

6308474_1
SEQUENCE LISTING

<110> SYSTIMMUNE, INC.
SICHUAN BAILI PHARMACEUTICAL CO. LTD.

<120> MULTI-SPECIFIC ANTIBODIES AND METHODS OF MAKING AND USING THEREOF

<130> SIBA036PCT

<140> PCT/US2018/039157
<141> 2018-06-22

<150> US62524558
<151> 2017-06-25

<160> 40

<170> PatentIn version 3.5

<210> 1
<211> 360
<212> DNA
<213> Artificial Sequence

<220>
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<400> 1
gaggtgcagc tggtggagtc tgggggaggc ttggtccagc ctgggggggc cctgagactc 60
tcctgtgcag cctctggatt caccatcagt accaatgcaa tgagctgggt ccgccaggct 120
ccagggaagg ggctggagtg gatcggagtc attactggtc gtgatatacac atactacgcg 180

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agctgggcga aaggcagatt caccatctcc agagacaatt ccaagaacac gctgtatctt 240

caaatgaaca gcctgagagc cgaggacacg gctgtgtatt actgtgcgcg cgacggtgga 300

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<211> 120

<212> PRT

<213> Artificial Sequence

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<223> synthesized

<400> 2

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 Phe Thr Ile Ser Thr Asn
20 25 30

Ala Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Ile
35 40 45

Gly Val Ile Thr Gly Arg Asp Ile Thr Tyr Tyr Ala Ser Trp Ala Lys
50 55 60

Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr Leu

aattcttttcg gcggagggac caaggtggag atcaaa

336

<210> 4

<211> 112

<212> PRT

<213> Artificial Sequence

<220>

<223> synthesized

<400> 4

Asp Val Val Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
1 5 10 15

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

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

Tyr Glu Ala Ser Lys Leu Ala Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

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

Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gly Tyr Phe Tyr Phe Ile Ser

Arg Thr Tyr Val Asn Ser Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
100 105 110

<210> 5

<211> 375

<212> DNA

<213> Artificial Sequence

<220>

<223> synthesized

<400> 5

caggtgcaat tgggtgaaag cggaggggga ctggtgcagc ccgggggaag tctgaagctg 60

tcctgtgccg ccagcggctt taccttcaac aagtacgcca tgaattgggt ccgacaggcc 120

ccagggaaag gcctggaatg ggtggcacgg attcgggtcca agtacaacaa ctacgccacc 180

tactacgctg actccgtgaa ggacagattc accatcagcc gggacgactc taagaacacc 240

gcctatctgc agatgaacaa cctgaaaacc gaggatacag ctgtgtacta ttgtgtgcgg 300

cacggcaact tcggcaactc ctacatctcc tactgggcct attggggaca gggaacactg 360

gtcaccgtgt ctagc 375

<210> 6

<211> 125

<212> PRT

<213> Artificial Sequence

<220>

<223> synthesized

<400> 6

Gln Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
 1 5 10 15

Ser Leu Lys Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Asn Lys Tyr
 20 25 30

