gln Lys Ala His Leu Ile Arg His Ile Arg Thr His
                85                  90                  95

Thr Gly Glu Lys Pro Phe Ala Cys Asp Ile Cys Gly Arg Lys Phe Ala
            100                 105                 110

Gln Lys Gly Thr Leu Gly Glu His Thr Lys Ile His Thr Gly Ser Gln
        115                 120                 125

Lys Pro Phe Gln Cys Arg Ile Cys Met Gln Asn Phe Ser Arg Gly Arg
    130                 135                 140

Asp Leu Ser Arg His Ile Arg Thr His Thr Gly Glu Lys Pro Phe Ala
145                 150                 155                 160

Cys Asp Ile Cys Gly Arg Lys Phe Ala Arg Arg Asp Asn Leu His Ser
                165                 170                 175

His Thr Lys Ile His Glu Leu Glu Glu Lys Lys Ser Glu Leu Arg His
            180                 185                 190

Lys Leu Lys Tyr Val Pro His Glu Tyr Ile Glu Leu Ile Glu Ile Ala
        195                 200                 205

Arg Asn Ser Thr Gln Asp Arg Ile Leu Glu Met Lys Val Met Glu Phe
    210                 215                 220

Phe Met Lys Val Tyr Gly Tyr Arg Gly Lys His Leu Gly Gly Ser Arg
225                 230                 235                 240

Lys Pro Asp Gly Ala Ile Tyr Thr Val Gly Ser Pro Ile Asp Tyr Gly
                245                 250                 255

Val Ile Val Asp Thr Lys Ala Tyr Ser Gly Gly Tyr Asn Leu Pro Ile
            260                 265                 270

Gly Gln Ala Asp Glu Met Gln Arg Tyr Val Lys Glu Asn Gln Thr Arg
        275                 280                 285
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Asn Lys His Ile Asn Pro Asn Glu Trp Trp Lys Val Tyr Pro Ser Ser
    290                 295                 300

Val Thr Glu Phe Lys Phe Leu Phe Val Ser Gly His Phe Ser Gly Asn
305                 310                 315                 320

Tyr Lys Ala Gln Leu Thr Arg Leu Asn Arg Lys Thr Asn Cys Asn Gly
                325                 330                 335

Ala Val Leu Ser Val Glu Glu Leu Leu Ile Gly Gly Glu Met Ile Lys
            340                 345                 350

Ala Gly Thr Leu Thr Leu Glu Glu Val Arg Arg Lys Phe Asn Asn Gly
        355                 360                 365

Glu Ile Asn Phe
    370
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<210> 5
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 5

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Leu Arg Gly Ser Ile Ser Arg Ala Arg Pro Leu Asn Pro His Pro
1               5                   10                  15
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<210> 6
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 6

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Leu Arg Gly Ser Gln Leu Val Lys Ser
1               5
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SEQUENCE LISTING

<210> 7
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polypeptide

<400> 7
Val Pro Ala Ala Met Ala Glu Arg Pro Phe Gln Cys Arg Ile Cys Met
1 5 10 15

Arg Asn Phe Ser Asp Gln Ser Asn Leu Arg Ala His Ile Arg Thr His
20 25 30

<210> 8
<211> 28
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 8
Thr Gly Glu Lys Pro Phe Ala Cys Asp Ile Cys Gly Arg Lys Phe Ala
1 5 10 15

Arg Asn Phe Ser Leu Thr Met His Thr Lys Ile His
20 25

<210> 9
<211> 29
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 9
Thr Gly Ser Gln Lys Pro Phe Gln Cys Arg Ile Cys Met Arg Asn Phe
1 5 10 15

Ser Ser Thr Gly Asn Leu Thr Asn His Ile Arg Thr His
20 25

SEQUENCE LISTING

<210> 10
<211> 28
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 10
Thr Gly Glu Lys Pro Phe Ala Cys Asp Ile Cys Gly Arg Lys Phe Ala
1 5 10 15

Thr Ser Gly Ser Leu Thr Arg His Thr Lys Ile His
20 25

<210> 11
<211> 33
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
polypeptide

<400> 11
Thr His Pro Arg Ala Pro Ile Pro Lys Pro Phe Gln Cys Arg Ile Cys
1 5 10 15

