

SEQUENCE LISTING

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Buddle, Bryce M.

<120> POLYMER PARTICLES AND USES THEREOF

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<150> US 61/229,318
<151> 2009-07-29

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<170> PatentIn version 3.5

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Page 7

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Phe Ser Gly Trp Asp Ile Asn Thr Pro Ala Phe Glu Trp Tyr Asp Gln
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Ser Gly Leu Ser Val Val Met Pro Val Gly Gly Gln Ser Ser Phe Tyr
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Ser Asp Trp Tyr Gln Pro Ala Cys Gly Lys Ala Gly Cys Gln Thr Tyr
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Lys Trp Glu Thr Phe Leu Thr Ser Glu Leu Pro Gly Trp Leu Gln Ala
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Asn Arg His Val Lys Pro Thr Gly Ser Ala Val Val Gly Leu Ser Met
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Ala Ala Ser Ser Ala Leu Thr Leu Ala Ile Tyr His Pro Gln Gln Phe
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Val Tyr Ala Gly Ala Met Ser Gly Leu Leu Asp Pro Ser Gln Ala Met
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Gly Pro Thr Leu Ile Gly Leu Ala Met Gly Asp Ala Gly Gly Tyr Lys
165 170 175

Ala Ser Asp Met Trp Gly Pro Lys Glu Asp Pro Ala Trp Gln Arg Asn
180 185 190

Asp Pro Leu Leu Asn Val Gly Lys Leu Ile Ala Asn Asn Thr Arg Val
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Trp Val Tyr Cys Gly Asn Gly Lys Pro Ser Asp Leu Gly Gly Asn Asn
210 215 220

Leu Pro Ala Lys Phe Leu Glu Gly Phe Val Arg Thr Ser Asn Ile Lys
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 Phe Gln Asp Ala Tyr Asn Ala Gly Gly Gly His Asn Gly Val Phe Asp
 245 250 255
 Phe Pro Asp Ser Gly Thr His Ser Trp Glu Tyr Trp Gly Ala Gln Leu
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 Asn Ala Met Lys Pro Asp Leu Gln Arg Ala Leu Gly Ala Thr Pro Asn
 275 280 285
 Thr Gly Pro Ala Pro Gln Gly Ala Gly Ser Thr Glu Gln Gln Trp Asn
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 305 310 315 320
 Ser Ile His Ser Leu Leu Asp Glu Gly Lys Gln Ser Leu Thr Lys Leu
 325 330 335
 Ala Ala Ala Trp Gly Gly Ser Gly Ser Glu Ala Tyr Gln Gly Val Gln
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 Gln Lys Trp Asp Ala Thr Ala Thr Glu Leu Asn Asn Ala Leu Gln Asn
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 Gly Thr Glu Gly Asn Gly His Ala Ala Ala Ser Gly Ile Pro Gly Leu
 435 440 445
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 450 455 460
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 465 470 475 480
 Glu Gly Lys Ala Glu Ala Thr Gly Pro Leu His Asp Arg Arg Phe Ala
 485 490 495

Gly Asp Ala Trp Arg Thr Asn Leu Pro Tyr Arg Phe Ala Ala Ala Phe
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Tyr Leu Leu Asn Ala Arg Ala Leu Thr Glu Leu Ala Asp Ala Val Glu
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Ala Asp Ala Lys Thr Arg Gln Arg Ile Arg Phe Ala Ile Ser Gln Trp
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Val Asp Ala Met Ser Pro Ala Asn Phe Leu Ala Thr Asn Pro Glu Ala
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Gln Arg Leu Leu Ile Glu Ser Gly Gly Glu Ser Leu Arg Ala Gly Val
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Arg Asn Met Met Glu Asp Leu Thr Arg Gly Lys Ile Ser Gln Thr Asp
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Glu Ser Ala Phe Glu Val Gly Arg Asn Val Ala Val Thr Glu Gly Ala
595 600 605

Val Val Phe Glu Asn Glu Tyr Phe Gln Leu Leu Gln Tyr Lys Pro Leu
610 615 620

Thr Asp Lys Val His Ala Arg Pro Leu Leu Met Val Pro Pro Cys Ile
625 630 635 640

Asn Lys Tyr Tyr Ile Leu Asp Leu Gln Pro Glu Ser Ser Leu Val Arg
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His Val Val Glu Gln Gly His Thr Val Phe Leu Val Ser Trp Arg Asn
660 665 670

Pro Asp Ala Ser Met Ala Gly Ser Thr Trp Asp Asp Tyr Ile Glu His
675 680 685

Ala Ala Ile Arg Ala Ile Glu Val Ala Arg Asp Ile Ser Gly Gln Asp
690 695 700

Lys Ile Asn Val Leu Gly Phe Cys Val Gly Gly Thr Ile Val Ser Thr
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Ala Leu Ala Val Leu Ala Ala Arg Gly Glu His Pro Ala Ala Ser Val
725 730 735

Thr Leu Leu Thr Thr Leu Leu Asp Phe Ala Asp Thr Gly Ile Leu Asp
740 745 750

Val Phe Val Asp Glu Gly His Val Gln Leu Arg Glu Ala Thr Leu Gly
755 760 765

Gly Gly Ala Gly Ala Pro Cys Ala Leu Leu Arg Gly Leu Glu Leu Ala
Page 15

770

775

780

Asn Thr Phe Ser Phe Leu Arg Pro Asn Asp Leu Val Trp Asn Tyr Val
785 790 795 800

Val Asp Asn Tyr Leu Lys Gly Asn Thr Pro Val Pro Phe Asp Leu Leu
805 810 815

Phe Trp Asn Gly Asp Ala Thr Asn Leu Pro Gly Pro Trp Tyr Cys Trp
820 825 830

Tyr Leu Arg His Thr Tyr Leu Gln Asn Glu Leu Lys Val Pro Gly Lys
835 840 845

Leu Thr Val Cys Gly Val Pro Val Asp Leu Ala Ser Ile Asp Val Pro
850 855 860

Thr Tyr Ile Tyr Gly Ser Arg Glu Asp His Ile Val Pro Trp Thr Ala
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Ala Tyr Ala Ser Thr Ala Leu Leu Ala Asn Lys Leu Arg Phe Val Leu
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Gly Ala Ser Gly His Ile Ala Gly Val Ile Asn Pro Pro Ala Lys Asn
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Lys Arg Ser His Trp Thr Asn Asp Ala Leu Pro Glu Ser Pro Gln Gln
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Trp Leu Ala Gly Ala Ile Glu His His Gly Ser Trp Trp Pro Asp Trp
930 935 940

Thr Ala Trp Leu Ala Gly Gln Ala Gly Ala Lys Arg Ala Ala Pro Ala
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Thr Arg Lys Thr Ser Glu Arg Ser Gln Pro Arg Gly Arg Arg Gln Pro
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Ile Pro Lys Ala Arg Gln Pro Glu Gly Arg Ala Trp Ala Gln Pro Gly
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Tyr Pro Trp Pro Leu Tyr Gly Asn Glu Gly Met Gly Trp Ala Gly Trp
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 Phe Leu Leu Ala Leu Leu Ser Cys Leu Thr Ile Pro Ala Ser Ala Arg
 180 185 190
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 195 200 205
 Gln Glu Gly Lys Ser Gln Pro Phe Lys Val Thr Pro Gly Pro Phe Asp
 210 215 220
 Pro Ala Thr Trp Leu Glu Trp Ser Arg Gln Trp Gln Gly Thr Glu Gly
 225 230 235 240
 Asn Gly His Ala Ala Ala Ser Gly Ile Pro Gly Leu Asp Ala Leu Ala
 245 250 255
 Gly Val Lys Ile Ala Pro Ala Gln Leu Gly Asp Ile Gln Gln Arg Tyr
 260 265 270
 Met Lys Asp Phe Ser Ala Leu Trp Gln Ala Met Ala Glu Gly Lys Ala
 275 280 285
 Glu Ala Thr Gly Pro Leu His Asp Arg Arg Phe Ala Gly Asp Ala Trp
 290 295 300
 Arg Thr Asn Leu Pro Tyr Arg Phe Ala Ala Ala Phe Tyr Leu Leu Asn
 305 310 315 320
 Ala Arg Ala Leu Thr Glu Leu Ala Asp Ala Val Glu Ala Asp Ala Lys
 325 330 335
 Thr Arg Gln Arg Ile Arg Phe Ala Ile Ser Gln Trp Val Asp Ala Met
 340 345 350
 Ser Pro Ala Asn Phe Leu Ala Thr Asn Pro Glu Ala Gln Arg Leu Leu
 355 360 365
 Ile Glu Ser Gly Gly Glu Ser Leu Arg Ala Gly Val Arg Asn Met Met
 370 375 380
 Glu Asp Leu Thr Arg Gly Lys Ile Ser Gln Thr Asp Glu Ser Ala Phe

385		390		395		400
Glu Val Gly Arg	Asn 405	Val Ala Val Thr	Glu 410	Gly Ala Val Val	Phe 415	Glu
Asn Glu Tyr	Phe 420	Gln Leu Leu Gln	Tyr 425	Lys Pro Leu Thr	Asp 430	Lys Val
His Ala Arg	Pro 435	Leu Leu Met	Val 440	Pro Pro Cys Ile	Asn 445	Lys Tyr Tyr
Ile Leu Asp	Leu Gln Pro	Glu 455	Ser Ser Leu Val	Arg 460	His Val Val	Glu
Gln Gly His Thr	Val 470	Phe Leu Val Ser	Trp Arg 475	Asn Pro Asp	Ala	Ser 480
Met Ala Gly Ser	Thr 485	Trp Asp Asp Tyr	Ile 490	Glu His Ala Ala	Ile 495	Arg
Ala Ile Glu	Val 500	Ala Arg Asp Ile	Ser 505	Gly Gln Asp Lys	Ile 510	Asn Val
Leu Gly Phe	Cys 515	Val Gly Gly Thr	Ile 520	Val Ser Thr	Ala 525	Leu Ala Val
Leu Ala Ala	Arg Gly Glu	His 535	Pro Ala Ala Ser	Val 540	Thr Leu Leu Thr	
Thr Leu Leu Asp	Phe 550	Ala Asp Thr Gly	Ile 555	Leu Asp Val Phe	Val 560	Asp
Glu Gly His Val	Gln 565	Leu Arg Glu Ala	Thr 570	Leu Gly Gly Gly	Ala 575	Gly
Ala Pro Cys	Ala 580	Leu Leu Arg Gly	Leu 585	Glu Leu Ala Asn	Thr 590	Phe Ser
Phe Leu Arg	Pro 595	Asn Asp Leu Val	Trp Asn Tyr	Val 605	Val Asp Asn Tyr	
Leu Lys Gly	Asn Thr Pro	Val 615	Pro Phe Asp Leu	Leu 620	Phe Trp Asn Gly	
Asp Ala Thr	Asn Leu Pro	Gly 630	Pro Trp Tyr Cys	Trp 635	Tyr Leu Arg His	
Thr Tyr Leu Gln	Asn 645	Glu Leu Lys Val	Pro 650	Gly Lys Leu Thr	Val 655	Cys
Gly Val Pro	Val 660	Asp Leu Ala Ser	Ile 665	Asp Val Pro Thr	Tyr 670	Ile Tyr

Gly Ser Arg Glu Asp His Ile Val Pro Trp Thr Ala Ala Tyr Ala Ser
675 680 685

Thr Ala Leu Leu Ala Asn Lys Leu Arg Phe Val Leu Gly Ala Ser Gly
690 695 700

His Ile Ala Gly Val Ile Asn Pro Pro Ala Lys Asn Lys Arg Ser His
705 710 715 720

Trp Thr Asn Asp Ala Leu Pro Glu Ser Pro Gln Gln Trp Leu Ala Gly
725 730 735

Ala Ile Glu His His Gly Ser Trp Trp Pro Asp Trp Thr Ala Trp Leu
740 745 750

Ala Gly Gln Ala Gly Ala Lys Arg Ala Ala Pro Ala Asn Tyr Gly Asn
755 760 765

Ala Arg Tyr Arg Ala Ile Glu Pro Ala Pro Gly Arg Tyr Val Lys Ala
770 775 780

Lys Ala
785

<210> 9
<211> 2361
<212> DNA
<213> Artificial

<220>
<223> Synthetic construct pNZ-HepC-PhaCAB

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agaggacctt gattaggtgt tagagctaca cgtaaaacat cagaaagatc acaaccacgt 180
ggtcgtagac aaccaattcc taaagcaaga caaccagaag gtcgtgcttg ggcacaacct 240
ggatatcctt ggcctttata tggtaatgaa ggaatgggtt gggctggatg gttactttct 300
ccaagaggat ctcgtcctag ttgggggtcca actgatacctc gtagacgttc acgtaatcct 360
ggtaaagtta ttgatacact tacttgtgga tttgctgata ttatgggtta tattccatta 420
gttggagcac ctcttggagg tgctgcaaga gctcttgac atggagtctg tgtttttagaa 480
gatggtgtta attatgctac aggaaatcct ccagggtgtt ctttttctat ttttctttta 540
gctttacttt catgtttaac tattcctgct tctgcaacta gtggagggtg aggtggagca 600
acaggaaaag gtgccgcagc ttcaacgcaa gaaggaaaat cacaaccatt taaagttacc 660
ccaggcccat ttgatccagc aacatgggtg gaatgggtcaa gacaatggca aggaactgaa 720
ggaaatggac atgctgctgc tagcgggtatt cctgggtttag atgcacttgc tggagtcaaa 780