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

Ala Arg Ile Arg Ser Lys Tyr Asn Asn Tyr Ala Thr Tyr Tyr Ala Asp
 50 55 60

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

Ala Tyr Leu Gln Met Asn Asn Leu Lys Thr Glu Asp Thr Ala Val Tyr
 85 90 95

Tyr Cys Val Arg His Gly Asn Phe Gly Asn Ser Tyr Ile Ser Tyr Trp
 100 105 110

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

<210> 7

<211> 333

<212> DNA

<213> Artificial Sequence

<220>

<223> synthesized

<400> 7

cagaccgtgg tcaccagga accttcctg accgtctccc caggcggcac cgtgaccctg 60

acctgtggct cctctaccgg cgctgtgacc tccggcaact accctaactg ggtgcagcag 120

aaaccgggac aggctcctag aggcctgatc ggcggcacca agtttctggc ccctggcacc 180

cctgccagat tctccggctc cctgctggga ggcaaggccg ctctgaccct gtctggcgtg 240

cagcctgagg acgaggccga gtactactgt gtgctgtggt actccaacag atgggtgttc 300

ggaggcggca caaagctgac cgtgctgtcc tcg 333

<210> 8

<211> 111

<212> PRT

<213> Artificial Sequence

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<400> 8

Gln Thr Val Val Thr Gln Glu Pro Ser Leu Thr Val Ser Pro Gly Gly
1 5 10 15

Thr Val Thr Leu Thr Cys Gly Ser Ser Thr Gly Ala Val Thr Ser Gly
20 25 30

Asn Tyr Pro Asn Trp Val Gln Gln Lys Pro Gly Gln Ala Pro Arg Gly
35 40 45

Leu Ile Gly Gly Thr Lys Phe Leu Ala Pro Gly Thr Pro Ala Arg Phe
50 55 60

Ser Gly Ser Leu Leu Gly Gly Lys Ala Ala Leu Thr Leu Ser Gly Val
65 70 75 80

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

Arg Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Ser Ser
100 105 110

<210> 9

<211> 366

<212> DNA

<213> Artificial Sequence

<220>

<223> synthesized

<400> 9

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gctccaggga aggggctgga gtggatcgca tgcattgctg ctggtagtgc tggtatcact	180
tacgacgcga actgggcgaa aggccgggtc accatctcca gagacaattc caagaacacg	240
ctgtatctgc aaatgaacag cctgagagcc gaggacacgg ccgtatatta ctgtgcgaga	300
tcggcgtttt cgttcgacta cgccatggac ctctggggcc agggaaccct ggtcaccgtc	360
tcgagc	366

<210> 10

<211> 122

<212> PRT

<213> Artificial Sequence

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<223> synthesized

<400> 10

Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly

1

5

10

15

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

Tyr Asp Met Cys Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp
35 40 45

Ile Ala Cys Ile Ala Ala Gly Ser Ala Gly Ile Thr Tyr Asp Ala Asn
50 55 60

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

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

Tyr Cys Ala Arg Ser Ala Phe Ser Phe Asp Tyr Ala Met Asp Leu Trp
100 105 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 11

<211> 330

<212> DNA

<213> Artificial sequence

<220>

<223> synthesized

<400> 11

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atcacttgcc aggccagtca gagcattagt tcccacttaa actggtatca gcagaaacca 120

gggaaagccc ctaagctcct gatctataag gcatccactc tggcatctgg ggtcccatca 180

aggttcagcg gcagtggatc tgggacagaa tttactctca ccatcagcag cctgcagcct 240

gatgattttg caacttatta ctgccaacag gggtatagtt ggggtaatgt tgataatgtt 300

ttcggcggag ggaccaaggt ggagatcaaa 330

<210> 12

<211> 110

<212> PRT

<213> Artificial Sequence

<220>

<223> synthesized

<400> 12

Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly

1 5 10 15

Asp Arg Val Thr Ile Thr Cys Gln Ala Ser Gln Ser Ile Ser Ser His

20 25 30

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

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

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

Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Gly Tyr Ser Trp Gly Asn
 85 90 95

Val Asp Asn Val Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
 100 105 110

<210> 13

<211> 360

<212> DNA

<213> Artificial Sequence

<220>

<223> synthesized

<400> 13

cagtcgctgg tggagtctgg gggaggcttg gtacagcctg gggggtcctt gagactctcc 60

tgtgcagcct ctggattctc cttcagtagc aactactgga tatgctgggt ccgccaggct 120

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ccaggggaagg ggctggagtg gatcgcatgc atttatgttg gtagtagtgg tgacacttac 180

tacgcgagct ccgcgaaagg ccggttcacc atctccagag acaattccaa gaacacgctg 240

tatctgcaaa tgaacagcct gagagccgag gacacggccg tatattactg tgcgagagat 300

agtagtagtt attatatgtt taacttgtgg ggccagggaa ccctgggtcac cgtctcgagc 360

<210> 14

<211> 120

<212> PRT

<213> Artificial Sequence

<220>

<223> synthesized

<400> 14

Gln Ser Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly Ser

1 5 10 15

Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Ser Phe Ser Ser Asn Tyr

20 25 30

Trp Ile Cys Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Ile

35 40 45

Ala Cys Ile Tyr Val Gly Ser Ser Gly Asp Thr Tyr Tyr Ala Ser Ser

50 55 60

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

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

Cys Ala Arg Asp Ser Ser Ser Tyr Tyr Met Phe Asn Leu Trp Gly Gln
100 105 110

Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 15

<211> 336

<212> DNA

<213> Artificial Sequence

<220>

<223> synthesized

<400> 15

gcccttgtga tgaccagtc tccttcacc ctgtctgcat ctgtaggaga cagagtcacc 60

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gggaaagccc ctaagctcct gatcttttat gcatccgata tggcatctgg ggtcccatca 180

