SEQUENCE LISTING

<110> GENENTECH, INC. ET AL.

<120> METHODS AND COMPOSITIONS FOR PREVENTING NORLEUCINE MISINCORPORATION INTO PROTEINS

<130> P4967R1-WO

<140>
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<150> 61/777,700
<151> 2013-03-12

<150> 61/703,142
<151> 2012-09-19

<160> 52

<170> PatentIn version 3.5

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<212> DNA
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<220>
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<223> /note="Description of Artificial Sequence: Synthetic polynucleotide"

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cttaacctga tgccgaagaa gattgaaact gaaaatcagt ttctgcgcct gctttcaaac 180

tcacctttgc aggtcgatat tcagctgttg cgcatcgatt cccgtgaatc gcgcaacacg 240

cccgcagagc atctgaacaa cttctactgt aactttgaag atattcagga tcagaacttt 300

gacggtttga ttgtaactgg tgcgccgctg ggcctggtgg agtttaatga tgtcgcttac 360

tggccgcaga tcaaacaggt gctggagtgg tcgaaagatc acgtcacctc gacgctgttt 420

gtctgctggg cggtacaggc cgcgctcaat atcctctacg gcattcctaa gcaaactcgc 480

accgaaaaac tctctggcgt ttacgagcat catattctcc atcctcatgc gcttctgacg 540

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caaacgctgg cgcaggaatt tttccgcgat gtggaagccg gactagaccc ggatgtaccg 780

tataactatt tcccgcacaa tgatccgcaa aatacaccgc gagcgagctg gcgtagtcac 840

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ctacggcaca tgaatccaac gctggattaa 930

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<211> 930
<212> DNA
<213> Artificial Sequence

<220>
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<223> /note="Description of Artificial Sequence: Synthetic
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tttgtgatga caacttctcg tgcgtctggt caggaaattc gtccacttaa ggttctgatc 120

cttaacctga tgccgaagaa gattgaaact gaaaatcagt ttctgcgcct gctttcaaac 180

tcacctttgc aggtcgatat tcagctgttg cgcatcgatt cccgtgaatc gcgcaacacg 240

cccgcagagc atctgaacaa cttctactgt aactttgaag atattcagga tcagaacttt 300

gacggtttga ttgtaactgg tgcgccgctg ggcctggtgg agtttaatga tgtcgcttac 360

tggccgcaga tcaaacaggt gctggagtgg tcgaaagatc acgtcacctc gacgctgttt 420

gtctgctggg cggtacaggc cgcgctcaat atcctctacg gcattcctaa gcaaactcgc 480

accgaaaaac tctctggcgt ttacgagcat catattctcc atcctcatgc gcttctgacg 540

cgtggctttg atgattcatt cctggcaccg cattcgcgct atgctgactt tccggcagcg 600

ttgattcgtg attacaccga tctggaaatt ctggcagaga cggaagaagg ggatgcatat 660

ctgtttgcca gtaaagataa gcgcattgcc tttgtgacgg gccatcccga atatgatgcg 720

caaacgctgg cgcaggaatt tttccgcgat gtggaagccg gactagaccc ggatgtaccg 780

tataactatt tcccgcacaa tgatccgcaa aatacaccgc gagcgagctg gcgtagtcac 840

ggtaatttac tgtttaccaa ctggctcaac tattacgtct gccagatcac gccatacgat 900

ctacggcaca tgaatccaac gctggattaa 930

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cttaacctga tgccgaagaa gattgaaact gaaaatcagt ttctgcgcct gctttcaaac 180

