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<110> F. Hoffmann-La Roche AG
Roche Diagnostics GmbH
Roche Molecular Systems, Inc.

<120> NON-REPLICATIVE TRANSDUCTION PARTICLES WITH ONE OR MORE
NON-NATIVE TAIL FIBERS AND TRANSDUCTION PARTICLE-BASED REPORTER
SYSTEMS

<130> P34922-WO-HS

<150> 62/787,151

<151> 2018-12-31

<150> 62/926,989

<151> 2019-10-28

<160> 117

<170> PatentIn version 3.5

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<220>
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<220>
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<211> 2713

<212> DNA

<213> Artificial Sequence

<220>

<223> Fuzzy Tail Fiber

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<211> 3112
<212> DNA
<213> Artificial Sequence

<220>
<223> Inchworm Tail Fiber

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 <211> 3350
 <212> DNA
 <213> Artificial Sequence

<220>
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<220>
 <223> Jungle Tail Fiber

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 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Mango Tail Fiber

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 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Maroon Tail Fiber

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<220>

<223> Scarlet Tail Fiber

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<220>
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<220>
 <223> Sunset Tail Fiber

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 <212> DNA
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<220>
 <223> Tangerine Tail Fiber

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<220>
 <223> Thistle Tail Fiber

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 <213> Artificial Sequence

<220>
 <223> Tropical_pNS88 Tail Fiber

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<211> 2117
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<220>
<223> Tropical_pNS92 Tail Fiber

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Ala	Ala	Leu	Asn	Arg	Lys	Phe	Arg	Gly	Ile	Val	Asp	Pro	Gly	Phe	Tyr
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Ala	Gly	Phe	Leu	Pro	Lys	Pro	Gly	Gly	Gly	Met	Asn	Leu	Leu	Ile	Thr
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Ser Val Asp Gly Asp Lys Thr Ala Gly Ala Ala Ser Val Asp Ile Gly
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Glu Phe Tyr Gln Val Thr Ile Gln Gln Arg Lys Asp Ile Ser Leu Ala
85 90 95

Leu Ser Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Ser Val Ser Ala
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Ser Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Tyr Thr Ala Gln Asp Ala Ser Thr Thr Gln Lys Gly Leu Val Gln Leu
210 215 220

Ser Ser Ala Thr Asn Ser Asp Ser Glu Thr Met Ala Ala Thr Pro Lys
225 230 235 240

Ala Val Lys Ser Ile Lys Asp Leu Ala Asp Thr Lys Ala Pro Ile Glu
245 250 255

Ser Pro Ser Leu Thr Gly Thr Pro Thr Ala Pro Thr Ala Ala Gln Gly
260 265 270

Thr Asn Ser Thr Gln Ile Ala Asn Thr Ala Phe Val Lys Ala Ala Ile
275 280 285

Thr Ala Leu Ile Asn Gly Ala Pro Gly Thr Leu Asp Thr Leu Lys Glu
290 295 300

Ile Ala Ala Ala Ile Asn Asn Asp Pro Asn Tyr Ser Thr Thr Ile Asn
305 310 315 320

Asn Ala Leu Ala Leu Lys Ala Pro Leu Ala Ser Pro Ala Leu Thr Gly
325 330 335

Val Pro Thr Ala Pro Thr Ala Ala Gln Gly Thr Asn Asn Thr Gln Ile
340 345 350

Ala Thr Thr Ala Tyr Val Arg Ala Ala Ile Ser Ala Leu Val Gly Ser
355 360 365

Ser Pro Glu Ala Leu Asp Thr Leu Tyr Glu Leu Ala Ala Ala Leu Gly
370 375 380

Asn Asp Pro Asn Phe Ala Thr Thr Met Thr Asn Ala Leu Ala Gly Lys
385 390 395 400

Gln Pro Leu Asp Ala Thr Leu Thr Ala Leu Ala Gly Leu Ala Thr Gly
405 410 415

Ala Asn Lys Leu Pro Tyr Phe Thr Gly Thr Asp Thr Val Ser Gln Thr
420 425 430

Asp Leu Thr Ser Val Gly Arg Asp Ile Leu Ala Lys Thr Ser Ile Leu
435 440 445

Ala Val Ile Gln Tyr Leu Gly Leu Arg Glu Leu Gly Thr Ser Gly Glu
450 455 460

Lys Ile Pro Leu Leu Ser Thr Ala Asn Thr Trp Ser Ala Arg Gln Thr
465 470 475 480

Phe Asn Gly Gly Ile Thr Gly Ala Leu Thr Gly Asn Ala Asp Thr Ala
485 490 495

Thr Lys Leu Lys Thr Ala Arg Asn Ile Asn Gly Val Arg Phe Asp Gly
500 505 510

Ser Gly Asp Ile Asn Ile Asn Thr Leu Val Ser Arg Gly Arg Val Thr
515 520 525

Ala Leu Glu Ala Asn Ala Gln Gly Thr Ser Gly Ile Gln Leu Tyr Glu
530 535 540

Ala Tyr Asn Asn Gly Tyr Pro Ser Pro Tyr Gly Asn Val Leu His Leu
545 550 555 560

Lys Gly Ala Thr Ala Ala Gly Glu Gly Glu Leu Phe Ile Gly Trp Ser
565 570 575

Gly Thr Ser Gly Ala His Ala Pro Val His Ile Arg Ser Arg Arg Asp
580 585 590

Thr Asp Ser Ala Asn Trp Ser Glu Trp Ala Gln Val Tyr Thr Ser Lys
595 600 605

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

Asn Ala Ala Thr Ala Thr Lys Leu Gln Thr Ala Cys Thr Ile Asn Gly
625 630 635 640

Val Ser Phe Asp Gly Ser Lys Asn Ile Glu Leu Thr Ala Glu Asp Leu
645 650 655

Asn Leu Gln Glu Thr Val Asn Lys Ala Asp Asn Ala Val Gln Lys Thr
660 665 670

Gly Asp Thr Leu Ser Gly Gly Leu Thr Phe Glu Asn Asp Ser Ile Leu
675 680 685

Ala Trp Ile Arg Asn Thr Asp Trp Ala Lys Ile Gly Phe Lys Asn Asp
690 695 700

Ala Asp Ser Asp Thr Asp Ser Tyr Met Trp Phe Glu Thr Gly Asp Asn
705 710 715 720

Gly Asn Glu Tyr Phe Lys Trp Arg Ser Lys Gln Ser Thr Thr Thr Lys
725 730 735

Asp Leu Met Asn Leu Lys Trp Asp Ala Leu Ser Val Leu Val Asn Ala
740 745 750

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

Ala Tyr Gly Asn Tyr Gly Phe Phe Ile Arg Asn Asp Gly Ser Asn Thr
770 775 780

Tyr Phe Met Leu Thr Asn Ser Gly Asp Asn Met Gly Thr Tyr Asn Gly
785 790 795 800

Leu Arg Pro Leu Trp Ile Asn Asn Ala Thr Gly Ala Val Ser Met Gly
805 810 815

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

Asn Ser Ser Asn Gly Met Trp Ile Gln Met Arg Asp Asn Asn Ala Ile
835 840 845

Phe Gly Lys Asn Ile Val Asn Thr Asp Ser Ala Gln Ala Leu Leu Arg
850 855 860

Gln Asn His Ala Asp Arg Lys Phe Met Ile Gly Gly Leu Gly Asn Lys
865 870 875 880

Gln Phe Gly Ile Tyr Met Ile Asn Asn Ser Arg Thr Ala Asn Gly Thr
885 890 895

Asp Gly Gln Ala Tyr Met Asp Asn Asn Gly Asn Trp Leu Cys Gly Ala
900 905 910

Gln Val Ile Pro Gly Asn Tyr Ala Asn Phe Asp Ser Arg Tyr Val Arg
915 920 925

Asp Val Arg Leu Gly Thr Gln Ser Leu Thr Gly Gly Leu Ser Arg Asp
930 935 940

Tyr Lys Ala Pro Ser Gly His Val Ile Thr Gly Phe His Thr Asn Gly
945 950 955 960

Asp Trp Glu Met Gln Gly Gly Asp Asp Lys Val Tyr Ile Arg Pro Val
965 970 975

Gln Lys Asn Ile Asn Gly Thr Trp Tyr Asn Val Ala Ser Ala
980 985 990

<210> 36
<211> 763
<212> PRT
<213> Artificial Sequence

<220>
<223> Banana Tail Fiber

<400> 36

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Ser Glu
1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
50 55 60

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

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

Leu Ser Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Ser Val Ser Ala
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Ser Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Tyr Thr Ala Gln Asp Ala Thr Thr Ala Arg Lys Gly Ile Val Gln Leu
210 215 220