aggttcagcg gcagtggatc tgggacagaa ttcactctca ccatcagcag cctgcagcct 240

6308474_1

gatgattttg caacttatta ctgccaaggc gggtactata ctagtagtgc tgatacgagg 300

ggtgctttcg gcggagggac caaggtggag atcaaa 336

<210> 16

<211> 112

<212> PRT

<213> Artificial Sequence

<220>

<223> synthesized

<400> 16

Ala Leu Val Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
1 5 10 15

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

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

Phe Tyr Ala Ser Asp Leu Ala Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

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

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Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gly Gly Tyr Tyr Thr Ser Ser
85 90 95

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

<210> 17

<211> 345

<212> DNA

<213> Artificial Sequence

<220>

<223> synthesized

<400> 17

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gggaaggggc tggagtacat cggaaccatt agtagtggtg gtaatgtata ctacgcgagc 180

tccgcgagag gcagattcac catctccaga ccctcgtcca agaacacggt ggatcttcaa 240

atgaacagcc tgagagccga ggacacggct gtgtattact gtgcgagaga ctctgggttat 300

agtgatccta tgtggggcca gggaaccctg gtcaccgtct cgagc 345

<210> 18

<211> 115

<212> PRT

<213> Artificial Sequence

<220>

<223> synthesized

<400> 18

Arg Ser Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly Ser
1 5 10 15

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

Met Gln Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Tyr Ile Gly
35 40 45

Thr Ile Ser Ser Gly Gly Asn Val Tyr Tyr Ala Ser Ser Ala Arg Gly
50 55 60

Arg Phe Thr Ile Ser Arg Pro Ser Ser Lys Asn Thr Val Asp Leu Gln
65 70 75 80

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

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

Val Ser Ser

115

<210> 19

<211> 333

<212> DNA

<213> Artificial Sequence

<220>

<223> synthesized

<400> 19

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gggaaagccc ctaagctcct gatctatgct gcagccaatc tggcatctgg ggtcccatca 180

aggttcagcg gcagtggatc tgggacagat ttcactctca ccatcagcga cctggagcct 240

ggcgatgctg caacttacta ttgtcagtct acctatcttg gtactgatta tgttggcggt 300

gctttcggcg gagggaccaa ggtggagatc aaa 333

<210> 20

<211> 111

<212> PRT

<213> Artificial Sequence

<220>

<223> synthesized

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<400> 20

Asp Val Val Met Thr Gln Ser Pro Ser Ser Val Ser Ala Ser Val Gly
1 5 10 15

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

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

Tyr Ala Ala Ala Asn Leu Ala Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

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

Gly Asp Ala Ala Thr Tyr Tyr Cys Gln Ser Thr Tyr Leu Gly Thr Asp
85 90 95

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

<210> 21

<211> 345

<212> DNA

<213> Artificial Sequence

<220>

<223> synthesized

<400> 21

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gctccagggg aggggctgga gtggatcgca tgcataatata ctggtagccg cgatactcct 180

cactacgcga gctccgcgaa aggccgggtc accatctcca gagacaattc caagaacacg 240

ctgtatctgc aaatgaacag cctgagagcc gaggacacgg ccgtatatta ctgtgcgaga 300

gaaggtagcc tgtggggcca gggaaccctg gtcaccgtct cgagc 345

<210> 22

<211> 115

<212> PRT

<213> Artificial Sequence

<220>

<223> synthesized

<400> 22

Glu Val Gln Leu Leu 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 Ile Asp Phe Ser Arg Arg

20 25 6308474_1 30

Tyr Tyr Met Cys Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp
35 40 45

Ile Ala Cys Ile Tyr Thr Gly Ser Arg Asp Thr Pro His Tyr Ala Ser
50 55 60

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

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

Tyr Cys Ala Arg Glu Gly Ser Leu Trp Gly Gln Gly Thr Leu Val Thr
100 105 110

Val Ser Ser
115

<210> 23

<211> 333

<212> DNA

<213> Artificial Sequence

<220>

<223> synthesized

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<400> 23

gacatccaga tgaccagtc tccttcacc ctgtctgcat ctgtaggaga cagagtcacc 60
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 ccagggaag cccctaagct cctgatctat tctgcatcca ctctggcatc tgggggtcca 180
 tcaaggttca gcggcagtg atctgggaca gaattcactc tcaccatcag cagcctgcag 240
 cctgatgatt ttgcaactta ttactgcgca ggcgggttaca atactgttat tgatactttt 300
 gctttcggcg gagggaccaa ggtggagatc aaa 333