Met Arg Asn Phe Ser Asp Gln Ser Asn Leu Arg Ala His Ile Arg Thr
20 25 30

His

<210> 12
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
polypeptide

<400> 12

Thr Gly Glu Lys Pro Phe Ala Cys Asp Ile Cys Gly Arg Lys Phe Ala
1 5 10 15

Ala Gln Cys Cys Leu Phe His His Thr Lys Ile His Leu Arg Gly Ser
20 25 30

<210> 13
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polypeptide

<400> 13
Val Pro Ala Ala Met Ala Glu Arg Pro Phe Gln Cys Arg Ile Cys Met
1 5 10 15

Arg Lys Phe Ala Arg Asn Asp His Arg Thr Thr His Thr Lys Ile His
20 25 30

<210> 14
<211> 28
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 14
Thr Gly Glu Lys Pro Phe Gln Cys Arg Ile Cys Met Arg Asn Phe Ser
1 5 10 15

Gln Lys Ala His Leu Ile Arg His Ile Arg Thr His
20 25

<210> 15
<211> 28
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 15
Thr Gly Glu Lys Pro Phe Ala Cys Asp Ile Cys Gly Arg Lys Phe Ala
1 5 10 15

Gln Lys Gly Thr Leu Gly Glu His Thr Lys Ile His
20 25

<210> 16
<211> 29
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 16
Thr Gly Ser Gln Lys Pro Phe Gln Cys Arg Ile Cys Met Arg Asn Phe
1 5 10 15

Ser Arg Gly Arg Asp Leu Ser Arg His Ile Arg Thr His
20 25

<210> 17
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polypeptide

<400> 17
Thr Gly Glu Lys Pro Phe Ala Cys Asp Ile Cys Gly Arg Lys Phe Ala
1 5 10 15

Arg Arg Asp Asn Leu His Ser His Thr Lys Ile His Leu Arg Gly Ser
20 25 30

<210> 18
<211> 196
<212> PRT
<213> Unknown

<220>

SEQUENCE LISTING

<223> Description of Unknown:
Wild type FokI cleavage half domain

<400> 18

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Gln Leu Val Lys Ser Glu Leu Glu Glu Lys Lys Ser Glu Leu Arg His
1               5                  10                  15

Lys Leu Lys Tyr Val Pro His Glu Tyr Ile Glu Leu Ile Glu Ile Ala
            20                  25                  30

Arg Asn Ser Thr Gln Asp Arg Ile Leu Glu Met Lys Val Met Glu Phe
        35                  40                  45

Phe Met Lys Val Tyr Gly Tyr Arg Gly Lys His Leu Gly Gly Ser Arg
    50                  55                  60

Lys Pro Asp Gly Ala Ile Tyr Thr Val Gly Ser Pro Ile Asp Tyr Gly
65                  70                  75                  80

Val Ile Val Asp Thr Lys Ala Tyr Ser Gly Gly Tyr Asn Leu Pro Ile
                85                  90                  95

Gly Gln Ala Asp Glu Met Gln Arg Tyr Val Glu Glu Asn Gln Thr Arg
            100                 105                 110

Asn Lys His Ile Asn Pro Asn Glu Trp Trp Lys Val Tyr Pro Ser Ser
        115                 120                 125

Val Thr Glu Phe Lys Phe Leu Phe Val Ser Gly His Phe Lys Gly Asn
    130                 135                 140

Tyr Lys Ala Gln Leu Thr Arg Leu Asn His Ile Thr Asn Cys Asn Gly
145                 150                 155                 160

Ala Val Leu Ser Val Glu Glu Leu Leu Ile Gly Gly Glu Met Ile Lys
                165                 170                 175

Ala Gly Thr Leu Thr Leu Glu Glu Val Arg Arg Lys Phe Asn Asn Gly
            180                 185                 190
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Glu Ile Asn Phe
195

<210> 19
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 19
Asp Gln Ser Asn Leu Arg Ala
1 5

<210> 20
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 20
Arg Asn Phe Ser Leu Thr Met
1 5

<210> 21
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 21
Ser Thr Gly Asn Leu Thr Asn
1 5

<210> 22
<211> 7
<212> PRT
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<400> 22
Thr Ser Gly Ser Leu Thr Arg
1 5

<210> 23
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 23
Ala Gln Cys Cys Leu Phe His
1 5

<210> 24
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 24
Arg Asn Asp His Arg Thr Thr
1 5

<210> 25
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 25
Gln Lys Ala His Leu Ile Arg
1 5

<210> 26
<211> 7

<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 26
Gln Lys Gly Thr Leu Gly Glu
1 5

<210> 27
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 27
Arg Arg Asp Asn Leu His Ser
1 5

<210> 28
<211> 1727
<212> RNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
polynucleotide