Ser Ser Ala Thr Asp Ser Thr Ser Glu Ala Leu Ala Ala Thr Pro Lys
225 230 235 240

Ala Val Lys Ala Val Asn Asp Asn Ala Asn Gly Arg Val Pro Ser Ala
245 250 255

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

Gln Asp Ile Phe Asn Gly Gln Ala Val Ala Ile Gly Asn Ala Ala Asp
275 280 285

Leu Asn Ala Tyr Thr Thr Pro Gly Leu Tyr Tyr Gln Pro Ala Asn Ala
290 295 300

Gln Ala Gln Thr Gly Arg Asn Tyr Pro Glu Ala Asn Ala Gly Ser Leu
305 310 315 320

Glu Val Tyr Lys His Ala Gly Ile Thr Gln Ile Tyr Arg Ile Tyr Asn
325 330 335

Ser Ser Arg Ser Tyr Ile Arg Thr Leu Tyr Ser Gly Thr Trp Ser Ala
340 345 350

Trp Val Lys Gln Tyr Asp Ala Ala Asn Lys Pro Ser Pro Ala Asp Ile
355 360 365

Asn Ala Val Asn Lys Gly Gly Asp Thr Met Thr Gly Gly Leu Lys Ile
370 375 380

Arg Ala Ala Asp Ala Leu Arg Ile Tyr Asp Ala Ala Tyr Gly Met Ile
385 390 395 400

Phe Arg Arg Ser Glu Asn Asn Phe Tyr Leu Ile Pro Thr Ala Lys Asp
405 410 415

Gln Gly Glu Asp Gly Gly Ile Ser Gly Leu Arg Pro Leu Tyr Ile Asp
420 425 430

Leu Thr Asn Gly Arg Val Thr Leu Gly Asn Gly Ala Val Val Asn Gly
435 440 445

Gly Leu Gly Leu Gly Val Val Ser Gly Leu Gly Gly Asn Ser Ile Ala
450 455 460

Leu Gly Asp Asn Asp Thr Gly Phe Lys Gln Asn Gly Asp Gly Val Leu
465 470 475 480

Asp Val Tyr Ala Asn Ser Lys Gln Val Met Arg Phe Leu Asn Ser Gly
485 490 495

Ile Thr Ser Tyr Met Leu Phe Asn Met Asn Ala Gly Ala Ser Val Ser
500 505 510

Ser Thr Leu Thr Phe Lys Asn Gly Ser Gly Ile Thr Ser Glu Lys Thr
515 520 525

Gly Ala Asn Pro Arg Asn Gly Arg Ile Tyr Trp Gly Gly Asp Ala Ser
530 535 540

Arg Gly Asn Arg Ile Glu Phe Ala Asp Asp Ala Gly Trp Lys Ala Tyr
545 550 555 560

Ile Glu Arg His Pro Ser Asn Gly Val Gln Leu Val Val Asn Gly Arg
565 570 575

Ile Asn Gly Ser Ile Val Tyr Ser Ser Gly Glu Val Leu Ala Gly Gly
580 585 590

Gly Ser Ala Arg Phe Ala Ala Asp Gly Asn Ile Phe Gly Ser Lys Trp
595 600 605

Gly Asn Gln Trp Leu Asp Ala Tyr Leu Lys Asn Thr Tyr Gln Pro Lys
610 615 620

Gly Asn Tyr Thr Pro Ala Gly Gln Ala Tyr Thr Lys Val Glu Ser Asp
625 630 635 640

Gly Arg Phe Gln Pro Lys Gly Ser Tyr Thr Pro Ala Gly Gln Ala Tyr
645 650 655

Thr Lys Ala Glu Ser Asp Ala Arg Tyr Asn Leu Lys Asn Thr Ala Thr
660 665 670

Lys Ser Ala Asn Ala Met Thr His Lys Asp Ala Ser Thr Gly Val Met
675 680 685

Glu Val Val Met Ser Asn Ile Asn Val Pro Asn Lys Thr Asn Val Asn
690 695 700

Val Thr Phe Pro Ala Ala Phe Pro Asn Ala Cys Val Gly Val Val Ile
705 710 715 720

Thr Tyr Asn Gly Ala Gly His Gly Ser Gly Asp Asp Ser Ala Ile Tyr
725 730 735

Val Pro Ser Tyr Ser Arg Thr Gly Cys Thr Leu Tyr Ala His Asn Ala
740 745 750

Asp Gly Lys Phe Met Leu Ile Ala Lys Gly Tyr
755 760

<210> 37
<211> 748
<212> PRT
<213> Artificial Sequence

<220>
<223> Bittersweet Tail Fiber

<400> 37

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Pro Glu
1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
50 55 60

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

Glu Phe Tyr Gln Val Thr Ile Gln His Arg Lys Asp Ile Ser Leu Ala
85 90 95

Leu Asn Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Gly Val Ser Thr
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Thr Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Tyr Thr Ala Gln Asp Ala Ser Thr Thr Gln Lys Gly Leu Val Gln Leu
210 215 220

Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala Ala Thr Pro Lys
225 230 235 240

Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys Tyr Thr Ala Gln
245 250 255

Asp Ala Thr Thr Thr Gln Lys Gly Ile Val Gln Leu Ser Ser Asp Thr
260 265 270

Asn Ser Thr Ser Glu Thr Leu Ala Ala Thr Pro Lys Ala Val Lys Ala
275 280 285

Ala Tyr Asp Leu Ala Ala Gly Lys Ala Pro Ser Ser His Thr His Pro
290 295 300

Trp Asn Gln Ile Thr Gly Val Pro Thr Ala Ser Leu Thr Ala Lys Gly
305 310 315 320

Ile Thr Gln Leu Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala
325 330 335

Ala Thr Pro Lys Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys
340 345 350

Tyr Thr Ala Gln Asp Ala Thr Thr Ala Gln Lys Gly Ile Val Gln Leu
355 360 365

Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala Ala Thr Pro Lys
370 375 380

Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys Tyr Thr Ala Gln
385 390 395 400

Asp Ala Thr Thr Thr Gln Lys Gly Ile Val Gln Leu Ser Ser Asp Thr
405 410 415

Asn Ser Thr Ser Glu Thr Leu Ala Ala Thr Pro Lys Ala Val Lys Ala
420 425 430

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

Trp Asn Gln Ile Thr Val Val Pro Thr Ala Ser Leu Thr Ala Lys Gly
450 455 460

Ile Thr Gln Leu Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala
465 470 475 480

Ala Thr Pro Lys Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys
485 490 495

Tyr Thr Ala Gln Asp Ala Thr Thr Ala Gln Lys Gly Ile Val Gln Leu
500 505 510

Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala Ala Thr Pro Lys
515 520 525

Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys Gln Ala Ala Asp
530 535 540

Ala Thr Leu Thr Ala Leu Ala Ala Leu Ala Thr Ala Ala Asp Lys Leu
545 550 555 560

Pro Tyr Phe Thr Gly Val Asp Arg Ala Ala Leu Thr Ala Leu Thr Ser
565 570 575

Val Gly Arg Ala Ile Leu Gly Lys Thr Ser Ile Gln Ser Val Leu Asp
580 585 590

Tyr Leu Gly Leu Gly Glu Gly Ser Ala Leu Pro Val Gly Val Pro Val
595 600 605

Pro Trp Pro Ser Ala Thr Pro Pro Thr Gly Trp Leu Lys Cys Asn Gly
610 615 620

Ala Ala Phe Ser Ser Glu Lys Tyr Pro Asn Leu Ala Lys Ala Tyr Pro
625 630 635 640

Thr Asn Lys Leu Pro Asp Leu Arg Gly Glu Phe Ile Arg Gly Trp Asp
645 650 655

Asp Gly Arg Gly Val Asp Ala Gly Arg Gln Leu Leu Ser Ser Gln Gly
660 665 670

Asp Ala Ile Arg Asn Ile Glu Gly Phe Ala Asp Gly Gly Ile Gly Met
675 680 685

Ser Phe Asp Ala Ile Arg Gly Ala Phe Tyr Asp Ala Gly Thr Arg Ser
690 695 700

Ala Arg Met Pro Asn Asn Thr Thr Thr Ile Asp Lys Thr Asp Asp Leu
705 710 715 720

Gly Phe Asp Ala Ser Arg Val Val Pro Thr Ala Asn Glu Asn Arg Pro
725 730 735

Arg Asn Ile Ala Phe Asn Tyr Ile Val Arg Ala Ala
740 745

<210> 38
<211> 737
<212> PRT
<213> Artificial Sequence

<220>
<223> Cobalt Tail Fiber

<400> 38

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Pro Glu
1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
50 55 60

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

Glu Phe Tyr Gln Val Thr Ile Gln His Arg Lys Asp Ile Ser Leu Ala
85 90 95

Leu Asn Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Gly Val Ser Thr
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Thr Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Tyr Thr Ala Gln Asp Ala Ser Thr Thr Gln Lys Gly Leu Val Gln Leu
210 215 220

Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala Ala Thr Pro Lys
225 230 235 240

Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys Tyr Thr Ala Gln
245 250 255

Asp Ala Thr Thr Thr Gln Lys Gly Ile Val Gln Leu Ser Ser Asp Thr
260 265 270

Asn Ser Thr Ser Glu Thr Leu Ala Ala Thr Pro Lys Ala Val Lys Ala
275 280 285

Ala Tyr Asp Leu Ala Ala Gly Lys Ala Pro Ser Ser His Thr His Pro
290 295 300

Trp Asn Gln Ile Thr Gly Val Pro Thr Ala Ser Leu Thr Ala Lys Gly
305 310 315 320

Ile Thr Gln Leu Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala
325 330 335

Ala Thr Pro Lys Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys
340 345 350

Tyr Thr Ala Gln Asp Ala Thr Thr Ala Gln Lys Gly Ile Val Gln Leu
355 360 365

Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala Ala Thr Pro Lys
370 375 380

Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys Tyr Thr Ala Gln
385 390 395 400

Asp Ala Thr Thr Thr Gln Lys Gly Ile Val Gln Leu Ser Ser Asp Thr
405 410 415

Asn Ser Thr Ser Glu Thr Leu Ala Ala Thr Pro Lys Ala Val Lys Ala
420 425 430

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

Trp Asn Gln Ile Thr Val Val Pro Thr Ala Ser Leu Thr Ala Lys Gly
450 455 460

Ile Thr Gln Leu Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala
465 470 475 480

Ala Thr Pro Lys Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys
485 490 495

Tyr Thr Ala Gln Asp Ala Thr Thr Ala Gln Lys Gly Ile Val Gln Leu
500 505 510

Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala Ala Thr Pro Lys
515 520 525

Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys Gln Ala Ala Asp
530 535 540

Ala Thr Leu Thr Ala Leu Ala Ala Leu Ala Thr Ala Ala Asp Lys Leu
545 550 555 560

Pro Tyr Phe Thr Gly Val Asp Arg Ala Ala Leu Thr Ala Leu Thr Ser
565 570 575

Val Gly Arg Ala Ile Leu Gly Lys Thr Ser Ile Gln Ser Val Leu Asp
580 585 590

Tyr Leu Gly Leu Gly Glu Gly Ser Ala Leu Pro Val Gly Val Pro Val
595 600 605

Pro Trp Pro Leu Glu Thr Pro Pro Thr Gly Trp Leu Lys Cys Asn Gly
610 615 620

Ala Ala Phe Ser Ser Glu Met Tyr Pro Lys Leu Ala Lys Ala Tyr Pro
625 630 635 640

Thr Asn Lys Leu Pro Asp Leu Arg Gly Glu Phe Ile Arg Gly Trp Asp
645 650 655

Asp Gly Arg Gly Ile Asp Ala Gly Arg Thr Leu Leu Ser Gly Gln Asp
660 665 670

Gly Thr Ser Phe Ser His Tyr Gly Gly Asn Phe Asp Ile Gly Ser Gly
675 680 685

His Ser Ile Asn Asn Tyr Asp Gln Ile Val Ser Asn Gln Pro Gly Phe
690 695 700

Ser Arg Phe Ser Phe Ala Gly Pro Ser Arg Gly Asp Gly Val Asn Tyr
705 710 715 720

Val Thr Ile Arg Pro Arg Asn Ile Ala Phe Asn Tyr Ile Val Arg Ala
725 730 735

Ala

<210> 39
<211> 578
<212> PRT
<213> Artificial Sequence

<220>
<223> Cornflower Tail Fiber

<400> 39

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Ser Glu
1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
50 55 60

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

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

Leu Ser Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Ser Val Ser Ala
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Ser Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Ala Ala Ile Ala Gly Met Ala Lys Ala Ser Asp Leu Asn Ala Leu Ala
210 215 220