tcacctttgc aggtcgatat tcagctgttg cgcatcgatt cccgtgaatc gcgcaacacg 240

cccgcagagc atctgaacaa cttctactgt aactttgaag atattcagga tcagaacttt 300

gacggtttga ttgtaactgg tgcgccgctg ggcctggtgg agtttaatga tgtcgcttac 360

tggccgcaga tcaaacaggt gctggagtgg tcgaaagatc acgtcacctc gacgctgttt 420

gtctgctggg cggtacaggc cgcgctcaat atcctctacg gcattcctaa gcaaactcgc 480

accgaaaaac tctctggcgt ttacgagcat catattctcc atcctcatgc gcttctgacg 540

cgtggctttg atgattcatt cctggcaccg cattcgcgct atgctgactt tccggcagcg 600

ttgattcgtg attacaccga tctggaaatt ctggcagaga cggaagaagg ggatgcatat 660

ctgtttgcca gtaaagataa gcgcattgcc tttgtgacgg gccatcccga atatgatgcg 720

caaacgctgg cgcaggaatt tttccgcgat gtggaagccg gactagaccc ggatgtaccg 780

tataactatt tcccgcacaa tgatccgcaa aatacaccgc gagcgagctg gcgtagtcac 840

ggtaatttac tgtttaccaa ctggctcaac tattacgtct accagagcac gctatacgat 900

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cttaacctga tgccgaagaa gattgaaact gaaaatcagt ttctgcgcct gctttcaaac 180

tcacctttgg aggtcgatat tcagctgttg cgcatcgatt cccgtgaatc gcgcaacacg 240

cccgcagagc atctgaacaa cttctactgt aactttgaag atattcagga tcagaacttt 300

gacggtttga ttgtaactgg tgcgccgctg ggcctggtgg agtttaatga tgtcgcttac 360

tggccgcaga tcaaacaggt gctggagtgg tcgaaagatc acgtcacctc gacgctgttt 420

gtctgctggg cggtacaggc cgcgctcaat atcctctacg gcattcctaa gcaaactcgc 480

accgaaaaac tctctggcgt ttacgagcat catattctcc atcctcatgc gcttctgacg 540

cgtggctttg atgattcatt cctggcaccg cattcgcgct atgctgactt tccggcagcg 600

ttgattcgtg attacaccga tctggaaatt ctggcagaga cggaagaagg ggatgcatat 660

ctgtttgcca gtaaagataa gcgcattgcc tttgtgacgg gccatcccga atatgatgcg 720

caaacgctgg cgcaggaatt tttccgcgat gtggaagccg gactagaccc ggatgtaccg 780

tataactatt tcccgcacaa tgatccgcaa aatacaccgc gagcgagctg gcgtagtcac 840

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ctacggcaca tgaatccaac gctggattaa 930

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<212> DNA
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<220>
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gaccaaattt ctgatgccgt tttagacgcg atcctcgaac aggatccgaa agcacgcgtt 120

gcttgcgaaa cctacgtaaa aaccggcatg gttttagttg gcggcgaaat caccaccagc 180

gcctgggtag acatcgaaga gatcacccgt aacaccgttc gcgaaattgg ctatgtgcat 240

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cctgacatca accagggcgt tgaccgtgcc gatccgctgg aacagggcgc gggtgaccag 360

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tatgcacacc gtctggtaca gcgtcaggct gaagtgcgta aaaacggcac tctgccgtgg 480

ctgcgcccgg acgcgaaaag ccaggtgact tttcagtatg acgacggcaa aatcgttggt 540

atcgatgctg tcgagctttc cactcagcac tctgaagaga tcgaccagaa atcgctgcaa 600

gaagcggtaa tggaagagat catcaagcca attctgcccg ctgaatggct gacttctgcc 660

accaaattct tcatcaaccc gaccggtcgt ttcgttatcg gtggcccaat gggtgactgc 720

ggtctgactg gtcgtaaaat tatcgttgat acctacggcg gcatggcgcg tcacggtggc 780

ggtgcattct ctggtaaaga tccatcaaaa gtggaccgtt ccgcagccta cgcagcacgt 840

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gccggtctga agtaa 1155

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<212> DNA
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<220>
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gcttgcgaaa cctacgtaaa aaccggcatg gttttagttg gcggcgaaat caccaccagc 180