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attgctccag ctcaattagg tgatattcaa caacgatata tgaaagattt ttcagctttg      840
tggcaagcaa tggccgaagg aaaagctgaa gctacaggac cacttcatga tcgacgtttt      900
gcaggagatg cctggcgtac aaatttgcct tacagatttg cagctgcttt ttattttatta      960
aatgctcgtg ctttaacaga attggcagat gctgtggaag ctgatgctaa aactcgtcaa     1020
cgtattagat ttgcaattag tcaatggggt gatgctatga gtcctgcaaa tttcttggca     1080
accaatcctg aagcacaacg attacttatc gaatcaggcg gtgaatcact tcgtgctgggt     1140
gtagaaata tgatggaaga ttttaactcga ggtaaaatta gtcaaaccga tgaatcagca     1200
tttgaagtgg gtcgaaatgt agctgttacg gaagggtgctg ttgttttcga aaatgaatat     1260
tttcaattgt tacaatataa acctttaaca gataaagttc atgcccgctc tttgcttatg     1320
gttcctcctt gtattaataa atattacatt ttggatcttc aaccagaaag ctcacttggt     1380
cgacatgttg tcgaacaagg tcataccgtc tttttggtta gttggcgaaa tcctgacgct     1440
agtatggcag gtagtacgtg ggatgattat attgaacacg ctgccattcg agcaattgaa     1500
gttgcacgag atatttctgg tcaagacaaa attaatgtac ttggcttttg tgttggtggt     1560
acaattgttt ctacggcatt agctgtcctt gctgctcgag gagaacatcc tgccgcttct     1620
gtcacattgt tgacaacatt attagatttt gctgatactg gcattcttga tgtgtttgtc     1680
gatgaaggtc acgtacaatt aagagaagca accttaggtg gaggagctgg cgctccatgt     1740
gctttgttaa gaggtttgga acttgcta atatttagct ttcttcgacc aaatgatttg     1800
gtctggaact acgtgggtga caattattta aaaggtaata cgccagttcc tttcgattta     1860
ttgttctgga acggtgatgc aactaattta ccaggacctt ggtactgttg gtatttaaga     1920
cacacatatt tacaaaatga acttaaagtc ccaggaaaat taacagtctg tgggtgttcct     1980
gtagatttag catcaatcga cgtacctact tatatttatg gtagtcgtga agatcatatt     2040
gtgccttgga cagcagcata tgcttcaaca gcacttttgg ccaataaatt acgtttcggt     2100
cttgagacta gtggacacat tgctggagtt attaatcctc cagctaaaaa taaacgttct     2160
cattggacaa atgatgcttt gccagaaagt cctcaacaat ggtagccgg agcaatcgaa     2220
catcatggtt catggtggcc agattggact gcatggttgg ctggtcaagc cggtgcaaaa     2280
cgtgcagcac cagccaatta tggcaatgct cgatatagag ctattgaacc tgcaccaggc     2340
cgttatgtca aagcaaaagc a

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<210> 10
<211> 787
<212> PRT
<213> Artificial

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<220>
<223> HepC-PhaC fusion polypeptide encoded by pNZ-HepC-PhaCAB

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<400> 10

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Met Ala Ser Thr Asn Pro Lys Pro Gln Arg Lys Thr Lys Arg Ser Thr
1          5          10          15

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Asn Arg Arg Pro Gln Asp Val Lys Phe Pro Gly Gly Gly Gln Ile Val
 20 25 30
 Gly Gly Val Tyr Leu Leu Pro Arg Arg Gly Pro Arg Leu Gly Val Arg
 35 40 45
 Ala Thr Arg Lys Thr Ser Glu Arg Ser Gln Pro Arg Gly Arg Arg Gln
 50 55 60
 Pro Ile Pro Lys Ala Arg Gln Pro Glu Gly Arg Ala Trp Ala Gln Pro
 65 70 75 80
 Gly Tyr Pro Trp Pro Leu Tyr Gly Asn Glu Gly Met Gly Trp Ala Gly
 85 90 95
 Trp Leu Leu Ser Pro Arg Gly Ser Arg Pro Ser Trp Gly Pro Thr Asp
 100 105 110
 Pro Arg Arg Arg Ser Arg Asn Leu Gly Lys Val Ile Asp Thr Leu Thr
 115 120 125
 Cys Gly Phe Ala Asp Leu Met Gly Tyr Ile Pro Leu Val Gly Ala Pro
 130 135 140
 Leu Gly Gly Ala Ala Arg Ala Leu Ala His Gly Val Arg Val Leu Glu
 145 150 155 160
 Asp Gly Val Asn Tyr Ala Thr Gly Asn Leu Pro Gly Cys Ser Phe Ser
 165 170 175
 Ile Phe Leu Leu Ala Leu Leu Ser Cys Leu Thr Ile Pro Ala Ser Ala
 180 185 190
 Thr Ser Gly Gly Gly Gly Gly Ala Thr Gly Lys Gly Ala Ala Ala Ser
 195 200 205
 Thr Gln Glu Gly Lys Ser Gln Pro Phe Lys Val Thr Pro Gly Pro Phe
 210 215 220
 Asp Pro Ala Thr Trp Leu Glu Trp Ser Arg Gln Trp Gln Gly Thr Glu
 225 230 235 240
 Gly Asn Gly His Ala Ala Ala Ser Gly Ile Pro Gly Leu Asp Ala Leu
 245 250 255
 Ala Gly Val Lys Ile Ala Pro Ala Gln Leu Gly Asp Ile Gln Gln Arg
 260 265 270
 Tyr Met Lys Asp Phe Ser Ala Leu Trp Gln Ala Met Ala Glu Gly Lys
 275 280 285
 Ala Glu Ala Thr Gly Pro Leu His Asp Arg Arg Phe Ala Gly Asp Ala

290	295	300
Trp 305	Arg Thr Asn Leu 310	Pro Tyr Arg Phe Ala Ala 315
Ala Phe Tyr Leu 320	Asn Ala Arg Ala 325	Leu Thr Glu Leu Ala Asp 330
Ala Val Glu Ala 335	Asp Ala	
Lys Thr Arg Gln 340	Arg Ile Arg Phe Ala 345	Ile Ser Gln Trp Val 350
Asp Ala		
Met Ser Pro 355	Ala Asn Phe Leu 360	Ala Thr Asn Pro Glu 365
Ala Gln Arg Leu		
Leu Ile 370	Glu Ser Gly Gly 375	Glu Ser Leu Arg Ala 380
Gly Val Arg Asn Met		
Met Glu Asp Leu Thr 385	Arg Gly Lys Ile Ser 390	Gln Thr Asp Glu Ser 400
Ala		
Phe Glu Val Gly 405	Arg Asn Val Ala Val 410	Thr Glu Gly Ala Val 415
Val Phe		
Glu Asn Glu Tyr 420	Phe Gln Leu Leu 425	Gln Tyr Lys Pro Leu 430
Thr Asp Lys		
Val His Ala 435	Arg Pro Leu Leu 440	Met Val Pro Pro Cys 445
Ile Asn Lys Tyr		
Tyr Ile 450	Leu Asp Leu Gln 455	Pro Glu Ser Ser Leu 460
Val Arg His Val Val		
Glu Gln Gly His Thr 465	Val Phe Leu Val 470	Ser Trp Arg Asn Pro 475
Asp Ala		
Ser Met Ala Gly 485	Ser Thr Trp Asp Asp 490	Tyr Ile Glu His Ala 495
Ala Ile		
Arg Ala Ile 500	Glu Val Ala Arg Asp 505	Ile Ser Gly Gln Asp 510
Lys Ile Asn		
Val Leu Gly 515	Phe Cys Val Gly 520	Gly Thr Ile Val Ser 525
Thr Ala Leu Ala		
Val Leu 530	Ala Ala Arg Gly 535	Glu His Pro Ala Ala 540
Ser Val Thr Leu Leu		
Thr Thr Leu Leu Asp 545	Phe Ala Asp Thr 550	Gly Ile Leu Asp Val 555
Phe Val		
Asp Glu Gly His 565	Val Gln Leu Arg Glu 570	Ala Thr Leu Gly Gly 575
Gly Ala		

Gly Ala Pro Cys Ala Leu Leu Arg Gly Leu Glu Leu Ala Asn Thr Phe
580 585 590

Ser Phe Leu Arg Pro Asn Asp Leu Val Trp Asn Tyr Val Val Asp Asn
595 600 605

Tyr Leu Lys Gly Asn Thr Pro Val Pro Phe Asp Leu Leu Phe Trp Asn
610 615 620

Gly Asp Ala Thr Asn Leu Pro Gly Pro Trp Tyr Cys Trp Tyr Leu Arg
625 630 635 640

His Thr Tyr Leu Gln Asn Glu Leu Lys Val Pro Gly Lys Leu Thr Val
645 650 655

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

Tyr Gly Ser Arg Glu Asp His Ile Val Pro Trp Thr Ala Ala Tyr Ala
675 680 685

Ser Thr Ala Leu Leu Ala Asn Lys Leu Arg Phe Val Leu Gly Ala Ser
690 695 700

Gly His Ile Ala Gly Val Ile Asn Pro Pro Ala Lys Asn Lys Arg Ser
705 710 715 720

His Trp Thr Asn Asp Ala Leu Pro Glu Ser Pro Gln Gln Trp Leu Ala
725 730 735

Gly Ala Ile Glu His His Gly Ser Trp Trp Pro Asp Trp Thr Ala Trp
740 745 750

Leu Ala Gly Gln Ala Gly Ala Lys Arg Ala Ala Pro Ala Asn Tyr Gly
755 760 765

Asn Ala Arg Tyr Arg Ala Ile Glu Pro Ala Pro Gly Arg Tyr Val Lys
770 775 780

Ala Lys Ala
785

<210> 11
<211> 2775
<212> DNA
<213> Artificial

<220>
<223> Synthetic construct - pET-14b-PhaC-HA1 of H3-PhaC

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60

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acggaactgg	ttcagagctc	tagtaccggt	gaaatctgcg	atagcccgca	tcagattctg	180
gatggcgaaa	attgtacgct	gatcgatgcc	ctgctgggcg	atccgcagtg	cgatggtttt	240
cagaacaaaa	aatgggatct	gttcgtggaa	cgctctaaag	catacagtaa	ctgttaccgg	300
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tttaacaatg	aaagcttcaa	ctggaccggc	gttacgcaga	atggtacgag	tagcgcgtgc	420
attcgtcgca	gtaacaatag	ctttttctct	cgtctgaact	ggctgacca	cctgaaatth	480
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gaatgtatca	ccccgaacgg	ctctattccg	aatgataaac	cgttccagaa	cgtgaatcgc	900
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ggcgcggcag	cttcacgcga	ggaaggcaag	tccaaccat	tcaagggtcac	gccggggcca	1080
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cacgcggccg	cgtccggcat	tccgggcctg	gatgcgctgg	caggcgtcaa	gatcgcgccg	1200
gcgcagctgg	gtgatatcca	gcagcgctac	atgaaggact	tctcagcgct	gtggcaggcc	1260
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gcatggcgca	ccaacctccc	atatcgcttc	gctgccgcgt	tctacctgct	caatgcgcgc	1380
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 aaagccaagg catga 2775

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 <211> 924
 <212> PRT
 <213> Artificial

<220>
 <223> HA1 of H3-PhaC fusion polypeptide encoded by pET-14b-HA1 of H3-PhaC

<220>
 <221> Protein
 <222> (1)..(924)
 <223> HA1 of H3-PhaC

<400> 12

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20 25 30

Asp Gln Ile Glu Val Thr Asn Ala Thr Glu Leu Val Gln Ser Ser Ser
35 40 45

Thr Gly Glu Ile Cys Asp Ser Pro His Gln Ile Leu Asp Gly Glu Asn
50 55 60

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

Gln Asn Lys Lys Trp Asp Leu Phe Val Glu Arg Ser Lys Ala Tyr Ser
85 90 95

Asn Cys Tyr Pro Tyr Asp Val Pro Asp Tyr Ala Ser Leu Arg Ser Leu
100 105 110

Val Ala Ser Ser Gly Thr Leu Glu Phe Asn Asn Glu Ser Phe Asn Trp
 115 120 125
 Thr Gly Val Thr Gln Asn Gly Thr Ser Ser Ala Cys Ile Arg Arg Ser
 130 135 140
 Asn Asn Ser Phe Phe Ser Arg Leu Asn Trp Leu Thr His Leu Lys Phe
 145 150 155 160
 Lys Tyr Pro Ala Leu Asn Val Thr Met Pro Asn Asn Glu Lys Phe Asp
 165 170 175
 Lys Leu Tyr Ile Trp Gly Val His His Pro Gly Thr Asp Asn Asp Gln
 180 185 190
 Ile Phe Pro Tyr Ala Gln Ala Ser Gly Arg Ile Thr Val Ser Thr Lys
 195 200 205
 Arg Ser Gln Gln Thr Val Ile Pro Asn Ile Gly Ser Arg Pro Arg Val
 210 215 220
 Arg Asn Ile Pro Ser Arg Ile Ser Ile Tyr Trp Thr Ile Val Lys Pro
 225 230 235 240
 Gly Asp Ile Leu Leu Ile Asn Ser Thr Gly Asn Leu Ile Ala Pro Arg
 245 250 255
 Gly Tyr Phe Lys Ile Arg Ser Gly Lys Ser Ser Ile Met Arg Ser Asp
 260 265 270
 Ala Pro Ile Gly Lys Cys Asn Ser Glu Cys Ile Thr Pro Asn Gly Ser
 275 280 285
 Ile Pro Asn Asp Lys Pro Phe Gln Asn Val Asn Arg Ile Thr Tyr Gly
 290 295 300
 Ala Cys Pro Arg Tyr Val Lys Gln Asn Thr Leu Lys Leu Ala Thr Gly
 305 310 315 320
 Met Arg Asn Val Pro Glu Lys Gln Thr Arg Thr Gly Gly Gly Gly Gly
 325 330 335
 Ala Thr Gly Lys Gly Ala Ala Ala Ser Thr Gln Glu Gly Lys Ser Gln
 340 345 350
 Pro Phe Lys Val Thr Pro Gly Pro Phe Asp Pro Ala Thr Trp Leu Glu
 355 360 365
 Trp Ser Arg Gln Trp Gln Gly Thr Glu Gly Asn Gly His Ala Ala Ala
 370 375 380
 Ser Gly Ile Pro Gly Leu Asp Ala Leu Ala Gly Val Lys Ile Ala Pro

385		390		395		400									
Ala	Gln	Leu	Gly	Asp 405	Ile	Gln	Gln	Arg	Tyr 410	Met	Lys	Asp	Phe	Ser 415	Ala
Leu	Trp	Gln	Ala 420	Met	Ala	Glu	Gly	Lys 425	Ala	Glu	Ala	Thr	Gly 430	Pro	Leu
His	Asp	Arg 435	Arg	Phe	Ala	Gly	Asp 440	Ala	Trp	Arg	Thr	Asn 445	Leu	Pro	Tyr
Arg	Phe 450	Ala	Ala	Ala	Phe	Tyr 455	Leu	Leu	Asn	Ala	Arg 460	Ala	Leu	Thr	Glu
Leu 465	Ala	Asp	Ala	Val	Glu 470	Ala	Asp	Ala	Lys	Thr 475	Arg	Gln	Arg	Ile	Arg 480
Phe	Ala	Ile	Ser	Gln 485	Trp	Val	Asp	Ala	Met 490	Ser	Pro	Ala	Asn	Phe 495	Leu
Ala	Thr	Asn	Pro 500	Glu	Ala	Gln	Arg	Leu 505	Leu	Ile	Glu	Ser	Gly 510	Gly	Glu
Ser	Leu	Arg 515	Ala	Gly	Val	Arg	Asn 520	Met	Met	Glu	Asp	Leu 525	Thr	Arg	Gly
Lys	Ile 530	Ser	Gln	Thr	Asp	Glu 535	Ser	Ala	Phe	Glu	Val 540	Gly	Arg	Asn	Val
Ala 545	Val	Thr	Glu	Gly	Ala 550	Val	Val	Phe	Glu	Asn 555	Glu	Tyr	Phe	Gln	Leu 560
Leu	Gln	Tyr	Lys	Pro 565	Leu	Thr	Asp	Lys	Val 570	His	Ala	Arg	Pro	Leu 575	Leu
Met	Val	Pro	Pro 580	Cys	Ile	Asn	Lys	Tyr 585	Tyr	Ile	Leu	Asp	Leu 590	Gln	Pro
Glu	Ser	Ser 595	Leu	Val	Arg	His	Val 600	Val	Glu	Gln	Gly	His 605	Thr	Val	Phe
Leu	Val 610	Ser	Trp	Arg	Asn	Pro 615	Asp	Ala	Ser	Met	Ala 620	Gly	Ser	Thr	Trp
Asp 625	Asp	Tyr	Ile	Glu	His 630	Ala	Ala	Ile	Arg	Ala 635	Ile	Glu	Val	Ala	Arg 640
Asp	Ile	Ser	Gly	Gln 645	Asp	Lys	Ile	Asn	Val 650	Leu	Gly	Phe	Cys	Val 655	Gly
Gly	Thr	Ile	Val 660	Ser	Thr	Ala	Leu	Ala 665	Val	Leu	Ala	Ala	Arg 670	Gly	Glu