Lys Leu Thr Gly Gly Asn Lys Leu Asp Gly Ser Gln Val Ile Thr Ser
225 230 235 240

Asp Asn Ala Gly Phe Ile Leu Gly Lys Asn Ser Asp Leu Ala Leu Leu
245 250 255

Lys Lys Gln Gly Gln Gly Gly Thr Ile Ala Val Gly Ser Gly Thr Pro
260 265 270

Phe Arg Val Gln Arg Ser Arg Ala Thr Thr Val Ser Pro Ala Asp Thr
275 280 285

Phe Asp Asp Ile Leu Val Ile Asp Ala Asn Asn Arg Thr Thr Leu Pro
290 295 300

Gly Ala Leu Thr Ala Gly Gly Asp Ile Asp Asn Thr Thr Lys Gly Leu
305 310 315 320

Leu Tyr Thr Gln Ala Ile Glu Leu Ser Phe Ser Thr Pro Tyr Ile Asp
325 330 335

Phe His Phe Asn Tyr Ser Thr Asp Asp Phe Thr Gly Arg Ile Met Ala
340 345 350

Thr Ala Ala Asp Gln Ile Ser Val Gln Gly Ser His Trp Arg Val Asp
355 360 365

Arg Asp Leu Arg Val Gly Gly Met Ala Asp Ile Ala Gly Trp Ala Gln
370 375 380

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

Ile Gly Ser Leu Val Ser Gly Gly Arg Ile Arg Ser Arg Met Leu Gly
405 410 415

Arg Gly Gly Asn Val Asp Pro Ser Gly Ala Trp Gly Gly Phe Tyr Val
420 425 430

Glu Glu His Val Gly Thr Glu His Arg Ile Ile Met Tyr Met Asp Gly
435 440 445

Phe Gly Arg Thr Asp Ala Trp Ser Phe Arg Ala Gly Gly Val Ile Ser
450 455 460

Thr Pro Lys Gly Asp Val Met Thr Thr Gly Ser Asp Val Arg Leu Lys
465 470 475 480

Thr Asp Phe Thr Gln Ala Pro Gly Asn Ala Ser Glu Arg Ile Glu Arg
485 490 495

Leu Gly Val Cys Glu Tyr Arg Met Lys Gly Glu Thr Arg Arg Arg Arg
500 505 510

Gly Phe Ile Ala Gln Gln Ala Glu Lys Ala Asp Asp Leu Tyr Thr Phe
515 520 525

Leu Gly Ile Glu Gln Glu Ile Asp Gly Glu Lys Phe Lys Val Met Asn
530 535 540

Val Asp Tyr Thr Ala Ile Ile Ala Asp Leu Val Thr Val Ala Gln Gly
545 550 555 560

Leu Leu Val Lys Asn Gln Glu Leu Glu Arg Arg Ile Ser Val Leu Glu
565 570 575

Gly Ile

<210> 40
<211> 737
<212> PRT
<213> Artificial Sequence

<220>
<223> Denim Tail Fiber

<400> 40

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Pro Glu
1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
50 55 60

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

Glu Phe Tyr Gln Val Thr Ile Gln His Arg Lys Asp Ile Ser Leu Ala
85 90 95

Leu Asn Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Gly Val Ser Thr
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Thr Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Tyr Thr Ala Gln Asp Ala Ser Thr Thr Gln Lys Gly Leu Val Gln Leu
210 215 220

Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala Ala Thr Pro Lys
225 230 235 240

Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys Tyr Thr Ala Gln
245 250 255

Asp Ala Thr Thr Thr Gln Lys Gly Ile Val Gln Leu Ser Ser Asp Thr
260 265 270

Asn Ser Thr Ser Glu Thr Leu Ala Ala Thr Pro Lys Ala Val Lys Ala
275 280 285

Ala Tyr Asp Leu Ala Ala Gly Lys Ala Pro Ser Ser His Thr His Pro
290 295 300

Trp Asn Gln Ile Thr Gly Val Pro Thr Ala Ser Leu Thr Ala Lys Gly
305 310 315 320

Ile Thr Gln Leu Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala
325 330 335

Ala Thr Pro Lys Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys
340 345 350

Tyr Thr Ala Gln Asp Ala Thr Thr Ala Gln Lys Gly Ile Val Gln Leu
355 360 365

Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala Ala Thr Pro Lys
370 375 380

Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys Tyr Thr Ala Gln
385 390 395 400

Asp Ala Thr Thr Thr Gln Lys Gly Ile Val Gln Leu Ser Ser Asp Thr
405 410 415

Asn Ser Thr Ser Glu Thr Leu Ala Ala Thr Pro Lys Ala Val Lys Ala
420 425 430

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

Trp Asn Gln Ile Thr Val Val Pro Thr Ala Ser Leu Thr Ala Lys Gly
450 455 460

Ile Thr Gln Leu Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala
465 470 475 480

Ala Thr Pro Lys Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys
485 490 495

Tyr Thr Ala Gln Asp Ala Thr Thr Ala Gln Lys Gly Ile Val Gln Leu
500 505 510

Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala Ala Thr Pro Lys
515 520 525

Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys Gln Ala Ala Asp
530 535 540