gcctgggtag acatcgaaga gatcacccgt aacaccgttc gcgaaattgg ctatgtgcat 240

tccgacatgg gctttgacgc taactcctgt gcggttctga gcgctatcgg caaacagtct 300

cctgacatca accagggcgt tgaccgtgcc gatccgctgg aacagggcgc gggtgaccag 360

ggtctgatgt ttggctacgc aactaatgaa accgacgtgc tgatgccagc acctatcacc 420

tatgcacacc gtctggtaca gcgtcaggct gaagtgcgta aaaacggcac tctgccgtgg 480

ctgcgcccgg acgcgaaaag ccaggtgact tttcagtatg acgacggcaa aatcgttggt 540

atcgatgctg tcgtgctttc cactcagcac tctgaagaga tcgaccagaa atcgctgcaa 600

gaagcggtaa tggaagagat catcaagcca attctgcccg ctgaatggct gacttctgcc 660

accaaattct tcatcaaccc gaccggtcgt ttcgttatcg gtggcccaat gggtgactgc 720

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tatgtcgcga aaaacatcgt tgctgctggc ctggccgatc gttgtgaaat tcaggtttcc 900

tacgcaatcg gcgtggctga accgacctcc atcatggtag aaactttcgg tactgagaaa 960

gtgccttctg aacaactgac cctgctggta cgtgagttct tcgacctgcg cccatacggt 1020

ctgattcaga tgctggatct gctgcacccg atctacaaag aaaccgcagc atacggtcac 1080

tttggtcgtg aacatttccc gtgggaaaaa accgacaaag cgcagctgct ggcgatgctg 1140

ccggtctgaa gtaa 1154

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<213> Escherichia coli

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Ile Arg Pro Leu Lys Val Leu Ile Leu Asn Leu Met Pro Lys Lys Ile
35 40 45

Glu Thr Glu Asn Gln Phe Leu Arg Leu Leu Ser Asn Ser Pro Leu Gln
50 55 60

Val Asp Ile Gln Leu Leu Arg Ile Asp Ser Arg Glu Ser Arg Asn Thr
65 70 75 80

Pro Ala Glu His Leu Asn Asn Phe Tyr Cys Asn Phe Glu Asp Ile Gln
85 90 95

Asp Gln Asn Phe Asp Gly Leu Ile Val Thr Gly Ala Pro Leu Gly Leu
100 105 110

Val Glu Phe Asn Asp Val Ala Tyr Trp Pro Gln Ile Lys Gln Val Leu
115 120 125

Glu Trp Ser Lys Asp His Val Thr Ser Thr Leu Phe Val Cys Trp Ala
130 135 140

Val Gln Ala Ala Leu Asn Ile Leu Tyr Gly Ile Pro Lys Gln Thr Arg
145 150 155 160

Thr Glu Lys Leu Ser Gly Val Tyr Glu His His Ile Leu His Pro His
165 170 175

Ala Leu Leu Thr Arg Gly Phe Asp Asp Ser Phe Leu Ala His Ser Arg
180 185 190

Tyr Ala Asp Phe Pro Ala Ala Leu Ile Arg Asp Tyr Thr Asp Leu Glu
195 200 205

Ile Leu Ala Glu Thr Glu Glu Gly Asp Ala Tyr Leu Phe Ala Ser Lys
210 215 220

Asp Lys Arg Ile Ala Phe Val Thr Gly His Pro Glu Tyr Asp Ala Gln
225 230 235 240

Thr Leu Ala Gln Glu Phe Phe Arg Asp Val Glu Ala Gly Leu Asp Pro
245 250 255

Asp Val Pro Tyr Asn Tyr Phe Pro His Asn Asp Pro Gln Asn Thr Pro
260 265 270

Arg Ala Ser Trp Arg Ser His Gly Asn Leu Leu Phe Thr Asn Trp Leu
275 280 285

Asn Tyr Tyr Val Tyr Gln Ile Thr Pro Tyr Asp Leu Arg His Met Asn
290 295 300

Pro Thr Leu Asp
305

<210> 30
<211> 384
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<213> Escherichia coli