His Pro Ala Ala Ser Val Thr Leu Leu Thr Thr Leu Leu Asp Phe Ala
 675 680 685
 Asp Thr Gly Ile Leu Asp Val Phe Val Asp Glu Gly His Val Gln Leu
 690 695 700
 Arg Glu Ala Thr Leu Gly Gly Gly Ala Gly Ala Pro Cys Ala Leu Leu
 705 710 715 720
 Arg Gly Leu Glu Leu Ala Asn Thr Phe Ser Phe Leu Arg Pro Asn Asp
 725 730 735
 Leu Val Trp Asn Tyr Val Val Asp Asn Tyr Leu Lys Gly Asn Thr Pro
 740 745 750
 Val Pro Phe Asp Leu Leu Phe Trp Asn Gly Asp Ala Thr Asn Leu Pro
 755 760 765
 Gly Pro Trp Tyr Cys Trp Tyr Leu Arg His Thr Tyr Leu Gln Asn Glu
 770 775 780
 Leu Lys Val Pro Gly Lys Leu Thr Val Cys Gly Val Pro Val Asp Leu
 785 790 795 800
 Ala Ser Ile Asp Val Pro Thr Tyr Ile Tyr Gly Ser Arg Glu Asp His
 805 810 815
 Ile Val Pro Trp Thr Ala Ala Tyr Ala Ser Thr Ala Leu Leu Ala Asn
 820 825 830
 Lys Leu Arg Phe Val Leu Gly Ala Ser Gly His Ile Ala Gly Val Ile
 835 840 845
 Asn Pro Pro Ala Lys Asn Lys Arg Ser His Trp Thr Asn Asp Ala Leu
 850 855 860
 Pro Glu Ser Pro Gln Gln Trp Leu Ala Gly Ala Ile Glu His His Gly
 865 870 875 880
 Ser Trp Trp Pro Asp Trp Thr Ala Trp Leu Ala Gly Gln Ala Gly Ala
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 Glu Pro Ala Pro Gly Arg Tyr Val Lys Ala Lys Ala
 915 920

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<213> Artificial
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 <223> Primer - synthesised in the laboratory
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 <210> 14
 <211> 40
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 <220>
 <223> Primer - synthesised in the laboratory
 <400> 14
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 <210> 15
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 <212> DNA
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 <220>
 <223> Primer - synthesised in the laboratory
 <400> 15
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 <210> 16
 <211> 43
 <212> DNA
 <213> Artificial
 <220>
 <223> Primer - synthesised in the laboratory
 <400> 16
 gatgggatcc tcaggtctgt ttttccggca cattgcgcat gcc 43

 <210> 17
 <211> 3195
 <212> DNA
 <213> Artificial
 <220>
 <223> Synthetic construct - pET-14b-NA-PhaC
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 gaattcaact ccccccaaa caaccaagtg atgctgtgtg aaccaacaat aatagaaaga 180
 aacataacag agatagtgtg tctgaccaac accaccatag agaaggaaat atgccccaaa 240
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 tctaaggaca attcgattag gctttccgct ggtggggaca tctgggtgac aagagaacct 360
 tatgtgtcat gcgatcctga caagtgttat caatttgccc ttggacaggg aacaacacta 420
 aacaacgtgc attcaaatga cacagtacgt gataggacct cttatcggac cctattgatg 480

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gcaactgcta	gcttcattta	caatgggagg	cttgtagata	gtattgtttc	atggtccaaa	660
gaaatcctca	ggaccagga	gtcagaatgc	gtttgtatca	atggaacttg	tacagtagta	720
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tgcatcaaca	agtactacat	cctggacctg	cagccggaga	gctcgctggg	gcgccatgtg	2220
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ctgaccacgc	tgctggactt	tgccgacacg	ggcatcctcg	acgtctttgt	cgacgagggc	2520

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tcggggcata tcgccggtgt gatcaaccg ccggccaaga acaagcgag ccaactggact 3000
aacgatgcgc tgccggagtc gccgcagcaa tggctggccg gcgccatcga gcatcacggc 3060
agctggtggc cggactggac cgcattgctg gccgggcagg ccggcgcgaa acgcgccgcg 3120
cccgccaact atggcaatgc gcgctatcgc gcaatcgaac ccgcgcctgg gcgatacgtc 3180
aaagccaagg catga 3195

<210> 18
<211> 1064
<212> PRT
<213> Artificial

<220>
<223> NA-PhaC fusion polypeptide encoded by pET-14b-NA-PhaC

<400> 18

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1 5 10 15

Ile Ser Thr Ile Cys Phe Phe Met Gln Ile Ala Ile Leu Ile Thr Thr
20 25 30

Val Thr Leu His Phe Lys Gln Tyr Glu Phe Asn Ser Pro Pro Asn Asn
35 40 45

Gln Val Met Leu Cys Glu Pro Thr Ile Ile Glu Arg Asn Ile Thr Glu
50 55 60

Ile Val Tyr Leu Thr Asn Thr Thr Ile Glu Lys Glu Ile Cys Pro Lys
65 70 75 80

Leu Ala Glu Tyr Arg Asn Trp Ser Lys Pro Gln Cys Asp Ile Thr Gly
85 90 95

Phe Ala Pro Phe Ser Lys Asp Asn Ser Ile Arg Leu Ser Ala Gly Gly
100 105 110

Asp Ile Trp Val Thr Arg Glu Pro Tyr Val Ser Cys Asp Pro Asp Lys
115 120 125

Cys Tyr Gln Phe Ala Leu Gly Gln Gly Thr Thr Leu Asn Asn Val His
130 135 140

Ser 145 Asn Asp Thr Val Arg 150 Asp Arg Thr Pro Tyr 155 Arg Thr Leu Leu Met 160
 Asn Glu Leu Gly Val 165 Pro Phe His Leu Gly 170 Thr Lys Gln Val Cys 175 Ile
 Ala Trp Ser Ser 180 Ser Ser Cys His Asp 185 Gly Lys Ala Trp Leu 190 His Val
 Cys Ile Thr 195 Gly Asp Asp Lys Asn 200 Ala Thr Ala Ser Phe 205 Ile Tyr Asn
 Gly Arg 210 Leu Val Asp Ser Ile 215 Val Ser Trp Ser Lys 220 Glu Ile Leu Arg
 Thr 225 Gln Glu Ser Glu Cys 230 Val Cys Ile Asn Gly 235 Thr Cys Thr Val Val 240
 Met Thr Asp Gly Ser 245 Ala Ser Gly Lys Ala 250 Asp Thr Lys Ile Leu Phe 255
 Ile Glu Glu Gly 260 Lys Ile Val His Thr 265 Ser Thr Leu Ser Gly 270 Ser Ala
 Gln His Val 275 Glu Glu Cys Ser Cys 280 Tyr Pro Arg Tyr Pro 285 Gly Val Arg
 Cys Val 290 Cys Arg Asp Asn Trp 295 Lys Gly Ser Asn Arg 300 Pro Ile Val Asp
 Ile 305 Asn Ile Lys Asp His 310 Ser Thr Val Ser Ser 315 Tyr Val Cys Ser Gly 320
 Leu Val Gly Asp Thr 325 Pro Arg Lys Asn Asp 330 Ser Ser Ser Ser Ser 335 His
 Cys Leu Asp Pro 340 Asn Asn Glu Glu Gly 345 Gly His Gly Val Lys 350 Gly Trp
 Ala Phe Asp 355 Asp Gly Asn Asp Val 360 Trp Met Gly Arg Thr 365 Ile Ser Glu
 Lys Ser 370 Arg Leu Gly Tyr Glu 375 Thr Phe Lys Val Ile 380 Glu Gly Trp Ser
 Asn 385 Pro Lys Ser Lys Leu 390 Gln Ile Asn Arg Gln 395 Val Ile Val Asp Arg 400
 Gly Asn Arg Ser Gly 405 Tyr Ser Gly Ile Phe 410 Ser Val Glu Gly Lys 415 Ser

Cys Ile Asn Arg Cys Phe Tyr Val Glu Leu Ile Arg Gly Arg Lys Glu
 420 425 430
 Glu Thr Glu Val Leu Trp Thr Ser Asn Ser Ile Val Val Phe Cys Gly
 435 440 445
 Thr Ser Gly Thr Tyr Gly Thr Gly Ser Trp Pro Asp Gly Ala Asp Ile
 450 455 460
 Asn Leu Met Pro Ile Arg Thr Gly Gly Gly Gly Gly Ala Thr Gly Lys
 465 470 475 480
 Gly Ala Ala Ala Ser Thr Gln Glu Gly Lys Ser Gln Pro Phe Lys Val
 485 490 495
 Thr Pro Gly Pro Phe Asp Pro Ala Thr Trp Leu Glu Trp Ser Arg Gln
 500 505 510
 Trp Gln Gly Thr Glu Gly Asn Gly His Ala Ala Ala Ser Gly Ile Pro
 515 520 525
 Gly Leu Asp Ala Leu Ala Gly Val Lys Ile Ala Pro Ala Gln Leu Gly
 530 535 540
 Asp Ile Gln Gln Arg Tyr Met Lys Asp Phe Ser Ala Leu Trp Gln Ala
 545 550 555 560
 Met Ala Glu Gly Lys Ala Glu Ala Thr Gly Pro Leu His Asp Arg Arg
 565 570 575
 Phe Ala Gly Asp Ala Trp Arg Thr Asn Leu Pro Tyr Arg Phe Ala Ala
 580 585 590
 Ala Phe Tyr Leu Leu Asn Ala Arg Ala Leu Thr Glu Leu Ala Asp Ala
 595 600 605
 Val Glu Ala Asp Ala Lys Thr Arg Gln Arg Ile Arg Phe Ala Ile Ser
 610 615 620
 Gln Trp Val Asp Ala Met Ser Pro Ala Asn Phe Leu Ala Thr Asn Pro
 625 630 635 640
 Glu Ala Gln Arg Leu Leu Ile Glu Ser Gly Gly Glu Ser Leu Arg Ala
 645 650 655
 Gly Val Arg Asn Met Met Glu Asp Leu Thr Arg Gly Lys Ile Ser Gln
 660 665 670
 Thr Asp Glu Ser Ala Phe Glu Val Gly Arg Asn Val Ala Val Thr Glu
 675 680 685

Gly Ala Val Val Phe Glu Asn Glu Tyr Phe Gln Leu Leu Gln Tyr Lys
690 695 700

Pro Leu Thr Asp Lys Val His Ala Arg Pro Leu Leu Met Val Pro Pro
705 710 715 720

Cys Ile Asn Lys Tyr Tyr Ile Leu Asp Leu Gln Pro Glu Ser Ser Leu
725 730 735

Val Arg His Val Val Glu Gln Gly His Thr Val Phe Leu Val Ser Trp
740 745 750

Arg Asn Pro Asp Ala Ser Met Ala Gly Ser Thr Trp Asp Asp Tyr Ile
755 760 765

Glu His Ala Ala Ile Arg Ala Ile Glu Val Ala Arg Asp Ile Ser Gly
770 775 780

Gln Asp Lys Ile Asn Val Leu Gly Phe Cys Val Gly Gly Thr Ile Val
785 790 795 800

Ser Thr Ala Leu Ala Val Leu Ala Ala Arg Gly Glu His Pro Ala Ala
805 810 815

Ser Val Thr Leu Leu Thr Thr Leu Leu Asp Phe Ala Asp Thr Gly Ile
820 825 830

Leu Asp Val Phe Val Asp Glu Gly His Val Gln Leu Arg Glu Ala Thr
835 840 845

Leu Gly Gly Gly Ala Gly Ala Pro Cys Ala Leu Leu Arg Gly Leu Glu
850 855 860

Leu Ala Asn Thr Phe Ser Phe Leu Arg Pro Asn Asp Leu Val Trp Asn
865 870 875 880

Tyr Val Val Asp Asn Tyr Leu Lys Gly Asn Thr Pro Val Pro Phe Asp
885 890 895

Leu Leu Phe Trp Asn Gly Asp Ala Thr Asn Leu Pro Gly Pro Trp Tyr
900 905 910

Cys Trp Tyr Leu Arg His Thr Tyr Leu Gln Asn Glu Leu Lys Val Pro
915 920 925

Gly Lys Leu Thr Val Cys Gly Val Pro Val Asp Leu Ala Ser Ile Asp
930 935 940

Val Pro Thr Tyr Ile Tyr Gly Ser Arg Glu Asp His Ile Val Pro Trp
945 950 955 960

Thr Ala Ala Tyr Ala Ser Thr Ala Leu Leu Ala Asn Lys Leu Arg Phe

965

970

975

Val Leu Gly Ala Ser Gly His Ile Ala Gly Val Ile Asn Pro Pro Ala
 980 985 990

Lys Asn Lys Arg Ser His Trp Thr Asn Asp Ala Leu Pro Glu Ser Pro
 995 1000 1005

Gln Gln Trp Leu Ala Gly Ala Ile Glu His His Gly Ser Trp Trp
 1010 1015 1020

Pro Asp Trp Thr Ala Trp Leu Ala Gly Gln Ala Gly Ala Lys Arg
 1025 1030 1035

Ala Ala Pro Ala Asn Tyr Gly Asn Ala Arg Tyr Arg Ala Ile Glu
 1040 1045 1050

Pro Ala Pro Gly Arg Tyr Val Lys Ala Lys Ala
 1055 1060

<210> 19
 <211> 3228
 <212> DNA
 <213> Artificial

<220>
 <223> Synthetic construct - pET-14b-PhaC-linker-NA

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gaaaccttca	aagtcattga	aggctggtcc	aaccctaagt	ccaaattgca	gataaatagg	3000
caagtcatag	ttgacagagg	taatagggtcc	ggttattctg	gtattttctc	tgttgaaggc	3060