Ala Thr Leu Thr Ala Leu Ala Ala Leu Ala Thr Ala Ala Asp Lys Leu
545 550 555 560

Pro Tyr Phe Thr Gly Val Asp Arg Ala Ala Leu Thr Ala Leu Thr Ser
565 570 575

Val Gly Arg Ala Ile Leu Gly Lys Thr Ser Ile Gln Ser Val Leu Asp
580 585 590

Tyr Leu Gly Leu Gly Glu Gly Ser Ala Leu Pro Val Gly Val Pro Val
595 600 605

Pro Trp Pro Ser Ala Thr Pro Pro Thr Gly Trp Leu Lys Cys Asn Gly
610 615 620

Ala Ala Phe Ser Ser Glu Lys Tyr Pro Asn Leu Ala Lys Val Tyr Pro
625 630 635 640

Thr Asn Lys Leu Pro Asp Leu Arg Gly Glu Phe Ile Arg Gly Trp Asp
645 650 655

Asp Gly Arg Gly Val Asp Asn Gly Arg Ala Leu Leu Ser Ser Gln Glu
660 665 670

Ala Thr Asn Phe Ser Gln Arg Ala Gly Asn Ile Gly Asp Gly Ala Gly
675 680 685

His Ala Ile Asn Phe His Asp Gly Ile Val Gly Asn Gln Pro Gly Phe
690 695 700

Ser Arg Phe Asn Phe Thr Ser Asn Ser Val Gly Asp Gly Ile Asn Phe
705 710 715 720

Val Ala Val Arg Pro Arg Asn Ile Ala Phe Asn Tyr Ile Val Arg Ala
725 730 735

Ala

<210> 41
<211> 939
<212> PRT
<213> Artificial Sequence

<220>
<223> Eggplant Tail Fiber

<400> 41

Met Gly Ala Asp Lys Thr Asn Asn Ile Met Thr Leu Ser Ser Gly Val
1 5 10 15

Ser Gln Pro Leu Leu Ala Asp Val Gln Tyr Phe Glu Leu Tyr Ser Ser
20 25 30

Ser Ala Leu Asn Arg Lys Leu Lys Asn Ile Val Leu Pro Gly Phe Tyr
35 40 45

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

Ser Glu Asn Ser Glu Gly Lys Gly Ala Ala Ser Val Asp Val Asn Asn
65 70 75 80

Val Gln Ile Ser Val Gln Gln Ile Glu Asp Val Thr Val Ser Val Lys
85 90 95

Ala Gly Ala Thr Asn Ile Ile Val Leu Glu Ala Asn Phe Glu His Gly
100 105 110

Val Lys Thr Thr Gln Val Asp Ser Ala Ser Ser Val Ser Ala Ala Arg
115 120 125

Ile Tyr Ala Arg Thr Asp Asn Thr Ile Gly Gln Asn Gln Ile Glu Leu
130 135 140

Cys Arg Val Ile Val Pro Asn Gly Ala Thr Ala Val Thr Lys Glu Met
145 150 155 160

Ile Val Leu Lys Tyr Arg Val Asn Arg Ala Val Gly Val Glu Phe Ser
165 170 175

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

Val Lys Thr Leu His Asp Leu Val Asp Thr Lys Ala Pro Leu Asp Ser
195 200 205

Pro His Leu Ser Gly Thr Pro Thr Ser Pro Thr Pro Glu Pro Gly Thr
210 215 220

Asn Asn Thr Gln Ile Ala Asn Ala Ala Phe Val Tyr Ala Ala Ile Asn
225 230 235 240

Ala Leu Ile Asn Gly Ala Pro Gly Thr Met Asp Thr Leu Lys Glu Ile
245 250 255

Ala Ala Ala Ile Asn Asn Asp Pro Asn Phe Ser Thr Thr Ile Asn Asn
260 265 270

Ala Leu Ala Leu Lys Ala Pro Leu Ala Ser Pro Ala Leu Thr Gly Ile
275 280 285

Pro Thr Ala Pro Thr Ala Ala Gln Gly Thr Asn Asn Thr Gln Ile Ala
290 295 300

Thr Thr Ala Tyr Val Arg Ala Ala Ile Ser Ala Leu Val Gly Ser Ser
305 310 315 320

Pro Glu Ala Leu Asp Thr Leu Asn Glu Leu Ala Ala Ala Leu Gly Asn
325 330 335

Asp Pro Asn Phe Ala Thr Thr Met Thr Asn Ala Leu Ala Gly Lys Gln
340 345 350

Pro Leu Asp Ala Thr Leu Thr Ala Leu Ala Gly Leu Ala Thr Gly Ala
355 360 365

Asn Lys Leu Pro Tyr Phe Thr Gly Lys Asp Thr Val Ala Gln Thr Asp
370 375 380

Leu Thr Ser Val Gly Arg Asp Ile Leu Ala Lys Thr Ser Thr Leu Ala
385 390 395 400

Val Ile Gln Tyr Leu Gly Leu Arg Glu Leu Gly Thr Ser Gly Glu Lys
405 410 415

Ile Pro Leu Leu Ser Thr Ala Asn Thr Trp Ser Ala Arg Gln Thr Phe
420 425 430

Asn Gly Gly Ile Thr Gly Ala Leu Thr Gly Asn Ala Asp Thr Ala Thr
435 440 445

Lys Leu Lys Thr Ala Ile Asn Ile Asn Gly Val Arg Phe Asp Gly Ser
450 455 460

Thr Asn Ile Ser Ile Pro Thr Ile Thr Ser Arg Gly Arg Val Thr Ala
465 470 475 480

Leu Thr Gly Thr Thr Gln Gly Ala Ala Thr Gly Leu Gln Met Tyr Glu
485 490 495

Ala Tyr Asn Asn Gly Tyr Pro Ser Pro Tyr Gly Asn Val Leu His Leu
500 505 510

Lys Gly Ala Thr Ala Ala Gly Glu Gly Glu Leu Phe Ile Gly Trp Ser
515 520 525

Gly Thr Asn Gly Ala His Ala Pro Ala Phe Ile Arg Ser Lys Arg Asp
530 535 540

Ser Thr Ala Ala Ala Trp Ser Glu Trp Ala Gln Ile Tyr Thr Ser Lys
545 550 555 560

Asp Ser Val Pro Gly Val Asn Ala Lys Gly Asn Gln Asp Thr Ser Gly
565 570 575

Asn Ala Ala Thr Ala Thr Lys Leu Gln Ile Ala Cys Thr Ile Asn Gly
580 585 590

Val Ser Phe Asp Gly Ser Lys Asn Ile Glu Leu Thr Ala Glu Asp Leu
595 600 605

Asn Leu Gln Glu Thr Val Asn Lys Ala Asp Asn Ala Val Gln Lys Thr
610 615 620

Gly Asp Thr Leu Ser Gly Gly Leu Thr Phe Glu Asn Asp Ser Ile Leu
625 630 635 640

Ala Trp Ile Arg Asn Thr Asp Trp Ala Lys Ile Gly Phe Lys Asn Asp
645 650 655

Ala Asp Ser Asp Thr Asp Ser Tyr Met Trp Phe Glu Thr Gly Asp Asn
660 665 670

Gly Asn Glu Tyr Phe Lys Trp Arg Ser Lys Gln Ser Thr Thr Thr Lys
675 680 685

Asp Leu Met Asn Leu Lys Trp Asp Ala Leu Tyr Val Leu Val Asn Ala
690 695 700

Ile Val Asn Gly Glu Val Ile Ser Lys Ser Ala Asn Gly Leu Arg Ile
705 710 715 720

Ala Tyr Gly Asn Tyr Gly Phe Phe Ile Arg Asn Asp Gly Ser Asn Thr
725 730 735

Tyr Phe Met Leu Thr Asn Ser Gly Asp Asn Met Gly Thr Tyr Asn Gly
740 745 750

Leu Arg Pro Leu Trp Ile Asn Asn Ala Thr Gly Ala Val Ser Met Gly
755 760 765

Arg Gly Leu Asn Val Ser Gly Glu Thr Leu Ser Asp Arg Phe Ala Ile
770 775 780

Asn Ser Ser Asn Gly Met Trp Ile Gln Met Arg Asp Asn Asn Ala Ile
785 790 795 800

Phe Gly Lys Asn Ile Val Asn Thr Asp Ser Ala Gln Ala Leu Leu Arg
805 810 815

Gln Asn His Ala Asp Arg Lys Phe Met Ile Gly Gly Leu Gly Asn Lys
820 825 830

Gln Phe Gly Ile Tyr Met Ile Asn Asn Ser Arg Thr Ala Asn Gly Thr
835 840 845

Asp Gly Gln Ala Tyr Met Asp Asn Asn Gly Asn Trp Leu Cys Gly Ala
850 855 860

Gln Val Ile Pro Gly Asn Tyr Gly Asn Phe Asp Ser Arg Tyr Val Arg
865 870 875 880

Asp Val Arg Leu Gly Thr Arg Val Val Gln Leu Met Ala Arg Gly Gly
885 890 895

Arg Tyr Glu Lys Ala Gly His Ala Ile Thr Gly Leu Arg Ile Ile Gly
900 905 910

Glu Val Asp Gly Asp Asp Glu Ala Ile Phe Arg Pro Ile Gln Lys Tyr
915 920 925

Ile Asn Gly Thr Trp Tyr Asn Val Ala Gln Val
930 935

<210> 42

<211> 986

<212> PRT

<213> Artificial Sequence

<220>

<223> Fern Tail Fiber

<400> 42

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Ser Glu
1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
50 55 60

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

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

Leu Ser Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Ser Val Ser Ala
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Ser Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Tyr Thr Ala Gln Asp Ala Ser Thr Thr Gln Lys Gly Leu Val Gln Leu
210 215 220

Ser Ser Ala Thr Asn Ser Asp Ser Glu Thr Met Ala Ala Thr Pro Lys
225 230 235 240

Ala Val Lys Ser Ile Lys Asp Leu Ala Asp Thr Lys Ala Pro Ile Glu
245 250 255

Ser Pro Ser Leu Thr Gly Thr Pro Thr Ala Pro Thr Ala Ala Gln Gly
260 265 270

Thr Asn Ser Thr Gln Ile Ala Asn Thr Ala Phe Val Lys Ala Ala Ile
275 280 285

Thr Ala Leu Ile Asn Gly Ala Pro Gly Thr Leu Asp Thr Leu Lys Glu
290 295 300

Ile Ala Ala Ala Ile Asn Asn Asp Pro Asn Tyr Ser Thr Thr Ile Asn
305 310 315 320

Asn Ala Leu Ala Leu Lys Ala Pro Leu Ala Ser Pro Ala Leu Thr Gly
325 330 335

Val Pro Thr Ala Pro Thr Ala Ala Gln Gly Thr Asn Asn Thr Gln Ile
340 345 350

Ala Thr Thr Ala Tyr Val Arg Ala Ala Ile Ser Ala Leu Val Gly Ser
355 360 365

Ser Pro Glu Ala Leu Asp Thr Leu Tyr Glu Leu Ala Ala Ala Leu Gly
370 375 380

Asn Asp Pro Asn Phe Ala Thr Thr Met Thr Asn Ala Leu Ala Gly Lys
385 390 395 400

Gln Pro Leu Asp Ala Thr Leu Thr Ala Leu Ala Gly Leu Ala Thr Gly
405 410 415

Ala Asn Lys Leu Pro Tyr Phe Thr Gly Thr Asp Thr Val Ser Gln Thr
420 425 430

Asp Leu Thr Ser Val Gly Arg Asp Ile Leu Ala Lys Thr Ser Ile Leu
435 440 445

Ala Val Ile Gln Tyr Leu Gly Leu Arg Glu Leu Gly Thr Ser Gly Glu
450 455 460

Lys Ile Pro Leu Leu Ser Thr Ala Asn Thr Trp Ser Ala Arg Gln Thr
465 470 475 480

Phe Asn Gly Gly Ile Thr Gly Ala Leu Thr Gly Asn Ala Asp Thr Ala
485 490 495

Thr Lys Leu Lys Thr Ala Arg Asn Ile Asn Gly Val Arg Phe Asp Gly
500 505 510

Ser Gly Asp Ile Asn Ile Asn Thr Leu Val Ser Arg Gly Arg Val Thr
515 520 525

Ala Leu Glu Ala Asn Ala Gln Gly Thr Ser Gly Ile Gln Leu Tyr Glu
530 535 540

Ala Tyr Asn Asn Gly Tyr Pro Ser Pro Tyr Gly Asn Val Leu His Leu
545 550 555 560

Lys Gly Ala Thr Ala Ala Gly Glu Gly Glu Leu Phe Ile Gly Trp Ser
565 570 575

Gly Thr Ser Gly Ala His Ala Pro Val His Ile Arg Ser Arg Arg Asp
580 585 590

Thr Asp Ser Ala Asn Trp Ser Glu Trp Ala Gln Val Tyr Thr Ser Lys
595 600 605

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

Asn Ala Ala Thr Ala Thr Lys Leu Gln Thr Ala Cys Thr Ile Asn Gly
625 630 635 640

Val Ser Phe Asp Gly Ser Lys Asn Ile Glu Leu Thr Ala Glu Asp Leu
645 650 655

Asn Leu Gln Glu Thr Val Asn Lys Ala Gly Asn Ala Val Gln Lys Thr
660 665 670

Gly Asp Thr Leu Ser Gly Gly Leu Thr Phe Glu Asn Asp Ser Ile Leu
675 680 685

Ala Trp Ile Arg Asn Thr Asp Trp Ala Lys Ile Gly Phe Lys Asn Asp
690 695 700

Ala Asp Gly Asp Thr Asp Ser Tyr Met Trp Phe Glu Thr Gly Asp Asn
705 710 715 720

Gly Asn Glu Tyr Phe Lys Trp Arg Ser Lys Arg Gly Thr Thr Thr Lys
725 730 735

Asp Leu Met Asn Leu Lys Trp Asp Ala Leu Tyr Val Leu Val Asn Ala
740 745 750

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

Ala Tyr Gly Asn Tyr Gly Phe Phe Ile Arg Asn Asp Gly Ser Asn Thr
770 775 780

Tyr Phe Met Leu Thr Asn Ser Gly Asp Asn Met Gly Thr Tyr Asn Gly
785 790 795 800

Leu Arg Pro Leu Trp Ile Asn Asn Ala Thr Gly Ala Val Ser Met Gly
805 810 815

Arg Gly Leu Asn Val Ser Gly Glu Thr Leu Gln Thr Val Cys Tyr Asn
820 825 830

Ser Ser Asn Gly Met Trp Ile Gln Met Arg Asp Asn Asn Ala Ile Phe
835 840 845

Gly Lys Asn Ile Val Asn Thr Asp Ser Ala Gln Ala Leu Leu Arg Gln
850 855 860

Asn His Ala Asp Arg Lys Phe Met Ile Gly Gly Leu Gly Asn Lys Gln
865 870 875 880

Phe Gly Ile Tyr Met Ile Asn Asn Ser Arg Thr Ala Asn Gly Thr Asp
885 890 895

Gly Gln Ala Tyr Met Asp Asn Asn Gly Asn Trp Leu Cys Gly Ala Gln
900 905 910

Ile Ile Pro Gly Asn Tyr Gly Asn Phe Asp Ser Arg Tyr Val Ser Asp
915 920 925

Val Arg Leu Gly Thr Arg Val Val Gln Thr Met Gln Lys Gly Val Met
930 935 940

Tyr Glu Lys Ser Gly His Ala Ile Thr Gly Leu Gly Ile Val Gly Glu
945 950 955 960

Val Asp Gly Asp Asp Pro Ala Val Phe Arg Pro Ile Gln Lys Tyr Ile
965 970 975

Asn Gly Thr Trp Tyr Asn Val Ala Gln Val
980 985

<210> 43
<211> 972
<212> PRT
<213> Artificial Sequence

<220>
<223> Fuchsia Tail Fiber

<400> 43

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Ser Glu
1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
50 55 60

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

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

Leu Ser Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Ser Val Ser Ala
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Ser Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Tyr Thr Ala Gln Asp Ala Ser Thr Thr Gln Lys Gly Leu Val Gln Leu
210 215 220