<400> 30
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1 5 10 15

Asp Lys Ile Ala Asp Gln Ile Ser Asp Ala Val Leu Asp Ala Ile Leu
20 25 30

Glu Gln Asp Pro Lys Ala Arg Val Ala Cys Glu Thr Tyr Val Lys Thr
35 40 45

Gly Met Val Leu Val Gly Gly Glu Ile Thr Thr Ser Ala Trp Val Asp
50 55 60

Ile Glu Glu Ile Thr Arg Asn Thr Val Arg Glu Ile Gly Tyr Val His
65 70 75 80

Ser Asp Met Gly Phe Asp Ala Asn Ser Cys Ala Val Leu Ser Ala Ile
85 90 95

Gly Lys Gln Ser Pro Asp Ile Asn Gln Gly Val Asp Arg Ala Asp Pro
100 105 110

Leu Glu Gln Gly Ala Gly Asp Gln Gly Leu Met Phe Gly Tyr Ala Thr
115 120 125

Asn Glu Thr Asp Val Leu Met Pro Ala Pro Ile Thr Tyr Ala His Arg
130 135 140

Leu Val Gln Arg Gln Ala Glu Val Arg Lys Asn Gly Thr Leu Pro Trp
145 150 155 160

Leu Arg Pro Asp Ala Lys Ser Gln Val Thr Phe Gln Tyr Asp Asp Gly
165 170 175

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

Glu Ile Asp Gln Lys Ser Leu Gln Glu Ala Val Met Glu Glu Ile Ile
195 200 205

Lys Pro Ile Leu Pro Ala Glu Trp Leu Thr Ser Ala Thr Lys Phe Phe
210 215 220

Ile Asn Pro Thr Gly Arg Phe Val Ile Gly Gly Pro Met Gly Asp Cys
225 230 235 240

Gly Leu Thr Gly Arg Lys Ile Ile Val Asp Thr Tyr Gly Gly Met Ala
245 250 255

Arg His Gly Gly Gly Ala Phe Ser Gly Lys Asp Pro Ser Lys Val Asp
260 265 270

Arg Ser Ala Ala Tyr Ala Ala Arg Tyr Val Ala Lys Asn Ile Val Ala
275 280 285

Ala Gly Leu Ala Asp Arg Cys Glu Ile Gln Val Ser Tyr Ala Ile Gly
290 295 300

Val Ala Glu Pro Thr Ser Ile Met Val Glu Thr Phe Gly Thr Glu Lys
305 310 315 320

Val Pro Ser Glu Gln Leu Thr Leu Leu Val Arg Glu Phe Phe Asp Leu
325 330 335

Arg Pro Tyr Gly Leu Ile Gln Met Leu Asp Leu Leu His Pro Ile Tyr
340 345 350

Lys Glu Thr Ala Ala Tyr Gly His Phe Gly Arg Glu His Phe Pro Trp
355 360 365

Glu Lys Thr Asp Lys Ala Gln Leu Leu Arg Asp Ala Ala Gly Leu Lys
370 375 380

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tcacctttgc aggtcgatat tcagctgttg cgcatcgatt cccgtgaatc gcgcaacacg 240

cccgcagagc atctgaacaa cttctactgt aactttgaag atattcagga tcagaacttt 300

gacggtttga ttgtaactgg tgcgccgctg ggcctggtgg agtttaatga tgtcgcttac 360

tggccgcaga tcaaacaggt gctggagtgg tcgaaagatc acgtcacctc gacgctgttt 420

gtctgctggg cggtacaggc cgcgctcaat atcctctacg gcattcctaa gcaaactcgc 480

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caaacgctgg cgcaggaatt tttccgcgat gtggaagccg gactagaccc ggatgtaccg 780

tataactatt tcccgcacaa tgatccgcaa aatacaccgc gagcgagctg gcgtagtcac 840

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ctacggcaca tgaatccaac gctggattaa 930