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gaagtcttgt ggacctcaaa cagtattgtt gtgttttgtg gcacctcagg tacatatgga 3180
acaggctcat ggcctgatgg ggcggacatc aatctcatgc ctatataa 3228

<210> 20
<211> 1075
<212> PRT
<213> Artificial

<220>
<223> PhaC-linker-NA fusion polypeptide encoded by
pET-14b-PhaC-linker-NA

<400> 20

Met Ala Thr Gly Lys Gly Ala Ala Ala Ser Thr Gln Glu Gly Lys Ser
1 5 10 15

Gln Pro Phe Lys Val Thr Pro Gly Pro Phe Asp Pro Ala Thr Trp Leu
20 25 30

Glu Trp Ser Arg Gln Trp Gln Gly Thr Glu Gly Asn Gly His Ala Ala
35 40 45

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

Pro Ala Gln Leu Gly Asp Ile Gln Gln Arg Tyr Met Lys Asp Phe Ser
65 70 75 80

Ala Leu Trp Gln Ala Met Ala Glu Gly Lys Ala Glu Ala Thr Gly Pro
85 90 95

Leu His Asp Arg Arg Phe Ala Gly Asp Ala Trp Arg Thr Asn Leu Pro
100 105 110

Tyr Arg Phe Ala Ala Ala Phe Tyr Leu Leu Asn Ala Arg Ala Leu Thr
115 120 125

Glu Leu Ala Asp Ala Val Glu Ala Asp Ala Lys Thr Arg Gln Arg Ile
130 135 140

Arg Phe Ala Ile Ser Gln Trp Val Asp Ala Met Ser Pro Ala Asn Phe
145 150 155 160

Leu Ala Thr Asn Pro Glu Ala Gln Arg Leu Leu Ile Glu Ser Gly Gly
165 170 175

Glu Ser Leu Arg Ala Gly Val Arg Asn Met Met Glu Asp Leu Thr Arg
180 185 190

Gly Lys Ile Ser Gln Thr Asp Glu Ser Ala Phe Glu Val Gly Arg Asn
195 200 205

Val Ala Val Thr Glu Gly Ala Val Val Phe Glu Asn Glu Tyr Phe Gln
 210 215 220
 Leu Leu Gln Tyr Lys Pro Leu Thr Asp Lys Val His Ala Arg Pro Leu
 225 230 235 240
 Leu Met Val Pro Pro Cys Ile Asn Lys Tyr Tyr Ile Leu Asp Leu Gln
 245 250 255
 Pro Glu Ser Ser Leu Val Arg His Val Val Glu Gln Gly His Thr Val
 260 265 270
 Phe Leu Val Ser Trp Arg Asn Pro Asp Ala Ser Met Ala Gly Ser Thr
 275 280 285
 Trp Asp Asp Tyr Ile Glu His Ala Ala Ile Arg Ala Ile Glu Val Ala
 290 295 300
 Arg Asp Ile Ser Gly Gln Asp Lys Ile Asn Val Leu Gly Phe Cys Val
 305 310 315 320
 Gly Gly Thr Ile Val Ser Thr Ala Leu Ala Val Leu Ala Ala Arg Gly
 325 330 335
 Glu His Pro Ala Ala Ser Val Thr Leu Leu Thr Thr Leu Leu Asp Phe
 340 345 350
 Ala Asp Thr Gly Ile Leu Asp Val Phe Val Asp Glu Gly His Val Gln
 355 360 365
 Leu Arg Glu Ala Thr Leu Gly Gly Gly Ala Gly Ala Pro Cys Ala Leu
 370 375 380
 Leu Arg Gly Leu Glu Leu Ala Asn Thr Phe Ser Phe Leu Arg Pro Asn
 385 390 395 400
 Asp Leu Val Trp Asn Tyr Val Val Asp Asn Tyr Leu Lys Gly Asn Thr
 405 410 415
 Pro Val Pro Phe Asp Leu Leu Phe Trp Asn Gly Asp Ala Thr Asn Leu
 420 425 430
 Pro Gly Pro Trp Tyr Cys Trp Tyr Leu Arg His Thr Tyr Leu Gln Asn
 435 440 445
 Glu Leu Lys Val Pro Gly Lys Leu Thr Val Cys Gly Val Pro Val Asp
 450 455 460
 Leu Ala Ser Ile Asp Val Pro Thr Tyr Ile Tyr Gly Ser Arg Glu Asp
 465 470 475 480

His Ile Val Pro Trp Thr Ala Ala Tyr Ala Ser Thr Ala Leu Leu Ala
485 490 495

Asn Lys Leu Arg Phe Val Leu Gly Ala Ser Gly His Ile Ala Gly Val
500 505 510

Ile Asn Pro Pro Ala Lys Asn Lys Arg Ser His Trp Thr Asn Asp Ala
515 520 525

Leu Pro Glu Ser Pro Gln Gln Trp Leu Ala Gly Ala Ile Glu His His
530 535 540

Gly Ser Trp Trp Pro Asp Trp Thr Ala Trp Leu Ala Gly Gln Ala Gly
545 550 555 560

Ala Lys Arg Ala Ala Pro Ala Asn Tyr Gly Asn Ala Arg Tyr Arg Ala
565 570 575

Ile Glu Pro Ala Pro Gly Arg Tyr Val Lys Ala Lys Ala His Met Val
580 585 590

Leu Ala Val Ala Ile Asp Lys Arg Gly Gly Gly Gly Gly Leu Glu Asn
595 600 605

Pro Asn Gln Lys Ile Ile Thr Ile Gly Ser Val Ser Leu Thr Ile Ser
610 615 620

Thr Ile Cys Phe Phe Met Gln Ile Ala Ile Leu Ile Thr Thr Val Thr
625 630 635 640

Leu His Phe Lys Gln Tyr Glu Phe Asn Ser Pro Pro Asn Asn Gln Val
645 650 655

Met Leu Cys Glu Pro Thr Ile Ile Glu Arg Asn Ile Thr Glu Ile Val
660 665 670

Tyr Leu Thr Asn Thr Thr Ile Glu Lys Glu Ile Cys Pro Lys Leu Ala
675 680 685

Glu Tyr Arg Asn Trp Ser Lys Pro Gln Cys Asp Ile Thr Gly Phe Ala
690 695 700

Pro Phe Ser Lys Asp Asn Ser Ile Arg Leu Ser Ala Gly Gly Asp Ile
705 710 715 720

Trp Val Thr Arg Glu Pro Tyr Val Ser Cys Asp Pro Asp Lys Cys Tyr
725 730 735

Gln Phe Ala Leu Gly Gln Gly Thr Thr Leu Asn Asn Val His Ser Asn
740 745 750

Asp Thr Val Arg Asp Arg Thr Pro Tyr Arg Thr Leu Leu Met Asn Glu
Page 41

755					760					765					
Leu	Gly	Val	Pro	Phe	His	Leu	Gly	Thr	Lys	Gln	Val	Cys	Ile	Ala	Trp
	770						775					780			
Ser	Ser	Ser	Ser	Cys	His	Asp	Gly	Lys	Ala	Trp	Leu	His	Val	Cys	Ile
	785				790					795					800
Thr	Gly	Asp	Asp	Lys	Asn	Ala	Thr	Ala	Ser	Phe	Ile	Tyr	Asn	Gly	Arg
				805					810					815	
Leu	Val	Asp	Ser	Ile	Val	Ser	Trp	Ser	Lys	Glu	Ile	Leu	Arg	Thr	Gln
			820					825					830		
Glu	Ser	Glu	Cys	Val	Cys	Ile	Asn	Gly	Thr	Cys	Thr	Val	Val	Met	Thr
		835					840					845			
Asp	Gly	Ser	Ala	Ser	Gly	Lys	Ala	Asp	Thr	Lys	Ile	Leu	Phe	Ile	Glu
	850						855					860			
Glu	Gly	Lys	Ile	Val	His	Thr	Ser	Thr	Leu	Ser	Gly	Ser	Ala	Gln	His
	865				870					875					880
Val	Glu	Glu	Cys	Ser	Cys	Tyr	Pro	Arg	Tyr	Pro	Gly	Val	Arg	Cys	Val
				885					890					895	
Cys	Arg	Asp	Asn	Trp	Lys	Gly	Ser	Asn	Arg	Pro	Ile	Val	Asp	Ile	Asn
			900					905					910		
Ile	Lys	Asp	His	Ser	Thr	Val	Ser	Ser	Tyr	Val	Cys	Ser	Gly	Leu	Val
		915					920					925			
Gly	Asp	Thr	Pro	Arg	Lys	Asn	Asp	Ser	Ser	Ser	Ser	Ser	His	Cys	Leu
	930						935					940			
Asp	Pro	Asn	Asn	Glu	Glu	Gly	Gly	His	Gly	Val	Lys	Gly	Trp	Ala	Phe
	945				950					955					960
Asp	Asp	Gly	Asn	Asp	Val	Trp	Met	Gly	Arg	Thr	Ile	Ser	Glu	Lys	Ser
				965					970					975	
Arg	Leu	Gly	Tyr	Glu	Thr	Phe	Lys	Val	Ile	Glu	Gly	Trp	Ser	Asn	Pro
			980					985					990		
Lys	Ser	Lys	Leu	Gln	Ile	Asn	Arg	Gln	Val	Ile	Val	Asp	Arg	Gly	Asn
		995					1000					1005			
Arg	Ser	Gly	Tyr	Ser	Gly	Ile	Phe	Ser	Val	Glu	Gly	Lys	Ser	Cys	
	1010						1015				1020				
Ile	Asn	Arg	Cys	Phe	Tyr	Val	Glu	Leu	Ile	Arg	Gly	Arg	Lys	Glu	
	1025						1030				1035				

Glu Thr Glu Val Leu Trp Thr Ser Asn Ser Ile Val Val Phe Cys
 1040 1045 1050

Gly Thr Ser Gly Thr Tyr Gly Thr Gly Ser Trp Pro Asp Gly Ala
 1055 1060 1065

Asp Ile Asn Leu Met Pro Ile
 1070 1075

<210> 21
 <211> 2544
 <212> DNA
 <213> Artificial

<220>
 <223> Synthetic construct - pET-14b-M1-PhaC

<400> 21
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 gctctcatgg aatggctaaa gacaagacca attctgtcac ctctgactaa ggggattttg 180
 gggtttgtgt tcacgctcac cgtgcccagt gagcgaggac tgcagcgtag acgctttgtc 240
 caaaatgccc tcaatgggaa tggagatcca aataacatgg acaaagcagt taaactgtat 300
 aggaaactta agagggagat aacgttccat ggggccaaag aaatagctct cagttattct 360
 gctggtgcac ttgccagttg catgggcctc atatacaata gaatgggggc tgtaaccact 420
 gaagtggcat ttggcctggt atgtgcaaca tgtgagcaaa ttgctgactc ccagcacagg 480
 tctcataggc aaatggtggc aacaaccaat ccattaataa aacatgagaa cagaatggtt 540
 ttggccagca ctacagctaa ggctatggag caaatggctg gatcaagtga gcaggcagcg 600
 gaggccatgg agattgctag tcaggccagg cagatggtgc aggcaatgag agccattggg 660
 actcatccta gttccagtac tgggtctaaga gatgatcttc ttgaaaattt gcagacctat 720
 cagaaacgaa tgggggtgca gatgcaacga ttcaagcgta cgggtggcgg tggcgggtgcg 780
 accggcaaag gcgcggcagc ttccacgcag gaaggcaagt cccaaccatt caaggtcacg 840
 ccggggccat tcgatccagc cacatggctg gaatggtccc gccagtggca gggcactgaa 900
 ggcaacggcc acgcggccgc gtccggcatt ccgggcctgg atgcgctggc aggcgtcaag 960
 atcgcgccgg cgcagctggg tgatatccag cagcgctaca tgaaggactt ctcagcgctg 1020
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 gccggcgacg catggcgcac caacctcca tatcgcttcg ctgccgcgtt ctacctgctc 1140
 aatgcgcgcg ccttgaccga gctggccgat gccgtcgagg ccgatgccaa gacccgccag 1200
 cgcatccgct tcgcgatctc gcaatgggtc gatgcgatgt cggccgcaa cttccttgcc 1260
 accaatcccc aggcgcagcg cctgctgata gagtcgggcg gcgaatcgct gcgtgccggc 1320
 gtgcgcaaca tgatggaaga cctgacacgc ggcaagatct cgcagaccga cgagagcgcg 1380

tttgagggtcg gccgcaatgt cgcggtgacc gaaggcgccg tggctcttcga gaacgagtac	1440
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gtgccgcccgt gcatcaacaa gtactacatc ctggacctgc agccggagag ctcgctggtg	1560
cgccatgtgg tggagcaggg acatacgggtg tttctggtgt cgtggcgcaa tccggacgcc	1620
agcatggccg gcagcacctg ggacgactac atcgagcacg cggccatccg cgccatcgaa	1680
gtcgcgcgcg acatcagcgg ccaggacaag atcaacgtgc tcggcttctg cgtggggcggc	1740
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gtcacgctgc tgaccacgct gctggacttt gccgacacgg gcatcctcga cgtctttgtc	1860
gacgagggcc atgtgcagtt gcgcgaggcc acgctgggcg gcggcgccgg cgcgccgtgc	1920
gcgctgctgc gcggccttga gctggccaat accttctcgt tcttgcgccc gaacgacctg	1980
gtgtggaact acgtggtcga caactacctg aagggaaca cgccggtgcc gttcgacctg	2040
ctgttctgga acggcgacgc caccaacctg ccggggccgt ggtactgctg gtacctgcgc	2100
cacacctacc tgcagaacga gctcaaggta ccgggcaagc tgaccgtgtg cggcgtgccg	2160
gtggacctgg ccagcatcga cgtgccgacc tatactctacg gctcgcgcga agaccatata	2220
gtgccgtgga ccgcggccta tgcctcgacc gcgctgctgg cgaacaagct gcgcttcgtg	2280
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cactggacta acgatgcgct gccggagtcg ccgcagcaat ggctggccgg cgccatcgag	2400
catcacggca gctggtggcc ggactggacc gcatggctgg ccgggcaggc cggcgcgaaa	2460
cgcgccgcgc ccgccaacta tggcaatgcg cgctatcgcg caatcgaacc cgcgcctggg	2520
cgatacgtca aagccaaggc atga	2544

<210> 22
 <211> 847
 <212> PRT
 <213> Artificial

<220>
 <223> M1-PhaC fusion polypeptide encoded by pET-14b-M1-PhaC

<400> 22

Met	Ser	Leu	Leu	Thr	Glu	Val	Glu	Thr	Tyr	Val	Leu	Ser	Ile	Val	Pro
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Ser	Gly	Pro	Leu	Lys	Ala	Glu	Ile	Ala	Gln	Arg	Leu	Glu	Asp	Val	Phe
			20					25					30		