Ser Ser Ala Thr Asn Ser Asp Ser Glu Thr Met Ala Ala Thr Pro Lys
225 230 235 240

Ala Val Lys Ser Ile Lys Asp Leu Ala Asp Thr Lys Ala Pro Ile Glu
245 250 255

Ser Pro Ser Leu Thr Gly Thr Pro Thr Ala Pro Thr Ala Ala Gln Gly
260 265 270

Thr Asn Ser Thr Gln Ile Ala Asn Thr Ala Phe Val Lys Ala Ala Ile
275 280 285

Thr Ala Leu Ile Asn Gly Ala Pro Gly Thr Leu Asp Thr Leu Lys Glu
290 295 300

Ile Ala Ala Ala Ile Asn Asn Asp Pro Asn Tyr Ser Thr Thr Ile Asn
305 310 315 320

Asn Ala Leu Ala Leu Lys Ala Pro Leu Ala Ser Pro Ala Leu Thr Gly
325 330 335

Val Pro Thr Ala Pro Thr Ala Ala Gln Gly Thr Asn Asn Thr Gln Ile
340 345 350

Ala Thr Thr Ala Tyr Val Arg Ala Ala Ile Ser Ala Leu Val Gly Ser
355 360 365

Ser Pro Glu Ala Leu Asp Thr Leu Tyr Glu Leu Ala Ala Ala Leu Gly
370 375 380

Asn Asp Pro Asn Phe Ala Thr Thr Met Thr Asn Ala Leu Ala Gly Lys
385 390 395 400

Gln Pro Leu Asp Ala Thr Leu Thr Ala Leu Ala Gly Leu Ala Thr Gly
405 410 415

Ala Asn Lys Leu Pro Tyr Phe Thr Gly Thr Asp Thr Val Ser Gln Thr
420 425 430

Asp Leu Thr Ser Val Gly Arg Asp Ile Leu Ala Lys Thr Ser Ile Leu
435 440 445

Ala Val Ile His Gly Leu Arg Glu Leu Gly Thr Ser Gly Glu Lys Ile
450 455 460

Pro Leu Leu Ser Thr Ala Asn Thr Trp Ser Ala Arg Gln Thr Phe Asn
465 470 475 480

Gly Gly Ile Thr Gly Ala Leu Ile Gly Asn Ala Asp Thr Ala Thr Lys
485 490 495

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

Asp Ile Asn Ile Asn Thr Leu Val Ser Arg Gly Arg Val Thr Ala Leu
515 520 525

Gly Ala Asn Ala Gln Gly Thr Ser Gly Ile Gln Leu Tyr Glu Ala Tyr
530 535 540

Asn Asn Gly Tyr Pro Ser Pro Tyr Gly Asn Val Leu His Leu Lys Gly
545 550 555 560

Ala Thr Ala Ala Gly Glu Gly Glu Leu Phe Ile Gly Trp Ser Val Ser
565 570 575

Ser Gly Asp His Ala Pro Val His Ile Arg Ser Arg Arg Asp Ile Asp
580 585 590

Ser Ala Asn Trp Ser Glu Trp Ala Gln Val Tyr Thr Ser Lys Asp Ser
595 600 605

Val Pro Gly Val Asn Ala Lys Gly Asn Gln Asp Thr Ser Gly Asn Ala
610 615 620

Ala Thr Ala Thr Lys Leu Gln Thr Ala Cys Thr Ile Asn Gly Val Ser
625 630 635 640

Phe Asp Gly Ser Lys Asn Ile Glu Leu Thr Ala Glu Asp Leu Asn Leu
645 650 655

Glu Gln Thr Val Glu Leu Ala Ala Gly Ala Leu Gln Lys Asn Gln Asn
660 665 670

Gly Ala Asp Ile Pro Asn Lys Asp Lys Phe Ile Gln Asn Thr Gly Ala
675 680 685

Cys Arg Ala Phe Ser Gly Gln Thr Asp Ile Asp Gly Ser Gln Gly Glu
690 695 700

Trp Ser Thr Val Ala Phe Ile Ser Trp Leu Glu Asn Asn Gly Ala Phe
705 710 715 720

Arg His Pro Tyr Trp Met Cys Lys Gly Ser Trp Ser Tyr Ala Arg Asn
725 730 735

Arg Val Ile Thr Asp Thr Gly Cys Gly Asn Ile Cys Leu Ala Gly Ala
740 745 750

Val Ile Glu Val Met Gly Thr Arg Gly Ala Met Thr Ile Arg Val Thr
755 760 765

Thr Pro Ser Thr Ser Ser Gly Gly Gly Ile Thr Asn Ala Gln Phe Thr
770 775 780

Tyr Ile Asn His Gly Asp Ala Tyr Ala Pro Gly Trp Arg Arg Asp Tyr
785 790 795 800

Asn Thr Lys Asn Gln Gln Pro Ala Phe Ala Leu Gly Gln Thr Gly Arg
805 810 815

Arg Val Ala Asn Asp Lys Ala Val Gly Trp Asn Trp Asn Ser Gly Val
820 825 830

Tyr Asp Ala Asp Ile Ser Gly Ala Ser Thr Leu Ile Leu His Phe Asn
835 840 845

Met Asn Ala Gly Ser Cys Pro Ala Val Gln Phe Arg Val Asn Tyr Arg
850 855 860

Asn Gly Gly Ile Phe Tyr Arg Ser Ala Arg Asp Gly Tyr Gly Phe Glu
865 870 875 880

Ala Asn Trp Ser Glu Phe Tyr Thr Thr Thr Arg Lys Pro Ser Ala Gly
885 890 895

Asp Val Gly Ala Tyr Thr Gln Ala Glu Cys Asn Ser Arg Phe Ile Thr
900 905 910

Gly Ile Arg Leu Gly Gly Leu Ser Ser Val Gln Thr Trp Asn Gly Pro
915 920 925

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

Asn Arg Asp Glu Leu Ile Asp Thr Thr Gln Ala Arg Pro Ile Gln Tyr
945 950 955 960

Cys Ile Asn Gly Thr Trp Tyr Asn Ala Gly Ser Ile
965 970

<210> 44

<211> 550

<212> PRT

<213> Artificial Sequence

<220>

<223> Fuzzy Tail Fiber

<400> 44

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Ser Glu
1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
50 55 60

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

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

Leu Ser Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Ser Val Ser Ala
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Ser Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Lys Pro Asp Gly Thr Thr Gly Thr Val Lys Ser Trp Ala Gln Phe Leu
210 215 220

Ser Glu Tyr Ser Ser Arg Gln Thr Ala Ile Asp Gly Ala Ile Thr Ala
225 230 235 240

Ala Gly Lys Asn Val Ala Arg Thr Ser Ser Thr Asn Thr Phe Thr Gln
245 250 255

Pro Gln Thr Phe Ser Asn Gly Val Thr Phe Ser Ala Thr Ile Thr Ala
260 265 270

Ala Gly Gln Ile Leu Arg Asn Asn Ser Gly Thr Gln Phe Thr Ala Ile
275 280 285

Asp Ala Gly Ser Leu Glu Ile Ser Ser Asp Thr Thr Pro Tyr Ile Asp
290 295 300

Phe His His Lys Gly Ser Val Ala Asp Tyr Thr His Arg Ile Ile Thr
305 310 315 320

Glu Asp Gly Ala Leu Ala Val Tyr Pro Gly Leu Arg Val Arg Gly Gly
325 330 335

Phe Gly Leu Tyr Gly Val Gly Thr Val Tyr Gly Asp Ala Tyr Ser Gln
340 345 350

Gly Phe Ile Ala Arg Leu Asn Asn Asp Pro Asn Ala Ser Ile Gly Asp
355 360 365

Ile Leu Ala Ser Pro Arg Phe Thr Val Arg Phe Asn Ser Arg Gly Ser
370 375 380

Asp Ser Asn Val Asp Gly Gly Gln Gly Ala Met Trp Phe Glu Glu Gln
385 390 395 400

Val Gly Thr Asn His Arg Leu Val Leu Met Ala Gly Gly Phe Ser Ala
405 410 415

Asn Val Gln Tyr Trp Gln Phe Leu Ala Asp Gly Arg Ile Tyr Ser Ser
420 425 430

Gln Asn Gly Asn Val Gln Trp Gln Gly Thr Ser Asp Ala Arg Leu Lys
435 440 445

His Asp Ile Glu Pro Thr Asp Gly Gln Leu Ser Val Glu Arg Ile Arg
450 455 460

Lys Leu Glu Leu Val Thr Phe Val Tyr Asn Asp Asp Glu Gln Asn Arg
465 470 475 480

Thr Arg Arg Gly Ile Ile Ala Gln Gln Ala Gln Lys Val Asp Pro Gln
485 490 495

Tyr Val Lys Gln Val Asn Thr Ser Tyr Met Arg Asn Gly Glu Gln Val
500 505 510

Asn Asp Asp Arg Leu Gln Leu Asp Asn Asn Val Ile Met Met Asp Thr
515 520 525

Leu Ala Ala Val Lys Val Leu Leu Glu Arg Val Asp Glu Leu Glu Glu
530 535 540

Arg Leu Ser Ala His Gly
545 550

<210> 45

<211> 736

<212> PRT

<213> Artificial Sequence

<220>

<223> Inchworm Tail Fiber

<400> 45

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Ser Glu
1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
50 55 60

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

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

Leu Ser Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Ser Val Ser Ala
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Ser Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Val Ala Ala Asp Phe Lys Gly Arg Lys Ile Leu Ala Gly Asn Gly Leu
210 215 220