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gcctgggtag acatcgaaga gatcacccgt aacaccgttc gcgaaattgg ctatgtgcat 240

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cctgacatca accagggcgt tgaccgtgcc gatccgctgg aacagggcgc gggtgaccag 360

ggtctgatgt ttggctacgc aactaatgaa accgacgtgc tgatgccagc acctatcacc 420

tatgcacacc gtctggtaca gcgtcaggct gaagtgcgta aaaacggcac tctgccgtgg 480

ctgcgcccgg acgcgaaaag ccaggtgact tttcagtatg acgacggcaa aatcgttggt 540

atcgatgctg tcgtgctttc cactcagcac tctgaagaga tcgaccagaa atcgctgcaa 600

gaagcggtaa tggaagagat catcaagcca attctgcccg ctgaatggct gacttctgcc 660

accaaattct tcatcaaccc gaccggtcgt ttcgttatcg gtggcccaat gggtgactgc 720

ggtctgactg gtcgtaaaat tatcgttgat acctacggcg gcatggcgcg tcacggtggc 780

ggtgcattct ctggtaaaga tccatcaaaa gtggaccgtt ccgcagccta cgcagcacgt 840

tatgtcgcga aaaacatcgt tgctgctggc ctggccgatc gttgtgaaat tcaggtttcc 900

tacgcaatcg gcgtggctga accgacctcc atcatggtag aaactttcgg tactgagaaa 960

gtgccttctg aacaactgac cctgctggta cgtgagttct tcgacctgcg cccatacggt 1020

ctgattcaga tgctggatct gctgcacccg atctacaaag aaaccgcagc atacggtcac 1080

tttggtcgtg aacatttccc gtgggaaaaa accgacaaag cgcagctgct gcgcgatgct 1140

gccggtctga agtaa 1155

<210> 33
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic polynucleotide"

<400> 33
gatatccagt tgacccagtc cccgagctcc ctgtccgcct ctgtgggcga tagggtcacc 60

atcacctgca gcgcaagtca ggatattagc aactatttaa actggtatca acagaaacca 120

ggaaaagctc cgaaagtact gatttacttc acctcctctc tccactctgg agtcccttct 180

cgcttctctg gatccggttc tgggacggat ttcactctga ccatcagcag tctgcagcca 240

gaagacttcg caacttatta ctgtcaacag tatagcaccg tgccgtggac gtttggacag 300

ggtaccaagg tggagatcaa acgaactgtg gctgcaccat ctgtcttcat cttcccgcca 360

tctgatgagc agttgaaatc tggaactgct tctgttgtgt gcctgctgaa taacttctat 420

cccagagagg ccaaagtaca gtggaaggtg gataacgccc tccaatcggg taactcccag 480

gagagtgtca cagagcagga cagcaaggac agcacctaca gcctcagcag caccctgacg 540

ctgagcaaag cagactacga gaaacacaaa gtctacgcct gcgaagtcac ccatcagggc 600

ctgagctcgc ccgtcacaaa gagcttcaac aggggagagt gt 642

<210> 34
<211> 693
<212> DNA
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic polynucleotide"

<400> 34
gaggttcagc tggtggagtc tggcggtggc ctggtgcagc aggggggctc actccgtttg 60

tcctgtgcag cttctggcta cgacttcacg cactacggta tgaactgggt ccgtcaggcc 120

ccgggtaagg gcctggaatg ggttggatgg attaacacct ataccggtga accgacctat 180

gctgcggatt tcaaacgtcg tttcactttt tctttagaca cctccaaaag cacagcatac 240

ctgcagatga acagcctgcg cgctgaggac actgccgtct attactgtgc aaagtacccg 300

tactattatg ggacgagcca ctggtatttc gacgtctggg gtcaaggaac cctggtcacc 360

gtctcctcgg cctccaccaa gggcccatcg gtcttccccc tggcaccctc ctccaagagc 420

acctctgggg gcacagcggc cctgggctgc ctggtcaagg actacttccc cgaaccggtg 480

acggtgtcgt ggaactcagg cgccctgacc agcggcgtgc acaccttccc ggctgtccta 540

cagtcctcag gactctactc cctcagcagc gtggtgaccg tgccctccag cagcttgggc 600

acccagacct acatctgcaa cgtgaatcac aagcccagca acaccaaggt cgacaagaaa 660

gttgagccca aatcttgtga caaaactcac ctc 693

<210> 35
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic peptide"