Ala	Gly	Lys	Asn	Thr	Asp	Leu	Glu	Ala	Leu	Met	Glu	Trp	Leu	Lys	Thr
		35					40					45			

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

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

Gln Asn Ala Leu Asn Gly Asn Gly Asp Pro Asn Asn Met Asp Lys Ala
 85 90 95
 Val Lys Leu Tyr Arg Lys Leu Lys Arg Glu Ile Thr Phe His Gly Ala
 100 105 110
 Lys Glu Ile Ala Leu Ser Tyr Ser Ala Gly Ala Leu Ala Ser Cys Met
 115 120 125
 Gly Leu Ile Tyr Asn Arg Met Gly Ala Val Thr Thr Glu Val Ala Phe
 130 135 140
 Gly Leu Val Cys Ala Thr Cys Glu Gln Ile Ala Asp Ser Gln His Arg
 145 150 155 160
 Ser His Arg Gln Met Val Ala Thr Thr Asn Pro Leu Ile Lys His Glu
 165 170 175
 Asn Arg Met Val Leu Ala Ser Thr Thr Ala Lys Ala Met Glu Gln Met
 180 185 190
 Ala Gly Ser Ser Glu Gln Ala Ala Glu Ala Met Glu Ile Ala Ser Gln
 195 200 205
 Ala Arg Gln Met Val Gln Ala Met Arg Ala Ile Gly Thr His Pro Ser
 210 215 220
 Ser Ser Thr Gly Leu Arg Asp Asp Leu Leu Glu Asn Leu Gln Thr Tyr
 225 230 235 240
 Gln Lys Arg Met Gly Val Gln Met Gln Arg Phe Lys Arg Thr Gly Gly
 245 250 255
 Gly Gly Gly Ala Thr Gly Lys Gly Ala Ala Ala Ser Thr Gln Glu Gly
 260 265 270
 Lys Ser Gln Pro Phe Lys Val Thr Pro Gly Pro Phe Asp Pro Ala Thr
 275 280 285
 Trp Leu Glu Trp Ser Arg Gln Trp Gln Gly Thr Glu Gly Asn Gly His
 290 295 300
 Ala Ala Ala Ser Gly Ile Pro Gly Leu Asp Ala Leu Ala Gly Val Lys
 305 310 315 320
 Ile Ala Pro Ala Gln Leu Gly Asp Ile Gln Gln Arg Tyr Met Lys Asp
 325 330 335
 Phe Ser Ala Leu Trp Gln Ala Met Ala Glu Gly Lys Ala Glu Ala Thr
 340 345 350

Gly Pro Leu₃₅₅ His Asp Arg Arg Phe₃₆₀ Ala Gly Asp Ala Trp₃₆₅ Arg Thr Asn
 Leu Pro₃₇₀ Tyr Arg Phe Ala₃₇₅ Ala Ala Phe Tyr Leu Leu₃₈₀ Asn Ala Arg Ala
 Leu₃₈₅ Thr Glu Leu Ala Asp₃₉₀ Ala Val Glu Ala Asp₃₉₅ Ala Lys Thr Arg Gln₄₀₀
 Arg Ile Arg Phe₄₀₅ Ile Ser Gln Trp Val₄₁₀ Asp Ala Met Ser Pro₄₁₅ Ala
 Asn Phe Leu Ala₄₂₀ Thr Asn Pro Glu Ala₄₂₅ Gln Arg Leu Leu Ile₄₃₀ Glu Ser
 Gly Gly Glu₄₃₅ Ser Leu Arg Ala Gly₄₄₀ Val Arg Asn Met Met₄₄₅ Glu Asp Leu
 Thr Arg₄₅₀ Gly Lys Ile Ser Gln₄₅₅ Thr Asp Glu Ser Ala₄₆₀ Phe Glu Val Gly
 Arg₄₆₅ Asn Val Ala Val Thr₄₇₀ Glu Gly Ala Val Val₄₇₅ Phe Glu Asn Glu Tyr₄₈₀
 Phe Gln Leu Leu Gln₄₈₅ Tyr Lys Pro Leu Thr₄₉₀ Asp Lys Val His Ala₄₉₅ Arg
 Pro Leu Leu Met₅₀₀ Val Pro Pro Cys Ile₅₀₅ Asn Lys Tyr Tyr Ile₅₁₀ Leu Asp
 Leu Gln Pro₅₁₅ Glu Ser Ser Leu Val₅₂₀ Arg His Val Val Glu₅₂₅ Gln Gly His
 Thr Val₅₃₀ Phe Leu Val Ser Trp₅₃₅ Arg Asn Pro Asp Ala₅₄₀ Ser Met Ala Gly
 Ser₅₄₅ Thr Trp Asp Asp Tyr₅₅₀ Ile Glu His Ala Ala₅₅₅ Ile Arg Ala Ile Glu₅₆₀
 Val Ala Arg Asp Ile₅₆₅ Ser Gly Gln Asp Lys₅₇₀ Ile Asn Val Leu Gly₅₇₅ Phe
 Cys Val Gly Gly₅₈₀ Thr Ile Val Ser Thr₅₈₅ Ala Leu Ala Val Leu₅₉₀ Ala Ala
 Arg Gly Glu₅₉₅ His Pro Ala Ala Ser₆₀₀ Val Thr Leu Leu Thr₆₀₅ Thr Leu Leu
 Asp Phe₆₁₀ Ala Asp Thr Gly Ile₆₁₅ Leu Asp Val Phe Val₆₂₀ Asp Glu Gly His

Val Gln Leu Arg Glu Ala Thr Leu Gly Gly Gly Ala Gly Ala Pro Cys
625 630 635 640

Ala Leu Leu Arg Gly Leu Glu Leu Ala Asn Thr Phe Ser Phe Leu Arg
645 650 655

Pro Asn Asp Leu Val Trp Asn Tyr Val Val Asp Asn Tyr Leu Lys Gly
660 665 670

Asn Thr Pro Val Pro Phe Asp Leu Leu Phe Trp Asn Gly Asp Ala Thr
675 680 685

Asn Leu Pro Gly Pro Trp Tyr Cys Trp Tyr Leu Arg His Thr Tyr Leu
690 695 700

Gln Asn Glu Leu Lys Val Pro Gly Lys Leu Thr Val Cys Gly Val Pro
705 710 715 720

Val Asp Leu Ala Ser Ile Asp Val Pro Thr Tyr Ile Tyr Gly Ser Arg
725 730 735

Glu Asp His Ile Val Pro Trp Thr Ala Ala Tyr Ala Ser Thr Ala Leu
740 745 750

Leu Ala Asn Lys Leu Arg Phe Val Leu Gly Ala Ser Gly His Ile Ala
755 760 765

Gly Val Ile Asn Pro Pro Ala Lys Asn Lys Arg Ser His Trp Thr Asn
770 775 780

Asp Ala Leu Pro Glu Ser Pro Gln Gln Trp Leu Ala Gly Ala Ile Glu
785 790 795 800

His His Gly Ser Trp Trp Pro Asp Trp Thr Ala Trp Leu Ala Gly Gln
805 810 815

Ala Gly Ala Lys Arg Ala Ala Pro Ala Asn Tyr Gly Asn Ala Arg Tyr
820 825 830

Arg Ala Ile Glu Pro Ala Pro Gly Arg Tyr Val Lys Ala Lys Ala
835 840 845

<210> 23
<211> 2577
<212> DNA
<213> Artificial

<220>
<223> Synthetic construct - pET-14b-PhaC-linker-M1

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gtcacgccgg ggccattcga tccagccaca tggctggaat ggtcccgcga gtggcagggc 120

actgaaggca acggccacgc ggccgcgtcc ggcattccgg gcctggatgc gctggcaggc	180
gtcaagatcg cgccggcgca gctgggtgat atccagcagc gctacatgaa ggactttctca	240
gcgctgtggc aggccatggc cgagggcaag gccgaggcca ccggtccgct gcacgaccgg	300
cgcttcgccg gcgacgcatg gcgcaccaac ctcccatatc gcttcgctgc cgcgttctac	360
ctgctcaatg cgcgcgctt gaccgagctg gccgatgccg tcgaggccga tgccaagacc	420
cgccagcgca tccgcttcgc gatctcgcaa tgggtcgatg cgatgtcgcc cgccaacttc	480
cttgccacca atcccaggc gcagcgcctg ctgatcgagt cgggcggcga atcgctgcgt	540
gccggcgtgc gcaacatgat ggaagacctg acacgcggca agatctcgca gaccgacgag	600
agcgcgtttg aggtcggccg caatgtcgcg gtgaccgaag gcgccgtggt cttcgagaac	660
gagtacttcc agctgttgca gtacaagccg ctgaccgaca aggtgcacgc gcgcccgtg	720
ctgatggtgc cgccgtgcat caacaagtac tacatcctgg acctgcagcc ggagagctcg	780
ctggtgcgcc atgtggtgga gcagggacat acggtgtttc tgggtgtcgtg gcgcaatccg	840
gacgccagca tggccggcag cacctgggac gactacatcg agcacgcggc catccgcgcc	900
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ggcggcacca ttgtctcgac cgcgctggcg gtgctggccg cgcgcggcga gcacccggcc	1020
gccagcgtca cgctgctgac cacgctgctg gactttgccg acacgggcat cctcgacgtc	1080
tttgtcgacg agggccatgt gcagttgcgc gaggccacgc tgggcggcg cgccggcgcg	1140
ccgtgcgcgc tgctgcgcgg ccttgagctg gccaatacct tctcgttctt gcgcccgaac	1200
gacctggtgt ggaactacgt ggtcgacaac tacctgaagg gcaacacgcc ggtgccgttc	1260
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ctgcgccaca cctacctga gaacgagctc aaggtaccgg gcaagctgac cgtgtgcggc	1380
gtgccggtgg acctggccag catcgacgtg ccgacctata tctacggctc gcgcgaagac	1440
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ttcgtgctgg gtgcgtcggg ccatatcgcc ggtgtgatca acccgccggc caagaacaag	1560
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tcaagtgagc aggcagcggg ggccatggag attgctagtc aggccaggca gatggtgcag 2460
gcaatgagag ccattgggac tcatcctagt tccagtactg gtctaagaga tgatcttctt 2520
gaaaatttgc agacctatca gaaacgaatg ggggtgcaga tgcaacgatt caagtga 2577

<210> 24
<211> 858
<212> PRT
<213> Artificial

<220>
<223> PhaC-linker-M1 fusion polypeptide encoded by
pET-14b-PhaC-linker-M1

<400> 24

Met Ala Thr Gly Lys Gly Ala Ala Ala Ser Thr Gln Glu Gly Lys Ser
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Gln Pro Phe Lys Val Thr Pro Gly Pro Phe Asp Pro Ala Thr Trp Leu
20 25 30

Glu Trp Ser Arg Gln Trp Gln Gly Thr Glu Gly Asn Gly His Ala Ala
35 40 45

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

Pro Ala Gln Leu Gly Asp Ile Gln Gln Arg Tyr Met Lys Asp Phe Ser
65 70 75 80

Ala Leu Trp Gln Ala Met Ala Glu Gly Lys Ala Glu Ala Thr Gly Pro
85 90 95

Leu His Asp Arg Arg Phe Ala Gly Asp Ala Trp Arg Thr Asn Leu Pro
100 105 110

Tyr Arg Phe Ala Ala Ala Phe Tyr Leu Leu Asn Ala Arg Ala Leu Thr
115 120 125

Glu Leu Ala Asp Ala Val Glu Ala Asp Ala Lys Thr Arg Gln Arg Ile
130 135 140

Arg Phe Ala Ile Ser Gln Trp Val Asp Ala Met Ser Pro Ala Asn Phe
145 150 155 160

Leu Ala Thr Asn Pro Glu Ala Gln Arg Leu Leu Ile Glu Ser Gly Gly
165 170 175

Glu Ser Leu Arg Ala Gly Val Arg Asn Met Met Glu Asp Leu Thr Arg
180 185 190

Gly Lys Ile Ser Gln Thr Asp Glu Ser Ala Phe Glu Val Gly Arg Asn
195 200 205

Val Ala Val Thr Glu Gly Ala Val Val Phe Glu Asn Glu Tyr Phe Gln
210 215 220

Leu Leu Gln Tyr Lys Pro Leu Thr Asp Lys Val His Ala Arg Pro Leu
225 230 235 240

Leu Met Val Pro Pro Cys Ile Asn Lys Tyr Tyr Ile Leu Asp Leu Gln
245 250 255

Pro Glu Ser Ser Leu Val Arg His Val Val Glu Gln Gly His Thr Val
260 265 270

Phe Leu Val Ser Trp Arg Asn Pro Asp Ala Ser Met Ala Gly Ser Thr
275 280 285

Trp Asp Asp Tyr Ile Glu His Ala Ala Ile Arg Ala Ile Glu Val Ala
290 295 300

Arg Asp Ile Ser Gly Gln Asp Lys Ile Asn Val Leu Gly Phe Cys Val
305 310 315 320

Gly Gly Thr Ile Val Ser Thr Ala Leu Ala Val Leu Ala Ala Arg Gly
325 330 335

Glu His Pro Ala Ala Ser Val Thr Leu Leu Thr Thr Leu Leu Asp Phe
340 345 350

Ala Asp Thr Gly Ile Leu Asp Val Phe Val Asp Glu Gly His Val Gln
355 360 365

Leu Arg Glu Ala Thr Leu Gly Gly Gly Ala Gly Ala Pro Cys Ala Leu
370 375 380

Leu Arg Gly Leu Glu Leu Ala Asn Thr Phe Ser Phe Leu Arg Pro Asn
385 390 395 400

Asp Leu Val Trp Asn Tyr Val Val Asp Asn Tyr Leu Lys Gly Asn Thr
405 410 415

Pro Val Pro Phe Asp Leu Leu Phe Trp Asn Gly Asp Ala Thr Asn Leu
420 425 430

Pro Gly Pro Trp Tyr Cys Trp Tyr Leu Arg His Thr Tyr Leu Gln Asn
435 440 445

Glu Leu Lys Val Pro Gly Lys Leu Thr Val Cys Gly Val Pro Val Asp
Page 50

450	455	460
Leu 465	Ala Ser Ile Asp Val 470	Pro Thr Tyr Ile Tyr 475
	Gly Ser Arg Glu Asp 480	
His Ile Val Pro 485	Thr Ala Ala Tyr Ala 490	Ser Thr Ala Leu 495
Asn Lys Leu Arg 500	Phe Val Leu Gly Ala 505	Ser Gly His Ile Ala 510
Ile Asn Pro 515	Pro Ala Lys Asn Lys 520	Arg Ser His Trp Thr 525
Leu Pro 530	Glu Ser Pro Gln Gln 535	Trp Leu Ala Gly Ala 540
	Ile Glu His His	
Gly 545	Ser Trp Trp Pro Asp 550	Trp Thr Ala Trp Leu 555
	Ala Gly Gln Ala Gly 560	
Ala Lys Arg Ala 565	Ala Pro Ala Asn Tyr Gly 570	Asn Ala Arg Tyr Arg 575
Ile Glu Pro 580	Ala Pro Gly Arg Tyr Val 585	Lys Ala Lys Ala His 590
	Met Val	
Leu Ala Val 595	Ala Ile Asp Lys Arg 600	Gly Gly Gly Gly Gly 605
Leu Leu Thr 610	Glu Val Glu Thr Tyr Val 615	Leu Ser Ile Val Pro 620
	Ser Gly	
Pro 625	Leu Lys Ala Glu Ile 630	Ala Gln Arg Leu Glu 635
	Asp Val Phe Ala Gly 640	
Lys Asn Thr Asp 645	Leu Glu Ala Leu Met Glu 650	Trp Leu Lys Thr Arg 655
Ile Leu Ser 660	Pro Leu Thr Lys Gly Ile 665	Leu Gly Phe Val Phe 670
	Thr Leu	
Thr Val Pro 675	Ser Glu Arg Gly Leu 680	Gln Arg Arg Arg Phe 685
	Val Gln Asn	
Ala Leu 690	Asn Gly Asn Gly Asp 695	Pro Asn Asn Met Asp 700
	Lys Ala Val Lys	
Leu Tyr Arg Lys 705	Leu Lys Arg Glu Ile Thr 710	Phe His Gly Ala Lys 715
	Glu	
Ile Ala Leu Ser 725	Tyr Ser Ala Gly Ala Leu 730	Ala Ser Cys Met Gly 735
	Leu	