<210> 24

<211> 111

<212> PRT

<213> Artificial Sequence

<220>

<223> synthesized

<400> 24

Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
 1 5 10 15

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

Trp Phe Ser Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu

35 40 6308474_1 45

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

Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln
65 70 75 80

Pro Asp Asp Phe Ala Thr Tyr Tyr Cys Ala Gly Gly Tyr Asn Thr Val
85 90 95

Ile Asp Thr Phe Ala Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
100 105 110

<210> 25

<211> 363

<212> DNA

<213> Artificial Sequence

<220>

<223> synthesized

<400> 25

gaggtgcagc tgggtgcagtc tggagcagag gtgaagaaac caggagagtc tctgaagatc 60

tcctgtaagg gttctggata cagctttagc agttcatgga tcggctgggt gcgccaggca 120

cctgggaaag gcctggaatg gatggggatc atctatcctg atgactctga taccagatac 180

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agtccatcct	tccaaggcca	ggtcaccatc	tcagccgaca	agtccatcag	gactgcctac	240
ctgcagtgga	gtagcctgaa	ggcctcggac	accgctatgt	attactgtgc	gagacatgtt	300
actatgattt	ggggagttat	tattgacttc	tggggccagg	gaaccctggg	caccgtctcc	360
tca						363

<210>	26
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<220>
<223> synthesized

<400> 26

Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Glu
1 5 10 15

Ser Leu Lys Ile Ser Cys Lys Gly Ser Gly Tyr Ser Phe Ser Ser Ser
20 25 30

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

Gly Ile Ile Tyr Pro Asp Asp Ser Asp Thr Arg Tyr Ser Pro Ser Phe
50 55 60

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

Leu Gln Trp Ser Ser Leu Lys Ala Ser Asp Thr Ala Met Tyr Tyr Cys
85 90 95

Ala Arg His Val Thr Met Ile Trp Gly Val Ile Ile Asp Phe Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 27

<211> 321

<212> DNA

<213> Artificial Sequence

<220>

<223> synthesized

<400> 27

gccatccagt tgaccagtc tccatcctcc ctgtctgcat ctgtaggaga cagagtcacc 60

atcacttgcc gggcaagtca gggcattagc agtgctttag cctggtatca gcagaaacca 120

gggaaagctc ctaagctcct gatctatgat gcctccagtt tggaaagtgg ggtcccatca 180

aggttcagcg gcagtggatc tgggacagat ttcactctca ccatcagcag cctgcagcct 240

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gaagattttg caacttatta ctgtcaacag tttaatagtt acccattcac tttcggccct 300

gggaccaaag tggatatcaa a 321

<210> 28

<211> 107

<212> PRT

<213> Artificial Sequence

<220>

<223> synthesized

<400> 28

Ala 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 Arg Ala Ser Gln Gly Ile Ser Ser Ala
20 25 30

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

Tyr Asp Ala Ser Ser Leu Glu 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

6308474_1

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

Thr Phe Gly Pro Gly Thr Lys Val Asp Ile Lys
100 105

<210> 29

<211> 372

<212> DNA

<213> Artificial Sequence

<220>

<223> synthesized

<400> 29

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cctggacagg gtcttgagtg gattggacag atttggcctg gagatggtga tactaactac 180

aatggaaagt tcaaggggaa agccactctg actgcagacg aatcctccag cacagcctac 240

atgcaactca gcagcctagc atctgaggac tctgcggtct atttctgtgc aagacgggag 300

actacgacgg taggccgtta ttactatgct atggactact ggggcccaagg gaccacggtc 360

accgtctcct cc 372

<210> 30

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<211> 124

<212> PRT

<213> Artificial Sequence

<220>

<223> synthesized

<400> 30

Gln Val Gln Leu Gln Gln Ser Gly Ala Glu Leu Val Arg Pro Gly Ser
1 5 10 15

Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Ala Phe Ser Ser Tyr
20 25 30