<400> 35
Leu Ser Cys Ala Ala Ser Gly Tyr Asp Phe Thr His Tyr Gly Met Asn
1 5 10 15

Trp Val Arg

<210> 36
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic peptide"

<400> 36
Ser Thr Ala Tyr Leu Gln Met Asn Ser Leu Arg
1 5 10

<210> 37
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic peptide"

<400> 37
Ala Ser Gly Tyr Thr Phe Thr Asn Tyr Gly Met Asn Trp Val Arg
1 5 10 15

<210> 38
<211> 27
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic peptide"

<400> 38
Gln Ala Pro Gly Gln Gly Leu Glu Trp Met Gly Trp Ile Asn Thr Tyr
1 5 10 15

Thr Gly Glu Thr Thr Tyr Ala Asp Asp Phe Lys
20 25

<210> 39
<211> 24
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic peptide"

<400> 39
Val Thr Ile Thr Cys Ile Thr Ser Thr Asp Ile Asp Asp Asp Met Asn
1   5   10   15

Trp Tyr Gln Gln Lys Pro Gly Lys
            20

<210> 40
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic peptide"

<400> 40
Gly Leu Glu Trp Val Gly Met Ile Asp Pro Ser Asn Ser Asp Thr Arg
1   5   10   15

<210> 41
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic peptide"

<400> 41
Asn Thr Ala Tyr Leu Gln Met Asn Ser Leu Arg
1   5   10

<210> 42
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic peptide"

<400> 42
Asp Thr Leu Met Ile Ser Arg
1   5

<210> 43
<211> 5

<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic peptide"

<400> 43
Glu Glu Met Thr Lys
1 5

<210> 44
<211> 23
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic peptide"

<400> 44
Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu
1 5 10 15

His Asn His Tyr Thr Gln Lys
20

<210> 45
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic peptide"

<400> 45
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg

<210> 46
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic polypeptide"

<400> 46
Asp Ile Gln Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Ser Ala Ser Gln Asp Ile Ser Asn Tyr
20 25 30

```
Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Val Leu Ile
        35                  40                  45

Tyr Phe Thr Ser Ser Leu His Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Ser Thr Val Pro Trp
                85                  90                  95

Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

Phe Asn Arg Gly Glu Cys
    210


<210> 47
<211> 231
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic
      polypeptide"

<400> 47
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Tyr Asp Phe Thr His Tyr
            20                  25                  30
```

```
Gly Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Gly Trp Ile Asn Thr Tyr Thr Gly Glu Pro Thr Tyr Ala Ala Asp Phe
    50                  55                  60

Lys Arg Arg Phe Thr Phe Ser Leu Asp Thr Ser Lys Ser Thr Ala Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Lys Tyr Pro Tyr Tyr Tyr Gly Thr Ser His Trp Tyr Phe Asp Val
            100                 105                 110

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly
        115                 120                 125

Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
    130                 135                 140

Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145                 150                 155                 160

Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
                165                 170                 175

Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
            180                 185                 190

Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
        195                 200                 205

Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys
    210                 215                 220

Ser Cys Asp Lys Thr His Leu
225                 230


<210> 48
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic
      polypeptide"

<400> 48
Asp Ile Gln Val Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1               5                   10                  15
```

```
Asp Arg Val Thr Ile Thr Cys Ile Thr Ser Thr Asp Ile Asp Asp Asp
            20                  25                  30

Met Asn Trp Tyr Gln Gln Lys Pro Gly Lys Val Pro Lys Leu Leu Ile
        35                  40                  45

Ser Gly Gly Asn Thr Leu Arg Pro Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

Glu Asp Val Ala Thr Tyr Tyr Cys Leu Gln Ser Asp Ser Leu Pro Tyr
                85                  90                  95

Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

Phe Asn Arg Gly Glu Cys
    210


<210> 49
<211> 223
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic
      polypeptide"

<400> 49
Glu Val Gln Leu Val Gln Ser Gly Pro Glu Leu Lys Lys Pro Gly Ala
1               5                   10                  15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asn Tyr
```