Ile Tyr Asn Arg Met Gly Ala Val Thr Thr Glu Val Ala Phe Gly Leu
740 745 750

Val Cys Ala Thr Cys Glu Gln Ile Ala Asp Ser Gln His Arg Ser His
755 760 765

Arg Gln Met Val Ala Thr Thr Asn Pro Leu Ile Lys His Glu Asn Arg
770 775 780

Met Val Leu Ala Ser Thr Thr Ala Lys Ala Met Glu Gln Met Ala Gly
785 790 795 800

Ser Ser Glu Gln Ala Ala Glu Ala Met Glu Ile Ala Ser Gln Ala Arg
805 810 815

Gln Met Val Gln Ala Met Arg Ala Ile Gly Thr His Pro Ser Ser Ser
820 825 830

Thr Gly Leu Arg Asp Asp Leu Leu Glu Asn Leu Gln Thr Tyr Gln Lys
835 840 845

Arg Met Gly Val Gln Met Gln Arg Phe Lys
850 855

<210> 25
<211> 4005
<212> DNA
<213> Artificial

<220>
<223> Synthetic construct - pET14b-NA-PhaC-linker-M1

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gaattcaact ccccccaaa caaccaagtg atgctgtgtg aaccaacaat aatagaaaga 180
aacataacag agatagtgtg tctgaccaac accaccatag agaaggaaat atgccccaaa 240
ctagcagaat acagaaattg gtcaaagccg caatgtgaca ttacaggatt tgcacctttt 300
tctaaggaca attcgattag gctttccgct ggtggggaca tctgggtgac aagagaacct 360
tatgtgtcat gcgatcctga caagtgttat caatttgccc ttggacaggg aacaacta 420
aacaacgtgc attcaaatga cacagtacgt gataggaccc cttatcggac cctattgatg 480
aatgagttag gtgttccttt tcatctgggg accaagcaag tgtgcatagc atggtccagc 540
tcaagttgtc acgatggaaa agcatggctg catgtttgta taacggggga tgataaaaat 600
gcaactgcta gcttcattta caatgggagg cttgtagata gtattgtttc atggtccaaa 660
gaaatcctca ggaccagga gtcagaatgc gtttgtatca atggaacttg tacagtagta 720
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aaaatcgttc atactagcac attgtcagga agtgctcagc atgtcgagga gtgctcctgc	840
tatcctcgat atcctggtgt cagatgtgtc tgcagagaca actggaaagg ctccaatagg	900
cccatcgtag atataaacat aaaggatcat agcactgttt ccagttatgt gtgttcagga	960
cttgttggag acacacccag aaaaaacgac agctccagca gtagccattg tttagatcct	1020
aacaatgaag aagggtgtca tggagtgaag ggctgggcct ttgatgatgg aaatgacgtg	1080
tggatgggaa gaacgatcag cgagaagtcg cgcttagggg atgaaacctt caaagtcatt	1140
gaaggctggt ccaaccctaa gtccaaattg cagataaata ggcaagtcatt agttgacaga	1200
ggtaatagggt ccggttattc tgggtattttc tctgttgaag gcaaaagctg catcaatcgg	1260
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 pET-14b-NA-PhaC-linker-M1

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Val Thr Leu His Phe Lys Gln Tyr Glu Phe Asn Ser Pro Pro Asn Asn
 35 40 45

Gln Val Met Leu Cys Glu Pro Thr Ile Ile Glu Arg Asn Ile Thr Glu
 50 55 60

Ile Val Tyr Leu Thr Asn Thr Thr Ile Glu Lys Glu Ile Cys Pro Lys
 65 70 75 80

Leu Ala Glu Tyr Arg₈₅ Asn Trp Ser Lys₉₀ Pro Gln Cys Asp Ile₉₅ Thr Gly
 Phe Ala Pro Phe₁₀₀ Ser Lys Asp Asn₁₀₅ Ser Ile Arg Leu Ser Ala₁₁₀ Gly Gly
 Asp Ile Trp₁₁₅ Val Thr Arg Glu₁₂₀ Pro Tyr Val Ser Cys Asp₁₂₅ Pro Asp Lys
 Cys Tyr₁₃₀ Gln Phe Ala Leu Gly₁₃₅ Gln Gly Thr Thr Leu₁₄₀ Asn Asn Val His
 Ser₁₄₅ Asn Asp Thr Val₁₅₀ Arg Asp Arg Thr Pro Tyr₁₅₅ Arg Thr Leu Leu Met₁₆₀
 Asn Glu Leu Gly Val₁₆₅ Pro Phe His Leu Gly₁₇₀ Thr Lys Gln Val Cys₁₇₅ Ile
 Ala Trp Ser Ser₁₈₀ Ser Ser Cys His Asp₁₈₅ Gly Lys Ala Trp Leu₁₉₀ His Val
 Cys Ile Thr₁₉₅ Gly Asp Asp Lys Asn₂₀₀ Ala Thr Ala Ser Phe₂₀₅ Ile Tyr Asn
 Gly Arg₂₁₀ Leu Val Asp Ser Ile₂₁₅ Val Ser Trp Ser Lys₂₂₀ Glu Ile Leu Arg
 Thr₂₂₅ Gln Glu Ser Glu Cys₂₃₀ Val Cys Ile Asn Gly₂₃₅ Thr Cys Thr Val Val₂₄₀
 Met Thr Asp Gly Ser₂₄₅ Ala Ser Gly Lys Ala₂₅₀ Asp Thr Lys Ile Leu₂₅₅ Phe
 Ile Glu Glu Gly₂₆₀ Lys Ile Val His Thr₂₆₅ Ser Thr Leu Ser Gly₂₇₀ Ser Ala
 Gln His Val₂₇₅ Glu Glu Cys Ser Cys₂₈₀ Tyr Pro Arg Tyr Pro₂₈₅ Gly Val Arg
 Cys Val₂₉₀ Cys Arg Asp Asn Trp₂₉₅ Lys Gly Ser Asn Arg₃₀₀ Pro Ile Val Asp
 Ile₃₀₅ Asn Ile Lys Asp His₃₁₀ Ser Thr Val Ser Ser₃₁₅ Tyr Val Cys Ser Gly₃₂₀
 Leu Val Gly Asp Thr₃₂₅ Pro Arg Lys Asn Asp₃₃₀ Ser Ser Ser Ser Ser₃₃₅ His
 Cys Leu Asp Pro₃₄₀ Asn Asn Glu Glu Gly₃₄₅ Gly His Gly Val Lys₃₅₀ Gly Trp

Ala Phe Asp₃₅₅ Asp Gly Asn Asp Val₃₆₀ Trp Met Gly Arg Thr₃₆₅ Ile Ser Glu
 Lys Ser₃₇₀ Arg Leu Gly Tyr Glu₃₇₅ Thr Phe Lys Val Ile₃₈₀ Glu Gly Trp Ser
 Asn₃₈₅ Pro Lys Ser Lys Leu₃₉₀ Gln Ile Asn Arg Gln₃₉₅ Val Ile Val Asp Arg₄₀₀
 Gly Asn Arg Ser Gly₄₀₅ Tyr Ser Gly Ile Phe₄₁₀ Ser Val Glu Gly Lys₄₁₅ Ser
 Cys Ile Asn Arg₄₂₀ Cys Phe Tyr Val Glu₄₂₅ Leu Ile Arg Gly Arg₄₃₀ Lys Glu
 Glu Thr Glu₄₃₅ Val Leu Trp Thr Ser₄₄₀ Asn Ser Ile Val Val₄₄₅ Phe Cys Gly
 Thr Ser₄₅₀ Gly Thr Tyr Gly Thr₄₅₅ Gly Ser Trp Pro Asp₄₆₀ Gly Ala Asp Ile
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 Lys Gly Ala Ala Ala₄₈₅ Ser Thr Gln Glu Gly₄₉₀ Lys Ser Gln Pro Phe₄₉₅ Lys
 Val Thr Pro Gly₅₀₀ Pro Phe Asp Pro Ala₅₀₅ Thr Trp Leu Glu Trp₅₁₀ Ser Arg
 Gln Trp Gln₅₁₅ Gly Thr Glu Gly Asn₅₂₀ Gly His Ala Ala Ala₅₂₅ Ser Gly Ile
 Pro Gly₅₃₀ Leu Asp Ala Leu Ala₅₃₅ Gly Val Lys Ile Ala₅₄₀ Pro Ala Gln Leu
 Gly₅₄₅ Asp Ile Gln Gln Arg₅₅₀ Tyr Met Lys Asp Phe₅₅₅ Ser Ala Leu Trp Gln₅₆₀
 Ala Met Ala Glu Gly₅₆₅ Lys Ala Glu Ala Thr₅₇₀ Gly Pro Leu His Asp₅₇₅ Arg
 Arg Phe Ala Gly₅₈₀ Asp Ala Trp Arg Thr₅₈₅ Asn Leu Pro Tyr Arg₅₉₀ Phe Ala
 Ala Ala Phe₅₉₅ Tyr Leu Leu Asn Ala₆₀₀ Arg Ala Leu Thr Glu₆₀₅ Leu Ala Asp
 Ala Val₆₁₀ Glu Ala Asp Ala Lys₆₁₅ Thr Arg Gln Arg Ile₆₂₀ Arg Phe Ala Ile

Ser Gln Trp Val Asp Ala Met Ser Pro Ala Asn Phe Leu Ala Thr Asn
 625 630 635 640
 Pro Glu Ala Gln Arg Leu Leu Ile Glu Ser Gly Gly Glu Ser Leu Arg
 645 650 655
 Ala Gly Val Arg Asn Met Met Glu Asp Leu Thr Arg Gly Lys Ile Ser
 660 665 670
 Gln Thr Asp Glu Ser Ala Phe Glu Val Gly Arg Asn Val Ala Val Thr
 675 680 685
 Glu Gly Ala Val Val Phe Glu Asn Glu Tyr Phe Gln Leu Leu Gln Tyr
 690 695 700
 Lys Pro Leu Thr Asp Lys Val His Ala Arg Pro Leu Leu Met Val Pro
 705 710 715 720
 Pro Cys Ile Asn Lys Tyr Tyr Ile Leu Asp Leu Gln Pro Glu Ser Ser
 725 730 735
 Leu Val Arg His Val Val Glu Gln Gly His Thr Val Phe Leu Val Ser
 740 745 750
 Trp Arg Asn Pro Asp Ala Ser Met Ala Gly Ser Thr Trp Asp Asp Tyr
 755 760 765
 Ile Glu His Ala Ala Ile Arg Ala Ile Glu Val Ala Arg Asp Ile Ser
 770 775 780
 Gly Gln Asp Lys Ile Asn Val Leu Gly Phe Cys Val Gly Gly Thr Ile
 785 790 795 800
 Val Ser Thr Ala Leu Ala Val Leu Ala Ala Arg Gly Glu His Pro Ala
 805 810 815
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 820 825 830
 Ile Leu Asp Val Phe Val Asp Glu Gly His Val Gln Leu Arg Glu Ala
 835 840 845
 Thr Leu Gly Gly Gly Ala Gly Ala Pro Cys Ala Leu Leu Arg Gly Leu
 850 855 860
 Glu Leu Ala Asn Thr Phe Ser Phe Leu Arg Pro Asn Asp Leu Val Trp
 865 870 875 880
 Asn Tyr Val Val Asp Asn Tyr Leu Lys Gly Asn Thr Pro Val Pro Phe
 885 890 895
 Asp Leu Leu Phe Trp Asn Gly Asp Ala Thr Asn Leu Pro Gly Pro Trp

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Tyr	Cys	Trp	Tyr	Leu	Arg	His	Thr	Tyr	Leu	Gln	Asn	Glu	Leu	Lys	Val
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Ala	Lys	Asn	Lys	Arg	Ser	His	Trp	Thr	Asn	Asp	Ala	Leu	Pro	Glu	Ser
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Asn Met Asp Lys Ala Val Lys Leu Tyr Arg Lys Leu Lys Arg Glu
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 Ile Thr Phe His Gly Ala Lys Glu Ile Ala Leu Ser Tyr Ser Ala
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 Gly Ala Leu Ala Ser Cys Met Gly Leu Ile Tyr Asn Arg Met Gly
 1205 1210 1215
 Ala Val Thr Thr Glu Val Ala Phe Gly Leu Val Cys Ala Thr Cys
 1220 1225 1230
 Glu Gln Ile Ala Asp Ser Gln His Arg Ser His Arg Gln Met Val
 1235 1240 1245
 Ala Thr Thr Asn Pro Leu Ile Lys His Glu Asn Arg Met Val Leu
 1250 1255 1260
 Ala Ser Thr Thr Ala Lys Ala Met Glu Gln Met Ala Gly Ser Ser
 1265 1270 1275
 Glu Gln Ala Ala Glu Ala Met Glu Ile Ala Ser Gln Ala Arg Gln
 1280 1285 1290
 Met Val Gln Ala Met Arg Ala Ile Gly Thr His Pro Ser Ser Ser
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 Thr Gly Leu Arg Asp Asp Leu Leu Glu Asn Leu Gln Thr Tyr Gln
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 Lys Arg Met Gly Val Gln Met Gln Arg Phe Lys
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<212> PRT
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pET-14b-NA-PhaC-linker-M1/hemagglutinin-PhaC