Leu Gly Gly Gly Asp Leu Ser Ala Asp Arg Ser Ile Gly Leu Ala Pro
225 230 235 240

Ser Gly Val Thr Ala Gly Ser Tyr Arg Ser Val Thr Val Asn Ala Asn
245 250 255

Gly Val Val Thr Gln Gly Ser Asn Pro Thr Thr Leu Ala Gly Tyr Ala
260 265 270

Ile Gly Asp Ala Tyr Thr Lys Ala Asp Thr Asp Gly Lys Leu Ala Gln
275 280 285

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

Leu Arg Val Asp Gly Asn Ala Val Ser Ser Ser Arg Leu Ala Ala Pro
305 310 315 320

Arg Ser Leu Ala Ala Ser Gly Asp Ala Ser Trp Ser Val Thr Phe Asp
325 330 335

Gly Ser Ala Asn Val Ser Ala Pro Leu Ser Leu Ser Ala Thr Gly Val
340 345 350

Ala Ala Gly Ser Tyr Pro Lys Val Thr Val Asp Thr Lys Gly Arg Val
355 360 365

Thr Ala Gly Met Ala Leu Ala Ala Thr Asp Ile Pro Gly Leu Asp Ala
370 375 380

Ser Lys Leu Val Ser Gly Val Leu Ala Glu Gln Arg Leu Pro Val Phe
385 390 395 400

Ala Arg Gly Leu Ala Thr Ala Val Ser Asn Ser Ser Asp Pro Asn Thr
405 410 415

Ala Thr Val Pro Leu Met Leu Thr Asn His Ala Asn Gly Pro Val Ala
420 425 430

Gly Arg Tyr Phe Tyr Ile Gln Ser Met Phe Tyr Pro Asp Gln Asn Gly
435 440 445

Asn Ala Ser Gln Ile Ala Thr Ser Tyr Asn Ala Thr Ser Glu Met Tyr
450 455 460

Val Arg Val Ser Tyr Ala Ala Asn Pro Ser Ile Arg Glu Trp Leu Pro
465 470 475 480

Trp Gln Arg Cys Asp Ile Gly Gly Ser Phe Thr Lys Glu Ala Asp Gly
485 490 495

Glu Leu Pro Gly Gly Val Asn Leu Asp Ser Met Val Thr Ser Gly Trp
500 505 510

Trp Ser Gln Ser Phe Thr Ala Gln Ala Ala Ser Gly Ala Asn Tyr Pro
515 520 525

Ile Val Arg Ala Gly Leu Leu His Val Tyr Ala Ala Ser Ser Asn Phe
530 535 540

Ile Tyr Gln Thr Tyr Gln Ala Tyr Asp Gly Glu Ser Phe Tyr Phe Arg
545 550 555 560

Cys Arg His Ser Asn Thr Trp Phe Pro Trp Arg Arg Met Trp His Gly
565 570 575

Gly Asp Phe Asn Pro Ser Asp Tyr Leu Leu Lys Ser Gly Phe Tyr Trp
580 585 590

Asn Ala Leu Pro Gly Lys Pro Ala Thr Phe Pro Pro Ser Ala His Asn
595 600 605

His Asp Val Gly Gln Leu Thr Ser Gly Ile Leu Pro Leu Ala Arg Gly
610 615 620

Gly Val Gly Ser Asn Thr Ala Ala Gly Ala Arg Ser Thr Ile Gly Ala
625 630 635 640

Gly Val Pro Ala Thr Ala Ser Leu Gly Ala Ser Gly Trp Trp Arg Asp
645 650 655

Asn Asp Thr Gly Leu Ile Arg Gln Trp Gly Gln Val Thr Cys Pro Ala
660 665 670

Asp Ala Asp Ala Ser Ile Thr Phe Pro Ile Pro Phe Pro Thr Leu Cys
675 680 685

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

Ala Ser Thr Gly Phe Arg Gly Ala Thr Thr Thr Thr Ala Val Ile Arg
705 710 715 720

Asn Gly Tyr Phe Ala Gln Ala Val Leu Ser Trp Glu Ala Phe Gly Arg
725 730 735

<210> 46
<211> 762
<212> PRT
<213> Artificial Sequence

<220>
<223> Indian Tail Fiber

<400> 46

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Pro Glu
1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
50 55 60

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

Glu Phe Tyr Gln Val Thr Ile Gln His Arg Lys Asp Ile Ser Leu Ala
85 90 95

Leu Asn Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Gly Val Ser Thr
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Thr Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Tyr Thr Ala Gln Asp Ala Ser Thr Thr Gln Lys Gly Leu Val Gln Leu
210 215 220

Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala Ala Thr Pro Lys
225 230 235 240

Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys Tyr Thr Ala Gln
245 250 255

Asp Ala Thr Thr Thr Gln Lys Gly Ile Val Gln Leu Ser Ser Asp Thr
260 265 270

Asn Ser Thr Ser Glu Thr Leu Ala Ala Thr Pro Lys Ala Val Lys Ala
275 280 285

Ala Tyr Asp Leu Ala Ala Gly Lys Ala Pro Ser Ser His Thr His Pro
290 295 300

Trp Asn Gln Ile Thr Gly Val Pro Thr Ala Ser Leu Thr Ala Lys Gly
305 310 315 320

Ile Thr Gln Leu Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala
325 330 335

Ala Thr Pro Lys Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys
340 345 350

Tyr Thr Ala Gln Asp Ala Thr Thr Ala Gln Lys Gly Ile Val Gln Leu
355 360 365

Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala Ala Thr Pro Lys
370 375 380

Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys Tyr Thr Ala Gln
385 390 395 400

Asp Ala Thr Thr Thr Gln Lys Gly Ile Val Gln Leu Ser Ser Asp Thr
405 410 415

Asn Ser Thr Ser Glu Thr Leu Ala Ala Thr Pro Lys Ala Val Lys Ala
420 425 430

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

Trp Asn Gln Ile Thr Val Val Pro Thr Ala Ser Leu Thr Ala Lys Gly
450 455 460

Ile Thr Gln Leu Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala
465 470 475 480

Ala Thr Pro Lys Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys
485 490 495

Tyr Thr Ala Gln Asp Ala Thr Thr Ala Gln Lys Gly Ile Val Gln Leu
500 505 510

Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala Ala Thr Pro Lys
515 520 525

Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys Gln Ala Ala Asp
530 535 540

Ala Thr Leu Thr Ala Leu Ala Ala Leu Ala Thr Ala Ala Asp Lys Leu
545 550 555 560

Pro Tyr Phe Thr Gly Val Asp Arg Ala Ala Leu Thr Ala Leu Thr Ser
565 570 575

Val Gly Arg Ala Ile Leu Gly Lys Thr Ser Ile Gln Ser Val Leu Asp
580 585 590

Tyr Leu Gly Leu Gly Glu Gly Ser Ala Leu Pro Val Gly Val Pro Val
595 600 605

Pro Trp Pro Leu Glu Thr Pro Pro Thr Gly Trp Leu Lys Cys Asn Gly
610 615 620

Ala Ala Phe Ser Ser Glu Met Tyr Pro Lys Leu Ala Lys Ala Tyr Pro
625 630 635 640

Thr Asn Lys Leu Pro Asp Leu Arg Gly Glu Phe Ile Arg Gly Trp Asp
645 650 655

Asp Gly Arg Gly Val Asp Ala Gly Arg Ala Leu Leu Asn Trp Gln Pro
660 665 670

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

Gly Leu Ala Ala Gly Ser Ala Arg Glu Gly Val Asn Pro Gly Ile Leu
690 695 700

Ala Thr Tyr Gly Asp Gly Gly Ile Val Lys Thr Asp Glu Pro Gly His
705 710 715 720

Lys Val Pro Ser Ser Leu Arg Ala Ile Ser Ser Arg Ser Val Lys Arg
725 730 735

Tyr Gly Glu Ile Ser Gly Asn Val Gly Thr Glu Thr Arg Pro Arg Asn
740 745 750

Val Ala Phe Asn Tyr Ile Val Arg Ala Ala
755 760

<210> 47
<211> 750
<212> PRT
<213> Artificial Sequence

<220>
<223> Indigo Tail Fiber

<400> 47

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Pro Glu
1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
50 55 60

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

Glu Phe Tyr Gln Val Thr Ile Gln His Arg Lys Asp Ile Ser Leu Ala
85 90 95

Leu Asn Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Gly Val Ser Thr
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Thr Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Tyr Thr Ala Gln Asp Ala Ser Thr Thr Gln Lys Gly Leu Val Gln Leu
210 215 220

Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala Ala Thr Pro Lys
225 230 235 240

Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys Tyr Thr Ala Gln
245 250 255

Asp Ala Thr Thr Thr Gln Lys Gly Ile Val Gln Leu Ser Ser Asp Thr
260 265 270

Asn Ser Thr Ser Glu Thr Leu Ala Ala Thr Pro Lys Ala Val Lys Ala
275 280 285

Ala Tyr Asp Leu Ala Ala Gly Lys Ala Pro Ser Ser His Thr His Pro
290 295 300

Trp Asn Gln Ile Thr Gly Val Pro Thr Ala Ser Leu Thr Ala Lys Gly
305 310 315 320

Ile Thr Gln Leu Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala
325 330 335

Ala Thr Pro Lys Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys
340 345 350

Tyr Thr Ala Gln Asp Ala Thr Thr Ala Gln Lys Gly Ile Val Gln Leu
355 360 365

Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala Ala Thr Pro Lys
370 375 380

Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys Tyr Thr Ala Gln
385 390 395 400

Asp Ala Thr Thr Thr Gln Lys Gly Ile Val Gln Leu Ser Ser Asp Thr
405 410 415

Asn Ser Thr Ser Glu Thr Leu Ala Ala Thr Pro Lys Ala Val Lys Ala
420 425 430

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

Trp Asn Gln Ile Thr Val Val Pro Thr Ala Ser Leu Thr Ala Lys Gly
450 455 460

Ile Thr Gln Leu Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala
465 470 475 480

Ala Thr Pro Lys Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys
485 490 495

Tyr Thr Ala Gln Asp Ala Thr Thr Ala Gln Lys Gly Ile Val Gln Leu
500 505 510

Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala Ala Thr Pro Lys
515 520 525

Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys Gln Ala Ala Asp
530 535 540

Ala Thr Leu Thr Ala Leu Ala Ala Leu Ala Thr Ala Ala Asp Lys Leu
545 550 555 560

Pro Tyr Phe Thr Gly Val Asp Arg Ala Ala Leu Thr Ala Leu Thr Ser
565 570 575

Val Gly Arg Ala Ile Leu Gly Lys Thr Ser Ile Gln Ser Val Leu Asp
580 585 590

Tyr Leu Gly Leu Gly Glu Gly Ser Ala Leu Pro Val Gly Val Pro Val
595 600 605

Pro Trp Pro Leu Glu Thr Pro Pro Thr Gly Trp Leu Lys Cys Asn Gly
610 615 620

Ala Ala Phe Ser Ser Glu Lys Tyr Pro Asn Leu Ala Lys Ala Tyr Pro
625 630 635 640

Thr Asn Lys Leu Pro Asp Leu Arg Gly Glu Phe Ile Arg Gly Trp Asp
645 650 655

Asp Gly Arg Gly Ile Asp Ser Gly Arg Asn Leu Leu Ser Ala Gln Asn
660 665 670

Asp Ala Ile Gln Asn Ile Val Gly Ser Phe Gly Arg Thr Gln Leu Phe
675 680 685

Arg Asp Val Leu Ser Ser Gly Pro Phe Ser Gln His Gly Gln Val Leu
690 695 700

Ser Thr Gly Leu Lys Glu Thr Glu Ile Ile Glu Gly Tyr Gly Ser Tyr
705 710 715 720

Asn Trp Thr Phe Asp Ala Ser Arg Ser Val Arg Thr Ala Ser Glu Thr
725 730 735

Arg Pro Arg Asn Ile Ala Phe Asn Tyr Ile Val Arg Ala Ala
740 745 750

<210> 48
<211> 1181
<212> PRT
<213> Artificial Sequence

<220>
<223> Jazzberry Tail Fiber

<400> 48

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Ser Glu
1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
50 55 60

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

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

Leu Ser Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Ser Val Ser Ala
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Ser Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Tyr Thr Ala Gln Asp Ala Ser Thr Thr Gln Lys Gly Leu Val Gln Leu
210 215 220