<400> 28
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cucaacuuug gcagaucgaa uucgccaugg acuacaaaga ccaugacggu gauuauaaag 120

aucaugacau cgauuacaag gaugacgaug acaagauggc ccccaagaag aagaggaagg 180

ucggcaucca cgggguaccc gccgcuaugg cugagaggcc cuuccagugu cgaaucugca 240

ugcagaacuu cagugaccag uccaaccugc gcgcccacau ccgcacccac accggcgaga 300

agccuuuugc cugugacauu ugugggagga aauuugcccg caacuucucc cugaccaugc 360

auaccaagau acacacgggc agccaaaagc ccuuccagug ucgaaucugc augcagaacu 420

ucaguuccac cggcaaccug accaaccaca uccgcaccca caccggcgag aagccuuuug 480

ccugugacau uuguggggagg aaauuugcca ccuccggcuc ccugacccgc cauaccaaga 540

uacacacgca cccgcgcgcc ccgaucccga agcccuucca gugucgaauc ugcaugcaga 600

acuucaguga ccaguccaac cugcgcgccc acauccgcac ccacaccggc gagaagccuu 660

uugccuguga cauuuguggg aggaaauuug ccgcccagug uugucuguuc caccauacca 720

agauacaccu gcgggggaucc aucagcagag ccagaccacu gaacccgcac ccggagcugg 780

aggagaagaa guccgagcug cggcacaagc ugaaguacgu gccccacgag uacaucgagc 840

ugaucgagau cgccaggaac agcacccagg accgcauccu ggagaugaag gugauggagu 900

ucuucaugaa gguguacggc uacaggggaa agcaccuggg cggaagcaga aagccugacg 960

gcgccaucua uacagugggc agccccaucg auuacggcgu gaucguggac acaaaggccu 1020

acagcggcgg cuacaaucug ccuaucggcc aggccgacga gauggagaga uacguggagg 1080

agaaccagac ccgggauaag caccucaacc ccaacgagug guggaaggug uacccuagca 1140

gcgugaccga guucaaguuc cuguucguga gcggccacuu caagggcaac uacaaggccc 1200

agcugaccag gcugaaccac aucaccaacu gcaauggcgc cgugcugagc guggaggagc 1260

ugcugaucgg cggcgagaug aucaaagccg gcacccugac acuggaggag gugcggcgca 1320

aguucaacaa cggcgagauc aacuucagau cuugauaacu cgagucuaga agcucgcuuu 1380

cuugcugucc aauuucuauu aaagguuccu uuguucccua aguccaacua cuaaacuggg 1440

ggauauuaug aagggccuug agcaucugga uucugccuaa uaaaaaacau uuauuuucau 1500

ugcugcgcua gaagcucgcu uucuugcugu ccaauuucua uuaaagguuc cuuuguuccc 1560

uaaguccaac uacuaaacug ggggauauua ugaagggccu ugagcaucug gauucugccu 1620

aauaaaaaac auuuauuuuc auugcugcgg gacauucuua auuaaaaaaa aaaaaaaaaa 1680

aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaacuag 1727

<210> 29
<211> 422
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
polypeptide

SEQUENCE LISTING

<400> 29

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Met Asp Tyr Lys Asp His Asp Gly Asp Tyr Lys Asp His Asp Ile Asp
1               5                  10                  15

Tyr Lys Asp Asp Asp Asp Lys Met Ala Pro Lys Lys Lys Arg Lys Val
            20                  25                  30

Gly Ile His Gly Val Pro Ala Ala Met Ala Glu Arg Pro Phe Gln Cys
        35                  40                  45

Arg Ile Cys Met Gln Asn Phe Ser Asp Gln Ser Asn Leu Arg Ala His
    50                  55                  60

Ile Arg Thr His Thr Gly Glu Lys Pro Phe Ala Cys Asp Ile Cys Gly
65                  70                  75                  80

Arg Lys Phe Ala Arg Asn Phe Ser Leu Thr Met His Thr Lys Ile His
                85                  90                  95

Thr Gly Ser Gln Lys Pro Phe Gln Cys Arg Ile Cys Met Gln Asn Phe
            100                 105                 110

Ser Ser Thr Gly Asn Leu Thr Asn His Ile Arg Thr His Thr Gly Glu
        115                 120                 125

Lys Pro Phe Ala Cys Asp Ile Cys Gly Arg Lys Phe Ala Thr Ser Gly
    130                 135                 140

Ser Leu Thr Arg His Thr Lys Ile His Thr His Pro Arg Ala Pro Ile
145                 150                 155                 160

Pro Lys Pro Phe Gln Cys Arg Ile Cys Met Gln Asn Phe Ser Asp Gln
                165                 170                 175