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His His Ala Val Pro Asn Gly Thr Ile Val Lys Thr Ile Thr Asn Asp
35 40 45

Gln Ile Glu Val Thr Asn Ala Thr Glu Leu Val Gln Ser Ser Ser Thr
50 55 60

Gly Glu Ile Cys Asp Ser Pro His Gln Ile Leu Asp Gly Glu Asn Cys
65 70 75 80

Thr Leu Ile Asp Ala Leu Leu Gly Asp Pro Gln Cys Asp Gly Phe Gln

85

90

95

Asn Lys Lys Trp₁₀₀ Asp Leu Phe Val Glu₁₀₅ Arg Ser Lys Ala Tyr₁₁₀ Ser Asn
 Cys Tyr Pro₁₁₅ Tyr Asp Val Pro Asp₁₂₀ Tyr Ala Ser Leu Arg₁₂₅ Ser Leu Val
 Ala Ser₁₃₀ Ser Gly Thr Leu Glu₁₃₅ Phe Asn Asn Glu₁₄₀ Ser Phe Asn Trp Thr
 Gly₁₄₅ Val Thr Gln Asn Gly₁₅₀ Thr Ser Ser Ala Cys₁₅₅ Ile Arg Arg Ser Asn₁₆₀
 Asn Ser Phe Phe Ser₁₆₅ Arg Leu Asn Trp Leu₁₇₀ Thr His Leu Lys Phe₁₇₅ Lys
 Tyr Pro Ala Leu₁₈₀ Asn Val Thr Met Pro₁₈₅ Asn Asn Glu Lys Phe₁₉₀ Asp Lys
 Leu Tyr Ile₁₉₅ Trp Gly Val His His₂₀₀ Pro Gly Thr Asp Asn₂₀₅ Asp Gln Ile
 Phe Pro₂₁₀ Tyr Ala Gln Ala Ser₂₁₅ Gly Arg Ile Thr Val₂₂₀ Ser Thr Lys Arg
 Ser₂₂₅ Gln Gln Thr Val Ile₂₃₀ Pro Asn Ile Gly Ser₂₃₅ Arg Pro Arg Val Arg₂₄₀
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 Asp Ile Leu Leu₂₆₀ Ile Asn Ser Thr Gly₂₆₅ Asn Leu Ile Ala Pro₂₇₀ Arg Gly
 Tyr Phe Lys₂₇₅ Ile Arg Ser Gly Lys₂₈₀ Ser Ser Ile Met Arg₂₈₅ Ser Asp Ala
 Pro Ile₂₉₀ Gly Lys Cys Asn Ser₂₉₅ Glu Cys Ile Thr Pro₃₀₀ Asn Gly Ser Ile
 Pro₃₀₅ Asn Asp Lys Pro Phe₃₁₀ Gln Asn Val Asn Arg₃₁₅ Ile Thr Tyr Gly Ala₃₂₀
 Cys Pro Arg Tyr Val₃₂₅ Lys Gln Asn Thr Leu₃₃₀ Lys Leu Ala Thr Gly₃₃₅ Met
 Arg Asn Val Pro₃₄₀ Glu Lys Gln Thr Arg₃₄₅ Gly Ile Phe Gly Ala₃₅₀ Ile Ala
 Gly Phe Ile₃₅₅ Glu Asn Gly Trp Glu₃₆₀ Gly Met Val Asp Gly₃₆₅ Trp Tyr Gly

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Ser Thr Gln Ala Ala Ile Asp Gln Ile Asn Gly Lys Leu Asn Arg Leu
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Ile Gly Lys Thr Asn Glu Lys Phe His Gln Ile Glu Lys Glu Phe Ser
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Lys Ile Asp Leu Trp Ser Tyr Asn Ala Glu Leu Leu Val Ala Leu Glu
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Phe	Gly	Pro ₁₉₅	Ser	Thr	Pro	Gly	Ala ₂₀₀	Leu	Asn	Leu	Val	Ala ₂₀₅	Gly	Ala Asn
Gly	Pro ₂₁₀	Ala	Met	Ser	Pro	Ser ₂₁₅	Gly	Asn	Leu	Glu	Asn ₂₂₀	Ile	Glu	Asn Ser
Tyr ₂₂₅	Ile	Ile	Asp	Asp	Pro ₂₃₀	Asn	Pro	Tyr	Tyr	Asp ₂₃₅	Asp	Cys	Ser	Tyr Gly ₂₄₀
Thr	Ser	Lys	Ser	Gly ₂₄₅	Asp	Thr	Asn	Thr	Ala ₂₅₀	Val	Ala	Lys	Ile	Thr Asp ₂₅₅
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Trp	Phe	Gln ₂₇₅	Gly	Gly	Phe	Lys	Pro ₂₈₀	Thr	Ser	Tyr	Ser	Gly ₂₈₅	Lys	Thr Ala
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 Gly Glu Ser Leu Arg Ala Gly Val Arg Asn Met Met Glu Asp Leu Thr
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Arg Gly Lys Ile Ser Gln Thr Asp Glu Ser Ala Phe Glu Val Gly Arg
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 Pro Glu Ser Ser Leu Val Arg His Val Val Glu Gln Gly His Thr Val
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Phe Leu Val Ser Trp Arg Asn Pro Asp Ala Ser Met Ala Gly Ser Thr
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Gly Gly Thr Ile Val Ser Thr Ala Leu Ala Val Leu Ala Ala Arg Gly
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Ala Asp Thr Gly Ile Leu Asp Val Phe Val Asp Glu Gly His Val Gln
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Asp Leu Val Trp Asn Tyr Val Val Asp Asn Tyr Leu Lys Gly Asn Thr
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Pro Val Pro Phe Asp Leu Leu Phe Trp Asn Gly Asp Ala Thr Asn Leu
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Pro Gly Pro Trp Tyr Cys Trp Tyr Leu Arg His Thr Tyr Leu Gln Asn
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Glu Leu Lys Val Pro Gly Lys Leu Thr Val Cys Gly Val Pro Val Asp
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Leu Ala Ser Ile Asp Val Pro Thr Tyr Ile Tyr Gly Ser Arg Glu Asp
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His Ile Val Pro Trp Thr Ala Ala Tyr Ala Ser Thr Ala Leu Leu Ala
485 490 495

Asn Lys Leu Arg Phe Val Leu Gly Ala Ser Gly His Ile Ala Gly Val
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Ile Asn Pro Pro Ala Lys Asn Lys Arg Ser His Trp Thr Asn Asp Ala
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Gly Ser Trp Trp Pro Asp Trp Thr Ala Trp Leu Ala Gly Gln Ala Gly

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515

520

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 Tyr Thr Gly Lys Asn Leu Gly Phe Val Glu Lys Leu Asp Ala Asn Ala
 Page 102

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Leu Asn Gly Glu Phe Lys Ile Lys Asp Lys Ser Gly Ala Thr Gln Ala	355	360 365
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 Tyr Arg Phe₅₉₅ Lys Asn Pro Asn Leu₆₀₀ Glu Ile Gly Trp Arg₆₀₅ Gly Arg Tyr
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 Thr Asn Leu Pro Tyr₈₀₅ Arg Phe Ala Ala₈₁₀ Ala Phe Tyr Leu Leu Asn₈₁₅ Ala
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 1910 1915 1920
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Pro Ala Gln Leu Gly Asp Ile Gln Gln Arg Tyr Met Lys Asp Phe Ser
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Tyr Arg Phe Ala Ala Ala Phe Tyr Leu Leu Asn Ala Arg Ala Leu Thr
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Gly Lys Ile Ser Gln Thr Asp Glu Ser Ala Phe Glu Val Gly Arg Asn
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 <213> Artificial

<220>
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Thr	Met	Ala	Lys	Asp	Lys	Pro	Thr	Leu	Asp	Ile	Glu	Leu	Leu	Lys	Thr
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Glu	Val	Thr	Asn	Pro	Ala	Val	Leu	Arg	Lys	Leu	Cys	Ile	Glu	Ala	Lys
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Ile	Ser	Asn	Thr	Thr	Thr	Asp	Ser	Arg	Cys	Pro	Thr	Gln	Gly	Glu	Ala
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Thr	Leu	Val	Glu	Glu	Gln	Asp	Thr	Asn	Phe	Val	Cys	Arg	Arg	Thr	Phe
			85						90					95	

Val	Asp	Arg	Gly	Trp	Gly	Asn	Gly	Cys	Gly	Leu	Phe	Gly	Lys	Gly	Ser
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Leu	Ile	Thr	Cys	Ala	Lys	Phe	Lys	Cys	Val	Thr	Lys	Leu	Glu	Gly	Lys
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Ile	Val	Gln	Tyr	Glu	Asn	Leu	Lys	Tyr	Ser	Val	Ile	Val	Thr	Val	His
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Thr	Gly	Asp	Gln	His	Gln	Val	Gly	Asn	Glu	Thr	Thr	Glu	His	Gly	Thr
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Thr Ala Thr Ile Thr Pro Gln Ala Pro Thr Ser Glu Ile Gln Leu Thr
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 Asp Tyr Gly Ala Leu Thr Leu Asp Cys Ser Pro Arg Thr Gly Leu Asp
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 Phe Asn Glu Met Val Leu Leu Thr Met Lys Lys Lys Ser Trp Leu Val
 195 200 205
 His Lys Gln Trp Phe Leu Asp Leu Pro Leu Pro Trp Thr Ser Gly Ala
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 Ser Thr Ser Gln Glu Thr Trp Asn Arg Gln Asp Leu Leu Val Thr Phe
 225 230 235 240
 Lys Thr Ala His Ala Lys Lys Gln Glu Val Val Val Leu Gly Ser Gln
 245 250 255
 Glu Gly Ala Met His Thr Ala Leu Thr Gly Ala Thr Glu Ile Gln Thr
 260 265 270
 Ser Gly Thr Thr Thr Ile Phe Ala Gly His Leu Lys Cys Arg Leu Lys
 275 280 285
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 370 375 380
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 385 390 395 400
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 405 410 415
 Asp Thr Ala Trp Asp Phe Gly Ser Ile Gly Gly Val Phe Thr Ser Val
 420 425 430
 Gly Lys Leu Ile His Gln Ile Phe Gly Thr Ala Tyr Gly Val Leu Phe
 Page 124

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Pro	Ala	Gln	Leu	Gly	Asp	Ile	Gln	Gln	Arg	Tyr	Met	Lys	Asp	Phe	Ser
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Ala	Leu	Trp	Gln	Ala	Met	Ala	Glu	Gly	Lys	Ala	Glu	Ala	Thr	Gly	Pro
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Tyr	Arg	Phe	Ala	Ala	Ala	Phe	Tyr	Leu	Leu	Asn	Ala	Arg	Ala	Leu	Thr
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Glu	Leu	Ala	Asp	Ala	Val	Glu	Ala	Asp	Ala	Lys	Thr	Arg	Gln	Arg	Ile
625					630					635					640
Arg	Phe	Ala	Ile	Ser	Gln	Trp	Val	Asp	Ala	Met	Ser	Pro	Ala	Asn	Phe
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Leu	Ala	Thr	Asn	Pro	Glu	Ala	Gln	Arg	Leu	Leu	Ile	Glu	Ser	Gly	Gly
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Glu	Ser	Leu	Arg	Ala	Gly	Val	Arg	Asn	Met	Met	Glu	Asp	Leu	Thr	Arg
		675					680					685			
Gly	Lys	Ile	Ser	Gln	Thr	Asp	Glu	Ser	Ala	Phe	Glu	Val	Gly	Arg	Asn
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Val	Ala	Val	Thr	Glu	Gly	Ala	Val	Val	Phe	Glu	Asn	Glu	Tyr	Phe	Gln
705					710					715					720

Leu Leu Gln Tyr Lys₇₂₅ Pro Leu Thr Asp Lys₇₃₀ Val His Ala Arg Pro₇₃₅ Leu
 Leu Met Val Pro₇₄₀ Pro Cys Ile Asn Lys₇₄₅ Tyr Tyr Ile Leu Asp₇₅₀ Leu Gln
 Pro Glu Ser₇₅₅ Ser Leu Val Arg His₇₆₀ Val Val Glu Gln Gly₇₆₅ His Thr Val
 Phe Leu₇₇₀ Val Ser Trp Arg Asn₇₇₅ Pro Asp Ala Ser Met₇₈₀ Ala Gly Ser Thr
 Trp₇₈₅ Asp Asp Tyr Ile Glu₇₉₀ His Ala Ala Ile Arg₇₉₅ Ala Ile Glu Val Ala₈₀₀
 Arg Asp Ile Ser Gly₈₀₅ Gln Asp Lys Ile Asn₈₁₀ Val Leu Gly Phe Cys₈₁₅ Val
 Gly Gly Thr Ile₈₂₀ Val Ser Thr Ala Leu₈₂₅ Ala Val Leu Ala Ala Arg Gly
 Glu His Pro₈₃₅ Ala Ala Ser Val Thr₈₄₀ Leu Leu Thr Thr Leu₈₄₅ Leu Asp Phe
 Ala Asp₈₅₀ Thr Gly Ile Leu Asp₈₅₅ Val Phe Val Asp Glu₈₆₀ Gly His Val Gln
 Leu₈₆₅ Arg Glu Ala Thr Leu₈₇₀ Gly Gly Gly Ala Gly₈₇₅ Ala Pro Cys Ala Leu₈₈₀
 Leu Arg Gly Leu₈₈₅ Glu Leu Ala Asn Thr Phe₈₉₀ Ser Phe Leu Arg Pro₈₉₅ Asn
 Asp Leu Val Trp₉₀₀ Asn Tyr Val Val Asp₉₀₅ Asn Tyr Leu Lys Gly₉₁₀ Asn Thr
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 Pro Gly₉₃₀ Pro Trp Tyr Cys Trp₉₃₅ Tyr Leu Arg His Thr₉₄₀ Tyr Leu Gln Asn
 Glu₉₄₅ Leu Lys Val Pro Gly₉₅₀ Lys Leu Thr Val Cys₉₅₅ Gly Val Pro Val Asp₉₆₀
 Leu Ala Ser Ile Asp₉₆₅ Val Pro Thr Tyr Ile₉₇₀ Tyr Gly Ser Arg Glu₉₇₅ Asp
 His Ile Val Pro₉₈₀ Trp Thr Ala Ala Tyr₉₈₅ Ala Ser Thr Ala Leu₉₉₀ Leu Ala