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

Gly Gln Ile Trp Pro Gly Asp Gly Asp Thr Asn Tyr Asn Gly Lys Phe
50 55 60

Lys Gly Lys Ala Thr Leu Thr Ala Asp Glu Ser Ser Ser Thr Ala Tyr
65 70 75 80

Met Gln Leu Ser Ser Leu Ala Ser Glu Asp Ser Ala Val Tyr Phe Cys
85 90 95

Ala Arg Arg Glu Thr Thr Thr Val Gly Arg Tyr Tyr Tyr Ala Met Asp

100 105 6308474_1 110

Tyr Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser
115 120

<210> 31

<211> 333

<212> DNA

<213> Artificial Sequence

<220>

<223> synthesized

<400> 31

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caacagattc caggacagcc acccaaactc ctcatctatg atgcttccaa tctagtttct 180

gggatcccac ccaggttttag tggcagtggg tctgggacag acttcaccct caacatccat 240

cctgtggaga aggtggatgc tgcaacctat cactgtcagc aaagtactga ggatccgtgg 300

acgttcggtg gagggaccaa gctcgagatt aaa 333

<210> 32

<211> 111

<212> PRT

<213> Artificial Sequence

<220>

<223> synthesized

<400> 32

Asp Ile Gln Leu Thr Gln Ser Pro Ala Ser Leu Ala Val Ser Leu Gly
 1 5 10 15

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

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

Lys Leu Leu Ile Tyr Asp Ala Ser Asn Leu Val Ser Gly Ile Pro Pro
 50 55 60

Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Asn Ile His
 65 70 75 80

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

Glu Asp Pro Trp Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys
 100 105 110

<210> 33

<211> 987

<212> DNA

<213> Artificial Sequence

<220>

<223> synthesized

<400> 33

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tggaactcag gcgccctgac cagcggcgtg cacaccttcc cggtgtcct acagtcctca	180
ggactctact ccctcagcag cgtgggtgacc gtgccctcca gcagcttggg caccagacc	240
tacatctgca acgtgaatca caagcccagc aacaccaagg tggacaagag agttgagccc	300
aaatcttgtg acaaaaactca cacatgcca ccgtgcccag cacctgaagc cgcgggggca	360
ccgtcagtct tcctcttccc cccaaaaccc aaggacaccc tcatgatctc ccggaccct	420
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gagtacaagt gcgcggtctc caacaaagcc ctcccagccc ccatcgagaa aaccatctcc	660
aaagccaaag ggcagccccg agaaccacag gtgtacaccc tgccccatc ccgggatgag	720
ctgaccaaga accagggtcag cctgacctgc ctgggtcaaag gcttctatcc cagcgacatc	780

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gccgtggagt gggagagcaa tgggcagccg gagaacaact acaagaccac gcctcccgtg 840

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cagcagggga acgtcttctc atgctccgtg atgcatgagg ctctgcacaa ccactacacg 960

cagaagagcc tctccctgtc tccgggt 987

<210> 34

<211> 329

<212> PRT

<213> Artificial Sequence

<220>

<223> synthesized

<400> 34

Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys

1 5 10 15

Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr

20 25 30

Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser

35 40 45

Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser

50 55 60

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Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
65 70 75 80

Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
85 90 95

Arg Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys
100 105 110

Pro Ala Pro Glu Ala Ala Gly Ala Pro Ser Val Phe Leu Phe Pro Pro
115 120 125

Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys
130 135 140

Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp
145 150 155 160

Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu
165 170 175

Glu Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu
180 185 190

His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Ala Val Ser Asn

195

200

205

Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly
 210 215 220

Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Asp Glu
 225 230 235 240

Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr
 245 250 255

Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn
 260 265 270

Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe
 275 280 285

Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn
 290 295 300

Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr
 305 310 315 320

Gln Lys Ser Leu Ser Leu Ser Pro Gly
 325

<210> 35
 <211> 321
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> synthesized

<400> 35
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 tggaagggtg ataacgccct ccaatcgggt aactcccagg agagtgtcac agagcaggac 180
 agcaaggaca gcacctacag cctcagcagc accctgacgc tgagcaaagc agactacgag 240
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<210> 36
 <211> 107
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized

<400> 36

Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu

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1

5

10

15

Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe

20

25

30

Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln

35

40

45

Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser

50

55

60

Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu

65

70

75

80

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

85

90

95

Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys

100

105

<210> 37

<211> 3693

<212> DNA

<213> Artificial Sequence

<220>

<223> synthesized

<400> 37

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gggaaagctc ctaagctcct gatctatgat gcctccagtt tggaaagtgg ggtcccatca	180
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ccaggagagt ctctgaagat ctctgtgaag ggttctggat acagcttttag cagttcatgg	480
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gatgactctg ataccagata cagtccatcc ttccaaggcc aggtcaccat ctcagccgac	600
aagtccatca ggactgccta cctgcagtgg agtagcctga aggcctcgga caccgctatg	660
tattactgtg cgagacatgt tactatgatt tggggagtta ttattgactt ctggggccag	720
ggaaccctgg tcaccgtctc ctcaggcggt ggaggggtccg gcggtggtgg atccgacgtc	780
gtgatgacct agtctccttc caccctgtct gcactctgtag gagacagagt caccatcaat	840
tgccaagcca gtgagagcat tagcagttgg ttagcctggt atcagcagaa accagggaaa	900
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cctgatgatt ttgcaactta ttactgccaa caggggtata gttggggtaa tgttgataat 3660
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<210> 38

<211> 1231

<212> PRT

<213> Artificial Sequence

<220>

<223> synthesized

<400> 38

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Ala Ile Gln Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
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Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Gly Ile Ser Ser Ala
20 25 30

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

Tyr Asp Ala Ser Ser Leu Glu 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 Phe Asn Ser Tyr Pro Phe
85 90 95

Thr Phe Gly Pro Gly Thr Lys Val Asp Ile Lys Gly Gly Gly Gly Ser
100 105 110

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Glu
115 120 125

Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Glu Ser

6308474_1
140

130

135

Leu Lys Ile Ser Cys Lys Gly Ser Gly Tyr Ser Phe Ser Ser Ser Trp
145 150 155 160

Ile Gly Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Met Gly
165 170 175

Ile Ile Tyr Pro Asp Asp Ser Asp Thr Arg Tyr Ser Pro Ser Phe Gln
180 185 190

Gly Gln Val Thr Ile Ser Ala Asp Lys Ser Ile Arg Thr Ala Tyr Leu
195 200 205

Gln Trp Ser Ser Leu Lys Ala Ser Asp Thr Ala Met Tyr Tyr Cys Ala
210 215 220

Arg His Val Thr Met Ile Trp Gly Val Ile Ile Asp Phe Trp Gly Gln
225 230 235 240

Gly Thr Leu Val Thr Val Ser Ser Gly Gly Gly Gly Ser Gly Gly Gly
245 250 255

Gly Ser Asp Val Val Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser
260 265 270

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Val Gly Asp Arg Val Thr Ile Asn Cys Gln Ala Ser Glu Ser Ile Ser
275 280 285

Ser Trp Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu
290 295 300

Leu Ile Tyr Glu Ala Ser Lys Leu Ala Ser Gly Val Pro Ser Arg Phe
305 310 315 320

Ser Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu
325 330 335

Gln Pro Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gly Tyr Phe Tyr Phe
340 345 350

Ile Ser Arg Thr Tyr Val Asn Ser Phe Gly Gly Gly Thr Lys Val Glu
355 360 365

Ile Lys Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly
370 375 380

Ser Gly Gly Gly Gly Ser Glu Val Gln Leu Val Glu Ser Gly Gly Gly
385 390 395 400

Leu Val Gln Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly

405 6308474_1 410 415

Phe Thr Ile Ser Thr Asn Ala Met Ser Trp Val Arg Gln Ala Pro Gly
420 425 430

Lys Gly Leu Glu Trp Ile Gly Val Ile Thr Gly Arg Asp Ile Thr Tyr
435 440 445

Tyr Ala Ser Trp Ala Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser
450 455 460

Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr
465 470 475 480

Ala Val Tyr Tyr Cys Ala Arg Asp Gly Gly Ser Ser Ala Ile Thr Ser
485 490 495

Asn Asn Ile Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Gly Gly
500 505 510

Gly Gly Ser Gly Gly Gly Gly Ser Gln Ser Leu Val Glu Ser Gly Gly
515 520 525

Gly Leu Val Gln Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser
530 535 540