Ser Asn Leu Arg Ala His Ile Arg Thr His Thr Gly Glu Lys Pro Phe
            180                 185                 190

Ala Cys Asp Ile Cys Gly Arg Lys Phe Ala Ala Gln Cys Cys Leu Phe
        195                 200                 205
```

```
His His Thr Lys Ile His Leu Arg Gly Ser Ile Ser Arg Ala Arg Pro
    210                 215                 220

Leu Asn Pro His Pro Glu Leu Glu Glu Lys Lys Ser Glu Leu Arg His
225                 230                 235                 240

Lys Leu Lys Tyr Val Pro His Glu Tyr Ile Glu Leu Ile Glu Ile Ala
                245                 250                 255

Arg Asn Ser Thr Gln Asp Arg Ile Leu Glu Met Lys Val Met Glu Phe
            260                 265                 270

Phe Met Lys Val Tyr Gly Tyr Arg Gly Lys His Leu Gly Gly Ser Arg
        275                 280                 285

Lys Pro Asp Gly Ala Ile Tyr Thr Val Gly Ser Pro Ile Asp Tyr Gly
    290                 295                 300

Val Ile Val Asp Thr Lys Ala Tyr Ser Gly Gly Tyr Asn Leu Pro Ile
305                 310                 315                 320

Gly Gln Ala Asp Glu Met Glu Arg Tyr Val Glu Glu Asn Gln Thr Arg
                325                 330                 335

Asp Lys His Leu Asn Pro Asn Glu Trp Trp Lys Val Tyr Pro Ser Ser
            340                 345                 350

Val Thr Glu Phe Lys Phe Leu Phe Val Ser Gly His Phe Lys Gly Asn
        355                 360                 365

Tyr Lys Ala Gln Leu Thr Arg Leu Asn His Ile Thr Asn Cys Asn Gly
    370                 375                 380

Ala Val Leu Ser Val Glu Glu Leu Leu Ile Gly Gly Glu Met Ile Lys
385                 390                 395                 400

Ala Gly Thr Leu Thr Leu Glu Glu Val Arg Arg Lys Phe Asn Asn Gly
                405                 410                 415
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Glu Ile Asn Phe Arg Ser
420

<210> 30
<211> 1680
<212> RNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polynucleotide

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caacuuuggc agaucgaauu cgccuagaga ucuggcggcg gagagggcag aggaagucuu 120