Asn Lys Leu Arg Phe Val Leu Gly Ala Ser Gly His Ile Ala Gly Val
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 Ile Asn Pro Pro Ala Lys Asn Lys Arg Ser His Trp Thr Asn Asp
 1010 1015 1020
 Ala Leu Pro Glu Ser Pro Gln Gln Trp Leu Ala Gly Ala Ile Glu
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 His His Gly Ser Trp Trp Pro Asp Trp Thr Ala Trp Leu Ala Gly
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 1055 1060 1065
 Arg Tyr Arg Ala Ile Glu Pro Ala Pro Gly Arg Tyr Val Lys Ala
 1070 1075 1080
 Lys Ala His Met Val Leu Ala Val Ala Ile Asp Lys Arg Gly Gly
 1085 1090 1095
 Gly Gly Gly Leu Glu Ser Val Ala Leu Ala Pro His Val Gly Leu
 1100 1105 1110
 Gly Leu Glu Thr Arg Thr Glu Thr Trp Met Ser Ser Glu Gly Ala
 1115 1120 1125
 Trp Lys Gln Ile Gln Lys Val Glu Thr Trp Ala Leu Arg His Pro
 1130 1135 1140
 Gly Phe Thr Val Ile Ala Leu Phe Leu Ala His Ala Ile Gly Thr
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 Ser Ile Thr Gln Lys Gly Ile Ile Phe Ile Leu Leu Met Leu Val
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 Thr Pro Ser Met Ala
 1175

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 <213> Artificial

<220>
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 Leu Thr Asn Thr Thr Thr Glu Ser Arg Cys Pro Thr Gln Gly Glu Pro
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 Page 132

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 Tyr Arg₆₁₀ Phe Ala Ala Ala Phe₆₁₅ Tyr Leu Leu Asn Ala₆₂₀ Arg Ala Leu Thr
 Glu₆₂₅ Leu Ala Asp Ala Val₆₃₀ Glu Ala Asp Ala Lys₆₃₅ Thr Arg Gln Arg Ile₆₄₀
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 Phe Leu Val Ser Trp Arg Asn₇₇₅ Pro Asp Ala Ser Met₇₈₀ Ala Gly Ser Thr
 Trp₇₈₅ Asp Asp Tyr Ile Glu₇₉₀ His Ala Ala Ile Arg₇₉₅ Ala Ile Glu Val Ala₈₀₀
 Arg Asp Ile Ser Gly₈₀₅ Gln Asp Lys Ile Asn₈₁₀ Val Leu Gly Phe Cys₈₁₅ Val
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Gly Gly Gly Leu Glu Ser Val Ala Leu Val Pro His Val Gly Met
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Gly Leu Glu Thr Arg Thr Glu Thr Trp Met Ser Ser Glu Gly Ala
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 Pro Ala Gln Leu Gly₅₆₅ Asp Ile Gln Gln Arg₅₇₀ Tyr Met Lys Asp Phe₅₇₅ Ser
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 Page 152

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Asp Lys Leu Val Cys Arg Asp Lys Leu Ser Ser Thr Asn Gln Leu Arg
 50 55 60

Ser Val Gly Leu Asn Leu Glu Gly Asn Gly Val Ala Thr Asp Val Pro
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Ser Ala Thr Lys Arg Trp Gly Phe Arg Ser Gly Val Pro Pro Lys Val
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Val Asn Tyr Glu Ala Gly Glu Trp Ala Glu Asn Cys Tyr Asn Leu Glu
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Ile Lys Lys Pro Asp Gly Ser Glu Cys Leu Pro Ala Ala Pro Asp Gly
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Ile Arg Gly Phe Pro Arg Cys Arg Tyr Val His Lys Val Ser Gly Thr
 130 135 140

Gly Pro Cys Ala Gly Asp Phe Ala Phe His Lys Glu Gly Ala Phe Phe
 145 150 155 160

Leu Tyr Asp Arg Leu Ala Ser Thr Val Ile Tyr Arg Gly Thr Thr Phe
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Ala Glu Gly Val Val Ala Phe Leu Ile Leu Pro Gln Ala Lys Lys Asp
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Phe Phe Ser Ser His Pro Leu Arg Glu Pro Val Asn Ala Thr Glu Asp
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Pro Ser Ser Gly Tyr Tyr Ser Thr Thr Ile Arg Tyr Gln Ala Thr Gly
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Phe Gly Thr Asn Glu Thr Glu Tyr Leu Phe Glu Val Asp Asn Leu Thr
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Tyr Val Gln Leu Glu Ser Arg Phe Thr Pro Gln Phe Leu Leu Gln Leu
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Asn Glu Thr Ile Tyr Thr Ser Gly Lys Arg Ser Asn Thr Thr Gly Lys
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Leu Ile Trp Lys Val Asn Pro Glu Ile Asp Thr Thr Ile Gly Glu Trp
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Ala Phe Trp Glu Thr Lys Lys Asn Leu Thr Arg Lys Ile Arg Ser Glu
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Glu Leu Ser Phe Thr Val Val Ser Asn Gly Ala Lys Asn Ile Ser Gly

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Val His	Ser 355	Gln Gly Arg Glu	Ala 360	Ala Val Ser His	Leu 365	Thr Thr Leu
Ala Thr	Ile 370	Ser Thr Ser	Pro 375	Gln Ser Leu Thr	Thr 380	Lys Pro Gly Pro
Asp 385	Asn Ser Thr	His 390	Asn Thr Pro Val	Tyr Lys 395	Leu Asp Ile Ser	Glu 400
Ala Thr Gln	Val 405	Glu Gln His His	Arg 410	Arg Thr Asp Asn	Asp 415	Ser Thr
Ala Ser Asp	Thr 420	Pro Ser Ala Thr	Thr 425	Ala Ala Gly Pro	Pro 430	Lys Ala
Glu Asn Thr	435	Asn Thr Ser Lys	Ser 440	Thr Asp Phe Leu	Asp 445	Pro Ala Thr
Thr Thr	450	Ser Pro Gln Asn	His 455	Ser Glu Thr Ala	Gly 460	Asn Asn Asn Thr
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Gln Ile Ile His Asp Phe Val Asp Lys Thr Leu Pro Asp Gln Gly Asp
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Asn Asp Asn Trp Trp Thr Gly Trp Arg Gln Trp Ile Pro Ala Gly Ile
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 Gly Val Lys Ile Ala Pro Ala Gln Leu Gly Asp Ile Gln Gln Arg Tyr
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 Glu Ala Thr Gly Pro Leu His Asp Arg Arg Phe Ala Gly Asp Ala Trp
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 Ala Arg Ala Leu Thr Glu Leu Ala Asp Ala Val Glu Ala Asp Ala Lys
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 Thr Arg Gln Arg Ile Arg Phe Ala Ile Ser Gln Trp Val Asp Ala Met
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 Ser Pro Ala Asn Phe Leu Ala Thr Asn Pro Glu Ala Gln Arg Leu Leu
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 Ile Glu Ser Gly Gly Glu Ser Leu Arg Ala Gly Val Arg Asn Met Met
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 Glu Asp Leu Thr Arg Gly Lys Ile Ser Gln Thr Asp Glu Ser Ala Phe
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 Glu Val Gly Arg Asn Val Ala Val Thr Glu Gly Ala Val Val Phe Glu
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935

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Met Ala Gly Ser Thr Trp Asp Asp Tyr Ile Glu His Ala Ala Ile Arg
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Leu Gly Phe Cys Val Gly Gly Thr Ile Val Ser Thr Ala Leu Ala Val
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Asn Lys Leu Arg Phe Val Leu Gly Ala Ser Gly His Ile Ala Gly
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Val Ile Asn Pro Pro Ala Lys Asn Lys Arg Ser His Trp Thr Asn
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Ala Ser Gly Ile Pro Gly Leu Asp Ala Leu Ala Gly Val Lys Ile Ala
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Pro Ala Gln Leu Gly Asp Ile Gln Gln Arg Tyr Met Lys Asp Phe Ser
65 70 75 80

Ala Leu Trp Gln Ala Met Ala Glu Gly Lys Ala Glu Ala Thr Gly Pro
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Leu His Asp Arg Arg Phe Ala Gly Asp Ala Trp Arg Thr Asn Leu Pro
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Tyr Arg Phe Ala Ala Ala Phe Tyr Leu Leu Asn Ala Arg Ala Leu Thr
115 120 125

Glu Leu Ala Asp Ala Val Glu Ala Asp Ala Lys Thr Arg Gln Arg Ile
130 135 140

Arg Phe Ala Ile Ser Gln Trp Val Asp Ala Met Ser Pro Ala Asn Phe
145 150 155 160

Leu Ala Thr Asn Pro Glu Ala Gln Arg Leu Leu Ile Glu Ser Gly Gly
165 170 175

Glu Ser Leu Arg Ala Gly Val Arg Asn Met Met Glu Asp Leu Thr Arg
180 185 190

Gly Lys Ile Ser Gln Thr Asp Glu Ser Ala Phe Glu Val Gly Arg Asn
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Val Ala Val Thr Glu Gly Ala Val Val Phe Glu Asn Glu Tyr Phe Gln
210 215 220

Leu Leu Gln Tyr Lys Pro Leu Thr Asp Lys Val His Ala Arg Pro Leu
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Leu Met Val Pro Pro Cys Ile Asn Lys Tyr Tyr Ile Leu Asp Leu Gln
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Pro Glu Ser Ser Leu Val Arg His Val Val Glu Gln Gly His Thr Val
 260 265 270

Phe Leu Val Ser Trp Arg Asn Pro Asp Ala Ser Met Ala Gly Ser Thr
 275 280 285

Trp Asp Asp Tyr Ile Glu His Ala Ala Ile Arg Ala Ile Glu Val Ala
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Arg Asp Ile Ser Gly Gln Asp Lys Ile Asn Val Leu Gly Phe Cys Val
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Gly Gly Thr Ile Val Ser Thr Ala Leu Ala Val Leu Ala Ala Arg Gly
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Glu His Pro Ala Ala Ser Val Thr Leu Leu Thr Thr Leu Leu Asp Phe
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Ala Asp Thr Gly Ile Leu Asp Val Phe Val Asp Glu Gly His Val Gln
 355 360 365

Leu Arg Glu Ala Thr Leu Gly Gly Gly Ala Gly Ala Pro Cys Ala Leu
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Leu Arg Gly Leu Glu Leu Ala Asn Thr Phe Ser Phe Leu Arg Pro Asn
 385 390 395 400

Asp Leu Val Trp Asn Tyr Val Val Asp Asn Tyr Leu Lys Gly Asn Thr
 405 410 415

Pro Val Pro Phe Asp Leu Leu Phe Trp Asn Gly Asp Ala Thr Asn Leu
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Pro Gly Pro Trp Tyr Cys Trp Tyr Leu Arg His Thr Tyr Leu Gln Asn
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Glu Leu Lys Val Pro Gly Lys Leu Thr Val Cys Gly Val Pro Val Asp
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Leu Ala Ser Ile Asp Val Pro Thr Tyr Ile Tyr Gly Ser Arg Glu Asp
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His Ile Val Pro Trp Thr Ala Ala Tyr Ala Ser Thr Ala Leu Leu Ala
 485 490 495

Asn Lys Leu Arg Phe Val Leu Gly Ala Ser Gly His Ile Ala Gly Val
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Ile Asn Pro Pro Ala Lys Asn Lys Arg Ser His Trp Thr Asn Asp Ala
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Leu Pro Glu Ser Pro Gln Gln Trp Leu Ala Gly Ala Ile Glu His His
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Gly Ser Trp Trp Pro Asp Trp Thr Ala Trp Leu Ala Gly Gln Ala Gly
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Ala Lys Arg Ala Ala Pro Ala Asn Tyr Gly Asn Ala Arg Tyr Arg Ala
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Ile Glu Pro Ala Pro Gly Arg Tyr Val Lys Ala Lys Ala His Met Val
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Leu Ala Val Ala Ile Asp Lys Arg Gly Gly Gly Gly Gly Leu Glu Phe
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Met Ser Lys Asp Lys Pro Thr Ile Asp Val Lys Met Met Asn Met Glu
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Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Ser Ile
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Asp Thr Cys Ala Lys Phe Ala Cys Ser Thr Lys Ala Ile Gly Arg Thr
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Ile Leu Lys Glu Asn Ile Lys Tyr Glu Val Ala Ile Phe Val His Gly
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Pro Thr Thr Val Glu Ser His Gly Asn Tyr Ser Thr Gln Val Gly Ala
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Thr Gln Ala Gly Arg Leu Ser Ile Thr Pro Ala Ala Pro Ser Tyr Thr
 770 775 780

Leu Lys Leu Gly Glu Tyr Gly Glu Val Thr Val Asp Cys Glu Pro Arg
 785 790 795 800

Ser Gly Ile Asp Thr Asn Ala Tyr Tyr Val Met Thr Val Gly Thr Lys
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Thr Phe Leu Val His Arg Glu Trp Phe Met Asp Leu Asn Leu Pro Trp
820 825 830

Ser Ser Ala Gly Ser Thr Val Trp Arg Asn Arg Glu Thr Leu Met Glu
835 840 845

Phe Glu Glu Pro His Ala Thr Lys Gln Ser Val Ile Ala Leu Gly Ser
850 855 860

Gln Glu Gly Ala Leu His Gln Ala Leu Ala Gly Ala Ile Pro Val Glu
865 870 875 880

Phe Ser Ser Asn Thr Val Lys Leu Thr Ser Gly His Leu Lys Cys Arg
885 890 895

Val Lys Met Glu Lys Leu Gln Leu Lys Gly Thr Thr Tyr Gly Val Cys
900 905 910

Ser Lys Ala Phe Lys Phe Leu Gly Thr Pro Ala Asp Thr Gly His Gly
915 920 925

Thr Val Val Leu Glu Leu Gln Tyr Thr Gly Thr Asp Gly Pro Cys Lys
930 935 940

Val Pro Ile Ser Ser Val Ala Ser Leu Asn Asp Leu Thr Pro Val Gly
945 950 955 960

Arg Leu Val Thr Val Asn Pro Phe Val Ser Val Ala Thr Ala Asn Ala
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Lys Val Leu Ile Glu Leu Glu Pro Pro Phe Gly Asp Ser Tyr Ile Val
980 985 990

Val Gly Arg Gly Glu Gln Gln Ile Asn His His Trp His Lys Ser Gly
995 1000 1005

Ser Ser Ile Gly Lys Ala Phe Thr Thr Thr Leu Lys Gly Ala Gln
1010 1015 1020

Arg Leu Ala Ala Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser Val
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Gly Gly Val Phe Thr Ser Val Gly Lys Ala Val His Gln Val Phe
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Gly Gly Ala Phe Arg Ser Leu Phe Gly Gly Met Ser Trp Ile Thr
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Gln Gly Leu Leu Gly Ala Leu Leu Leu Trp Met Gly Ile Asn Ala
Page 186

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