20 25 30

Gly Met Asn Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Trp Ile Asn Thr Tyr Thr Gly Glu Thr Thr Tyr Ala Asp Asp Phe
50 55 60

Lys Gly Arg Phe Val Phe Ser Leu Asp Thr Ser Val Ser Thr Ala Tyr
65 70 75 80

Leu Gln Ile Ser Ser Leu Lys Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Glu Arg Glu Gly Gly Val Asn Asn Trp Gly Gln Gly Thr Leu Val Thr
100 105 110

Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro
115 120 125

Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val
130 135 140

Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala
145 150 155 160

Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly
165 170 175

Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly
180 185 190

Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys
195 200 205

Val Asp Lys Lys Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr
210 215 220

<210> 50
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic polypeptide"

<400> 50
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Lys Ser Ser Gln Ser Leu Leu Tyr Thr
20 25 30

Ser Ser Gln Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys
35 40 45

Ala Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg Glu Ser Gly Val
50 55 60

Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65 70 75 80

Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln
85 90 95

Tyr Tyr Ala Tyr Pro Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile
100 105 110

Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
115 120 125

Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
130 135 140

Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145 150 155 160

Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
165 170 175

Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
180 185 190

Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
195 200 205

Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
210 215 220

<210> 51
<211> 449
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic polypeptide"

<400> 51
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Tyr Thr Phe Thr Ser Tyr
20 25 30

```
Trp Leu His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Gly Met Ile Asp Pro Ser Asn Ser Asp Thr Arg Phe Asn Pro Asn Phe
    50                  55                  60

Lys Asp Arg Phe Thr Ile Ser Ala Asp Thr Ser Lys Asn Thr Ala Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Thr Tyr Arg Ser Tyr Val Thr Pro Leu Asp Tyr Trp Gly Gln Gly
            100                 105                 110

Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
        115                 120                 125

Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
    130                 135                 140

Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145                 150                 155                 160

Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
                165                 170                 175

Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
            180                 185                 190

Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
        195                 200                 205

Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys Asp Lys
    210                 215                 220

Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro
225                 230                 235                 240

Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser
                245                 250                 255

Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp
            260                 265                 270

Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn
        275                 280                 285

Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg Val
    290                 295                 300
```

```
Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu
305                 310                 315                 320

Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys
                325                 330                 335

Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr
            340                 345                 350

Leu Pro Pro Ser Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Ser
        355                 360                 365

Cys Ala Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu
    370                 375                 380

Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu
385                 390                 395                 400

Asp Ser Asp Gly Ser Phe Phe Leu Val Ser Lys Leu Thr Val Asp Lys
                405                 410                 415

Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu
            420                 425                 430

Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly
        435                 440                 445

Lys
```

<210> 52
<211> 227
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic polypeptide"

<400> 52

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Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly
1               5                   10                  15

Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met
            20                  25                  30

Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His
        35                  40                  45

Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val
    50                  55                  60
```

```
His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr
65                  70                  75                  80

Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly
                85                  90                  95

Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile
            100                 105                 110

Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val
        115                 120                 125

Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met Thr Lys Asn Gln Val Ser
    130                 135                 140

Leu Trp Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu
145                 150                 155                 160

Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro
                165                 170                 175

Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val
            180                 185                 190

Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met
        195                 200                 205

His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser
    210                 215                 220

Pro Gly Lys
225
```