cuaaccugcg gugacgugga ggagaauccc ggcccuagga ccauggacua caaagaccau 180

gacggugauu auaaagauca ugacaucgau uacaaggaug acgaugacaa gauggccccc 240

aagaagaaga ggaaggucgg cauucauggg guacccgccg cuauggcuga gaggcccuuc 300

cagugucgaa ucugcaugca gaaguuugcc cgcaacgacc accgcaccac ccauaccaag 360

auacacacgg gcgagaagcc cuuccagugu cgaaucugca ugcagaacuu cagucagaag 420

gcccaccuga uccgccacau ccgcacccac accggcgaga agccuuuugc cugugacauu 480

ugugggagga aauuugccca gaagggcacc cugggcgagc auaccaagau acacacggga 540

ucucagaagc ccuuccagug ucgaaucugc augcagaacu ucagucgcgg ccgcgaccug 600

ucccgccaca uccgcaccca caccggcgag aagccuuuug ccugugacau uugugggagg 660

aaauuugccc gccgcgacaa ccugcacucc cauaccaaga uacaccugcg gggaucccag 720

cuggugaaga gcgagcugga ggagaagaag uccgagcugc ggcacaagcu gaaguacgug 780

ccccacgagu acaucgagcu gaucgagauc gccaggaaca gcacccagga ccgcauccug 840

gagaugaagg ugauggaguu cuucaugaag guguacggcu acaggggaaa gcaccugggc 900

ggaagcagaa agccugacgg cgccaucuau acagugggca gccccaucga uuacggcgug 960

aucguggaca caaaggccua cagcggcggc uacaaucugc cuaucggcca ggccgacgag 1020

augcagagau acgugaagga gaaccagacc cggaauaagc acaucaaccc caacgagugg 1080

uggaaggugu acccuagcag cgugaccgag uucaaguucc uguucgugag cggccacuuc 1140

agcggcaacu acaaggccca gcugaccagg cugaaccgca aaaccaacug caauggcgcc 1200

gugcugagcg uggaggagcu gcugaucggc ggcgagauga ucaaagccgg cacccugaca 1260

cuggaggagg ugcggcgcaa guucaacaac ggcgagauca acuucugaua acucgagucu 1320

agaagcucgc uuucuugcug uccaauuucu auuaaagguu ccuuuguucc cuaaguccaa 1380

cuacuaaacu gggggauauu augaagggcc uugagcaucu ggauucugcc uaauaaaaaa 1440

cauuuauuuu cauugcugcg cuagaagcuc gcuuucuugc uguccaauuu cuauuaaagg 1500

uuccuuuguu cccuaagucc aacuacuaaa cuggggggaua uuaugaaggg ccuugagcau 1560

cuggauucug ccuaauaaaa aacauuuauu uucauugcug cgggacauuc uuaauuaaaa 1620

aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaacuag 1680

<210> 31
<211> 381
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
polypeptide

<400> 31
Met Asp Tyr Lys Asp His Asp Gly Asp Tyr Lys Asp His Asp Ile Asp
1 5 10 15

Tyr Lys Asp Asp Asp Asp Lys Met Ala Pro Lys Lys Lys Arg Lys Val
20 25 30

Gly Ile His Gly Val Pro Ala Ala Met Ala Glu Arg Pro Phe Gln Cys
35 40 45

Arg Ile Cys Met Gln Lys Phe Ala Arg Asn Asp His Arg Thr Thr His
50 55 60

Thr Lys Ile His Thr Gly Glu Lys Pro Phe Gln Cys Arg Ile Cys Met
65 70 75 80

Gln Asn Phe Ser Gln Lys Ala His Leu Ile Arg His Ile Arg Thr His
85 90 95

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Thr Gly Glu Lys Pro Phe Ala Cys Asp Ile Cys Gly Arg Lys Phe Ala
            100                 105                 110

Gln Lys Gly Thr Leu Gly Glu His Thr Lys Ile His Thr Gly Ser Gln
        115                 120                 125

Lys Pro Phe Gln Cys Arg Ile Cys Met Gln Asn Phe Ser Arg Gly Arg
    130                 135                 140

Asp Leu Ser Arg His Ile Arg Thr His Thr Gly Glu Lys Pro Phe Ala
145                 150                 155                 160

Cys Asp Ile Cys Gly Arg Lys Phe Ala Arg Arg Asp Asn Leu His Ser
                165                 170                 175

His Thr Lys Ile His Leu Arg Gly Ser Gln Leu Val Lys Ser Glu Leu
            180                 185                 190

Glu Glu Lys Lys Ser Glu Leu Arg His Lys Leu Lys Tyr Val Pro His
        195                 200                 205

Glu Tyr Ile Glu Leu Ile Glu Ile Ala Arg Asn Ser Thr Gln Asp Arg
    210                 215                 220

Ile Leu Glu Met Lys Val Met Glu Phe Phe Met Lys Val Tyr Gly Tyr
225                 230                 235                 240

Arg Gly Lys His Leu Gly Gly Ser Arg Lys Pro Asp Gly Ala Ile Tyr
                245                 250                 255

Thr Val Gly Ser Pro Ile Asp Tyr Gly Val Ile Val Asp Thr Lys Ala
            260                 265                 270

Tyr Ser Gly Gly Tyr Asn Leu Pro Ile Gly Gln Ala Asp Glu Met Gln
        275                 280                 285

Arg Tyr Val Lys Glu Asn Gln Thr Arg Asn Lys His Ile Asn Pro Asn
    290                 295                 300
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Glu Trp Trp Lys Val Tyr Pro Ser Ser Val Thr Glu Phe Lys Phe Leu
305 310 315 320

Phe Val Ser Gly His Phe Ser Gly Asn Tyr Lys Ala Gln Leu Thr Arg
325 330 335

Leu Asn Arg Lys Thr Asn Cys Asn Gly Ala Val Leu Ser Val Glu Glu
340 345 350

Leu Leu Ile Gly Gly Glu Met Ile Lys Ala Gly Thr Leu Thr Leu Glu
355 360 365

Glu Val Arg Arg Lys Phe Asn Asn Gly Glu Ile Asn Phe
370 375 380

<210> 32
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic primer

<220>
<221> modified_base
<222> (21)..(24)
<223> a, c, t, g, unknown or other

<400> 32
acacgacgct cttccgatct nnnnagtcct cttctacccc accca 45

<210> 33
<211> 46
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic primer

<400> 33
gacgtgtgct cttccgatct ctactcttag acataacaca ccaggg 46

<210> 34
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 34
Arg Gly Arg Asp Leu Ser Arg
1 5