Ser Ser Ala Thr Asn Ser Asp Ser Glu Thr Met Ala Ala Thr Pro Lys
225 230 235 240

Ala Val Lys Ser Ile Lys Asp Leu Ala Asp Thr Lys Ala Pro Ile Glu
245 250 255

Ser Pro Ser Leu Thr Gly Thr Pro Thr Ala Pro Thr Ala Ala Gln Gly
260 265 270

Thr Asn Ser Thr Gln Ile Ala Asn Thr Ala Phe Val Lys Ala Ala Ile
275 280 285

Thr Ala Leu Ile Asn Gly Ala Pro Gly Thr Leu Asp Thr Leu Lys Glu
290 295 300

Ile Ala Ala Ala Ile Asn Asn Asp Pro Asn Tyr Ser Thr Thr Ile Asn
305 310 315 320

Asn Ala Leu Ala Leu Lys Ala Pro Leu Ala Ser Pro Ala Leu Thr Gly
325 330 335

Val Pro Thr Ala Pro Thr Ala Ala Gln Gly Thr Asn Asn Thr Gln Ile
340 345 350

Ala Thr Thr Ala Tyr Val Arg Ala Ala Ile Ser Ala Leu Val Gly Ser
355 360 365

Ser Pro Glu Ala Leu Asp Thr Leu Tyr Glu Leu Ala Ala Ala Leu Gly
370 375 380

Asn Asp Pro Asn Phe Ala Thr Thr Met Thr Asn Ala Leu Ala Gly Lys
385 390 395 400

Gln Pro Leu Asp Ala Thr Leu Thr Ala Leu Ala Gly Leu Ala Thr Gly
405 410 415

Ala Asn Lys Leu Pro Tyr Phe Thr Gly Thr Asp Thr Val Ser Gln Thr
420 425 430

Asp Leu Thr Ser Val Gly Arg Asp Ile Leu Ala Lys Thr Ser Ile Leu
435 440 445

Ala Val Ile Gln Tyr Leu Gly Leu Arg Glu Leu Gly Thr Ser Gly Glu
450 455 460

Lys Ile Pro Leu Leu Ser Thr Ala Asn Thr Trp Ser Ala Arg Gln Thr
465 470 475 480

Phe Asn Gly Gly Ile Thr Gly Ala Leu Thr Gly Asn Ala Asp Thr Ala
485 490 495

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

Ser Ala Asp Ile Thr Leu Thr Pro Glu Asn Leu Gly Val Thr Ser Leu
515 520 525

Thr Phe Glu Lys Asn Asn Gly Glu Met Pro Ile Asp Ala Asp Leu Asn
530 535 540

Thr Phe Gly Pro Val Glu Ala Tyr Leu Gly Val Trp Ser Lys Ala Thr
545 550 555 560

Ser Thr Asn Ala Thr Leu Glu Lys Asn Phe Pro Glu Asp Asn Ala Val
565 570 575

Gly Val Leu Glu Val Phe Ala Ala Gly Asn Phe Ala Gly Thr Gln Arg
580 585 590

Phe Thr Thr Arg Asp Gly Asn Val Tyr Ile Arg Arg Leu Ala Asn Lys
595 600 605

Trp Asn Gly Ser Asp Gly Pro Trp Gly Ile Trp Arg His Thr Gln Ser
610 615 620

Ala Thr Arg Pro Leu Ser Thr Thr Ile Asp Leu Asn Thr Leu Gly Ala
625 630 635 640

Ala Glu His Leu Gly Leu Trp Arg Asn Ser Ser Ser Ala Ile Ala Ser
645 650 655

Tyr Glu Arg Asn Tyr Pro Glu Glu Gly Gly Phe Ala Gln Gly Val Leu
660 665 670

Glu Ile Leu Glu Gly Gly Asn Tyr Gly Arg Thr Gln Arg Tyr Thr Thr
675 680 685

Arg Arg Gly Asn Met Tyr Val Arg Cys Leu Ala Ala Ser Trp Asp Ala
690 695 700

Ser Asn Pro Gln Trp Glu Pro Trp Leu Lys Val Gly His Gln Ser Glu
705 710 715 720

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

Tyr Ser Val Thr Gly Lys Ala Thr Asn Gly Pro Met Leu Asp Thr Val
740 745 750

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

Val Ser Val Trp Gln Arg Tyr Thr Thr Thr Gly Lys Ser Glu Thr Thr
770 775 780

Gln Gly Arg Thr Phe Glu Arg Val Tyr Ala Gly Ser Lys Trp Thr Glu
785 790 795 800

Trp Arg Glu Val Tyr Asn Ser Phe Ser Leu Pro Leu Asn Leu Gly Ile
805 810 815

Gly Gly Ala Val Ala Lys Leu Ser Ser Leu Asp Trp Gln Thr Tyr Asp
820 825 830

Phe Val Pro Gly Ser Leu Ile Thr Val Arg Leu Asp Asn Met Thr Asn
835 840 845

Ile Pro Asp Gly Met Asp Trp Gly Val Ile Asp Gly Asn Leu Ile Asn
850 855 860

Ile Ala Val Gly Pro Ser Asp Asp Ser Gly Thr Gly Arg Ser Met His
865 870 875 880

Val Trp Arg Ser Thr Val Ser Lys Ala Asn Tyr Arg Phe Phe Met Val
885 890 895

Arg Ile Ser Gly Asn Pro Gly Ser Arg Thr Ile Thr Ala Arg Arg Val
900 905 910

Pro Ile Ile Asp Glu Ala Gln Thr Trp Gly Ala Lys Gln Thr Phe Ser
915 920 925

Ala Gly Leu Ser Gly Glu Leu Ser Gly Asn Ala Ala Thr Ala Thr Lys
930 935 940

Leu Lys Thr Ala Arg Lys Ile Asn Asn Val Ser Phe Asp Gly Ser Gly
945 950 955 960

Asp Ile Glu Val Leu Pro Val Gly Val Pro Leu Pro Trp Pro Ser Asp
965 970 975

Thr Val Pro Ser Gly Tyr Ala Leu Met Gln Gly Gln Thr Phe Asp Lys
980 985 990

Ser Ala Tyr Pro Lys Leu Ala Ala Ala Tyr Pro Ser Gly Val Ile Pro
995 1000 1005

Asp Met Arg Gly Trp Thr Ile Lys Gly Lys Pro Ala Ser Gly Arg
1010 1015 1020

Asp Val Leu Ser Leu Glu Gln Asp Gly Ile Lys Ser His Thr His
1025 1030 1035

Ser Ala Ser Ala Ser Asn Thr Asp Leu Gly Thr Lys Thr Thr Ser
1040 1045 1050

Ser Phe Asp Tyr Gly Thr Lys Ser Thr Asn Asn Thr Gly Ala His
1055 1060 1065

Thr His Asn Val Ser Gly Thr Ala Asn Ser Ala Gly Ala His Thr
1070 1075 1080

His Thr Val Pro Leu Arg Arg Pro Asn Ser Gly Gly Met Asn Phe
1085 1090 1095

Asp Trp Leu Asp Gly Ala Ser Ser Gly Thr Val Val Gly Asn Gly
1100 1105 1110

Thr Val Pro Ser Ser Gly Ala His Thr His Ser Val Ser Gly Thr
1115 1120 1125

Ala Thr Ser Ala Gly Ala His Ala His Thr Val Gly Ile Gly Ala
1130 1135 1140

His Thr His Ser Val Ala Ile Gly Ser His Gly His Thr Ile Thr
1145 1150 1155

Val Asn Ala Ala Gly Asn Ala Glu Asn Thr Val Lys Asn Ile Ala
1160 1165 1170

Phe Asn Tyr Ile Val Arg Leu Ala
1175 1180

<210> 49

<211> 974

<212> PRT
<213> Artificial Sequence

<220>
<223> Jungle Tail Fiber

<400> 49

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Ser Glu
1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
50 55 60

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

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

Leu Ser Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Ser Val Ser Ala
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Ser Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Tyr Thr Ala Gln Asp Ala Ser Thr Thr Gln Lys Gly Leu Val Gln Leu
210 215 220