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Gly Phe Ser Phe Ser Ser Asn Tyr Trp Ile Cys Trp Val Arg Gln Ala
545 550 555 560

Pro Gly Lys Gly Leu Glu Trp Ile Ala Cys Ile Tyr Val Gly Ser Ser
565 570 575

Gly Asp Thr Tyr Tyr Ala Ser Ser Ala Lys Gly Arg Phe Thr Ile Ser
580 585 590

Arg Asp Asn Ser Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg
595 600 605

Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala Arg Asp Ser Ser Ser Tyr
610 615 620

Tyr Met Phe Asn Leu Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
625 630 635 640

Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
645 650 655

Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr
660 665 670

Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser

675

680

685

Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser
 690 695 700

Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
 705 710 715 720

Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
 725 730 735

Arg Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys
 740 745 750

Pro Ala Pro Glu Ala Ala Gly Ala Pro Ser Val Phe Leu Phe Pro Pro
 755 760 765

Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys
 770 775 780

Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp
 785 790 795 800

Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu
 805 810 815

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Gln Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu
 820 825 830

His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Ala Val Ser Asn
 835 840 845

Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly
 850 855 860

Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Asp Glu
 865 870 875 880

Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr
 885 890 895

Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn
 900 905 910

Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe
 915 920 925

Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn
 930 935 940

Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr

945	950	6308474_1 955	960
Gln Lys Ser Leu Ser Leu Ser Pro Gly Gly Gly Gly Gly Ser Gly Gly			
	965	970	975
Gly Gly Ser Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln			
	980	985	990
Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Ser Phe			
	995	1000	1005
Ser Ser Gly Tyr Asp Met Cys Trp Val Arg Gln Ala Pro Gly Lys			
	1010	1015	1020
Gly Leu Glu Trp Ile Ala Cys Ile Ala Ala Gly Ser Ala Gly Ile			
	1025	1030	1035
Thr Tyr Asp Ala Asn Trp Ala Lys Gly Arg Phe Thr Ile Ser Arg			
	1040	1045	1050
Asp Asn Ser Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg			
	1055	1060	1065
Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala Arg Ser Ala Phe Ser			
	1070	1075	1080

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Phe Asp Tyr Ala Met Asp Leu Trp Gly Gln Gly Thr Leu Val Thr
 1085 1090 1095

Val Ser Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly
 1100 1105 1110

Gly Gly Ser Gly Gly Gly Gly Ser Asp Ile Gln Met Thr Gln Ser
 1115 1120 1125

Pro Ser Thr Leu Ser Ala Ser Val Gly Asp Arg Val Thr Ile Thr
 1130 1135 1140

Cys Gln Ala Ser Gln Ser Ile Ser Ser His Leu Asn Trp Tyr Gln
 1145 1150 1155

Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile Tyr Lys Ala Ser
 1160 1165 1170

Thr Leu Ala Ser Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser
 1175 1180 1185

Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro Asp Asp
 1190 1195 1200

Phe Ala Thr Tyr Tyr Cys Gln Gln Gly Tyr Ser Trp Gly Asn Val

1205 1210 6308474_1 1215

Asp Asn Val Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
1220 1225 1230

<210> 39

<211> 657

<212> DNA

<213> Artificial Sequence

<220>

<223> synthesized

<400> 39

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gggaaagccc ctaagctcct gatcttttat gcatccgatac tggcatctgg ggtcccatca 180

aggttcagcg gcagtggatc tgggacagaa ttcactctca ccatcagcag cctgcagcct 240

gatgattttg caacttatta ctgccaaggc gggtactata ctagtagtgc tgatacgagg 300

ggtgctttcg gcggagggac caaggtggag atcaaacgta cgggtggctgc accatctgtc 360

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ctgaataact tctatcccag agaggccaaa gtacagtgga aggtggataa cgccctccaa 480

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<210> 40

<211> 219

<212> PRT

<213> Artificial Sequence

<220>

<223> synthesized

<400> 40

Ala Leu Val Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
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Asp Arg Val Thr Ile Asn Cys Gln Ala Ser Glu Asp Ile Asp Thr Tyr
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Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Phe Tyr Ala Ser Asp Leu Ala Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

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

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Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gly Gly Tyr Tyr Thr Ser Ser
85 90 95

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

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

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

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

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

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

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

Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys

210

215

6308474_1