Ser Ser Ala Thr Asn Ser Asp Ser Glu Thr Met Ala Ala Thr Pro Lys
225 230 235 240

Ala Val Lys Ser Ile Lys Asp Leu Ala Asp Thr Lys Ala Pro Ile Glu
245 250 255

Ser Pro Ser Leu Thr Gly Thr Pro Thr Ala Pro Thr Ala Ala Gln Gly
260 265 270

Thr Asn Ser Thr Gln Ile Ala Asn Thr Ala Phe Val Lys Ala Ala Ile
275 280 285

Thr Ala Leu Ile Asn Gly Ala Pro Gly Thr Leu Asp Thr Leu Lys Glu
290 295 300

Ile Ala Ala Ala Ile Asn Asn Asp Pro Asn Tyr Ser Thr Thr Ile Asn
305 310 315 320

Asn Ala Leu Ala Leu Lys Ala Pro Leu Ala Ser Pro Ala Leu Thr Gly
325 330 335

Val Pro Thr Ala Pro Thr Ala Ala Gln Gly Thr Asn Asn Thr Gln Ile
340 345 350

Ala Thr Thr Ala Tyr Val Arg Ala Ala Ile Ser Ala Leu Val Gly Ser
355 360 365

Ser Pro Glu Ala Leu Asp Thr Leu Tyr Glu Leu Ala Ala Ala Leu Gly
370 375 380

Asn Asp Pro Asn Phe Ala Thr Thr Met Thr Asn Ala Leu Ala Gly Lys
385 390 395 400

Gln Pro Leu Asp Ala Thr Leu Thr Ala Leu Ala Gly Leu Ala Thr Gly
405 410 415

Ala Asn Lys Leu Pro Tyr Phe Thr Gly Thr Asp Thr Val Ser Gln Thr
420 425 430

Asp Leu Thr Ser Val Gly Arg Asp Ile Leu Ala Lys Thr Ser Ile Leu
435 440 445

Ala Val Ile Gln Tyr Leu Gly Leu Arg Glu Leu Gly Thr Ser Gly Glu
450 455 460

Lys Ile Pro Leu Leu Ser Thr Ala Asn Thr Trp Ser Ala Arg Gln Thr
465 470 475 480

Phe Asn Gly Gly Ile Thr Gly Ala Leu Thr Gly Asn Ala Asp Thr Ala
485 490 495

Thr Lys Leu Lys Thr Ala Arg Asn Ile Asn Gly Val Arg Phe Asp Gly
500 505 510

Ser Gly Asp Ile Asn Ile Asn Thr Leu Val Ser Arg Gly Arg Val Thr
515 520 525

Ala Leu Glu Ala Asn Ala Gln Gly Thr Ser Gly Ile Gln Leu Tyr Glu
530 535 540

Ala Tyr Asn Asn Gly Tyr Pro Ser Pro Tyr Gly Asn Val Leu His Leu
545 550 555 560

Lys Gly Ala Thr Ala Ala Gly Glu Gly Glu Leu Phe Ile Gly Trp Ser
565 570 575

Gly Thr Ser Gly Ala His Ala Pro Val His Ile Arg Ser Arg Arg Asp
580 585 590

Thr Asp Ser Ala Asn Trp Ser Glu Trp Ala Gln Val Tyr Thr Ser Lys
595 600 605

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

Asn Ala Ala Thr Ala Thr Lys Leu Gln Thr Ala Cys Thr Ile Asn Gly
625 630 635 640

Val Ser Phe Asp Gly Ser Lys Asn Ile Glu Leu Thr Ala Glu Asn Leu
645 650 655

Asn Leu Glu Arg Thr Val Glu Leu Ala Ala Gly Ser Leu Gln Lys Asn
660 665 670

Gln Asn Gly Ala Asp Ile Pro Gly Lys Asp Thr Phe Thr Lys Asn Ile
675 680 685

Gly Ala Cys Arg Ala Tyr Ser Ala Trp Leu Asn Ile Gly Gly Asp Ser
690 695 700

Gln Val Trp Thr Thr Ala Gln Phe Ile Ser Trp Leu Glu Ser Gln Gly
705 710 715 720

Ala Phe Asn His Pro Tyr Trp Met Cys Lys Gly Ser Trp Ala Tyr Ala
725 730 735

Asn Asn Lys Val Ile Thr Asp Thr Gly Cys Gly Asn Ile Cys Leu Ala
740 745 750

Gly Ala Val Val Glu Val Ile Gly Thr Arg Gly Ala Met Thr Ile Arg
755 760 765

Val Thr Thr Pro Ser Thr Ser Ser Gly Gly Gly Ile Thr Asn Ala Gln
770 775 780

Phe Thr Tyr Ile Asn His Gly Asp Ala Tyr Ala Pro Gly Trp Arg Arg
785 790 795 800

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

Gly Ser Thr Val Gly Asn Asp Lys Ala Val Gly Trp Asn Trp Asn Ser
820 825 830

Gly Val Tyr Asn Ala Asn Ile Gly Gly Ala Ser Thr Leu Ile Leu His
835 840 845

Phe Asn Met Asn Thr Gly Ser Cys Pro Ala Val Gln Phe Arg Val Asn
850 855 860

Tyr Arg Asn Gly Gly Ile Phe Tyr Arg Ser Ala Arg Asp Gly Tyr Gly
865 870 875 880

Phe Glu Ala Asp Trp Ser Glu Ile Tyr Thr Thr Thr Arg Lys Pro Ser
885 890 895

Ala Gly Asp Val Gly Ala Tyr Thr Gln Ala Glu Cys Asn Ser Arg Phe
900 905 910

Ile Thr Gly Ile Arg Leu Gly Gly Leu Ser Ser Val Gln Thr Trp Asn
915 920 925

Gly Pro Gly Trp Ser Asp Arg Ser Gly Tyr Val Val Thr Gly Ser Val
930 935 940

Asn Gly Asn Arg Asp Glu Leu Ile Asp Thr Thr Gln Ala Arg Pro Ile
945 950 955 960

Gln Tyr Cys Ile Asn Gly Thr Trp Tyr Asn Ala Gly Ser Ile
965 970

<210> 50
<211> 765
<212> PRT
<213> Artificial Sequence

<220>
<223> Mango Tail Fiber

<400> 50

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Ser Glu
1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
50 55 60

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

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

Leu Ser Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Ser Val Ser Ala
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Ser Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Tyr Thr Ala Gln Asp Ala Thr Thr Ala Arg Lys Gly Ile Val Gln Leu
210 215 220

Ser Ser Ala Thr Asp Ser Val Ser Glu Val Leu Ala Ala Thr Pro Lys
225 230 235 240

Ala Val Lys Thr Ala Tyr Asp Leu Ala Asn Ala Lys Tyr Thr Ala Val
245 250 255

Asp Ala Thr Thr Ala Arg Lys Gly Leu Val Gln Leu Ser Ser Ala Ile
260 265 270

Asp Ser Val Ser Glu Met Leu Ala Ala Thr Pro Lys Ala Val Lys Ser
275 280 285

Ala Asn Asp Asn Ala Thr Ala Ala Asn Ile Asn Ala Ser Glu Arg Val
290 295 300

Ser Lys Ala Gly Asp Ser Met Thr Gly Thr Leu Asn Gln Asp Ala Val
305 310 315 320

Ala Gln Ala Thr Tyr Asn Leu Thr Ala Leu Ser Asn Ala Thr Thr Gly
325 330 335

Asn Lys Asn Tyr Leu Arg Lys Met Arg Gly Gly Ala Thr Asp Thr Ile
340 345 350

Trp His Glu Thr Val Gln Gly Gly Glu Tyr Arg Leu Ala Thr Gly Ser
355 360 365

Thr Asp Ser Gln Glu Glu Leu Ala Ile Ser Thr Asn Thr Gly Leu Arg
370 375 380

Val Arg Gly Asn Leu Thr Ser Gln Leu Gly Gly Phe Tyr Ser Gly Asn
385 390 395 400

Thr Lys Lys Phe Ser Phe Tyr Ser Ser Asn Thr Ser Asp Lys Asn Ala
405 410 415

Ala Leu Arg Leu Trp Gly Asn Val Asp Arg Pro Ser Val Val Glu Leu
420 425 430

Gly Asp Asp Thr Gly Tyr His Phe Tyr Ser Gln Arg Asn Lys Asp Gly
435 440 445

Ser Leu Leu Leu Gln Ala Asn Gly Ala Gly Gln Phe Ser Gly Tyr Leu
450 455 460

Arg Ser Asn Gly Glu Val Gln Ser Ile Ser Ala Asn Ser Tyr Arg Ile
465 470 475 480

Ala Tyr Gly Asn Tyr Gly Cys Phe Trp Arg Asn Asp Gly Asn Asn Leu
485 490 495

Tyr Leu Met Leu Thr Asn Lys Gly Asp Ala Tyr Gly Asn Tyr Asn Ser
500 505 510

Leu Arg Pro Leu Arg Val Ser Leu Glu Thr Gly Ala Leu Gln Ser Glu
515 520 525

Thr Pro Phe Thr Val Gly Asn Thr Ile Phe Ala Thr Lys Glu Ile Thr
530 535 540

Ala Gly Tyr Ala Gly Ala Leu Ala Trp Ala Glu Gln Tyr Lys Thr Lys
545 550 555 560

Ala Ala Phe Phe Asn Ser Tyr Ser Thr Thr Gly Ala Ser Glu Tyr His
565 570 575

Pro Ala Leu Lys Gln Gln Ala Ser Ile Ala Gly Val Asn Ser Trp Ala
580 585 590

Phe Ser Met Gly Ser Leu Val Ala Asp Thr Ala Leu Ser Trp His Leu
595 600 605

His Met Lys Gly Ser Gly Gly Gln Asp Val Asn Tyr Lys Trp Asp Thr
610 615 620

Ser Gly Asn Phe Ser Ala Pro Gly Gln Leu Ile Pro Gly Ser Phe Ala
625 630 635 640

Asn Phe Asp Ser Arg Tyr Tyr Thr Lys Gly Gln Ser Asp Ala Gly Tyr
645 650 655

Met Ala Lys Thr Gly Ala Tyr Thr Lys Ala Glu Ser Asp Ala Arg Tyr
660 665 670

Asn Leu Lys Asn Thr Ala Ser Arg Ala Ala Ser Gly Trp Glu Lys Asp
675 680 685

Asn Thr Thr Gly Ile Met Lys Gln Trp Gly Ile Ala Thr Arg Thr Ala
690 695 700

Asp Ser Thr Arg Ile Thr Phe Pro Thr Ala Phe Pro Thr Thr Cys Val
705 710 715 720

Ser Val Gln Leu Thr Leu Leu Tyr Thr Asn Gly Phe His Asp Gln Asn
725 730 735

Ile Tyr Val Gln Asn Pro Asp Ala Ser Gly Phe Thr Tyr Ile Ala Gly
740 745 750

Ser Gly Glu Val Lys Val Tyr Phe Glu Ala Arg Gly Tyr
755 760 765

<210> 51
<211> 753
<212> PRT
<213> Artificial Sequence

<220>
<223> Maroon Tail Fiber

<400> 51

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Pro Glu
1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
50 55 60

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

Glu Phe Tyr Gln Val Thr Ile Gln His Arg Lys Asp Ile Ser Leu Ala
85 90 95

Leu Asn Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Gly Val Ser Thr
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Thr Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Tyr Thr Ala Gln Asp Ala Ser Thr Thr Gln Lys Gly Leu Val Gln Leu
210 215 220

Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala Ala Thr Pro Lys
225 230 235 240

Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys Tyr Thr Ala Gln
245 250 255

Asp Ala Thr Thr Thr Gln Lys Gly Ile Val Gln Leu Ser Ser Asp Thr
260 265 270

Asn Ser Thr Ser Glu Thr Leu Ala Ala Thr Pro Lys Ala Val Lys Ala
275 280 285

Ala Tyr Asp Leu Ala Ala Gly Lys Ala Pro Ser Ser His Thr His Pro
290 295 300

Trp Asn Gln Ile Thr Gly Val Pro Thr Ala Ser Leu Thr Ala Lys Gly
305 310 315 320

Ile Thr Gln Leu Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala
325 330 335

Ala Thr Pro Lys Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys
340 345 350

Tyr Thr Ala Gln Asp Ala Thr Thr Ala Gln Lys Gly Ile Val Gln Leu
355 360 365

Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala Ala Thr Pro Lys
370 375 380

Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys Tyr Thr Ala Gln
385 390 395 400

Asp Ala Thr Thr Thr Gln Lys Gly Ile Val Gln Leu Ser Ser Asp Thr
405 410 415

Asn Ser Thr Ser Glu Thr Leu Ala Ala Thr Pro Lys Ala Val Lys Ala
420 425 430

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

Trp Asn Gln Ile Thr Val Val Pro Thr Ala Ser Leu Thr Ala Lys Gly
450 455 460

Ile Thr Gln Leu Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala
465 470 475 480

Ala Thr Pro Lys Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys
485 490 495

Tyr Thr Ala Gln Asp Ala Thr Thr Ala Gln Lys Gly Ile Val Gln Leu
500 505 510

Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala Ala Thr Pro Lys
515 520 525

Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys Gln Ala Ala Asp
530 535 540

Ala Thr Leu Thr Ala Leu Ala Ala Leu Ala Thr Ala Ala Asp Lys Leu
545 550 555 560

Pro Tyr Phe Thr Gly Val Asp Arg Ala Ala Leu Thr Ala Leu Thr Ser
565 570 575

Val Gly Arg Ala Ile Leu Gly Lys Thr Ser Ile Gln Ser Val Leu Asp
580 585 590

Tyr Leu Gly Leu Gly Glu Gly Ser Ala Leu Pro Val Gly Val Pro Val
595 600 605

Pro Trp Pro Ser Ala Thr Pro Pro Thr Gly Trp Leu Lys Cys Asn Gly
610 615 620

Ala Ala Phe Ser Ser Glu Met Tyr Pro Lys Leu Ala Lys Ala Tyr Pro
625 630 635 640

Thr Asn Lys Leu Pro Asp Leu Arg Gly Glu Phe Ile Arg Gly Trp Asp
645 650 655

Asp Gly Arg Gly Val Asp Ala Gly Arg Ala Leu Leu Ser Ile Gln Thr
660 665 670

Gly Met Leu Glu Lys His Arg His Ile Val Val Ala Asn Asp Gly Tyr
675 680 685

Asp Thr Lys Asp Glu Trp Glu Leu Ala Thr Ile Phe Lys Lys Thr Tyr
690 695 700

Thr Gln Gly Arg Gly Leu Asp Ala Ser Asn Thr Gly Gly Asn Leu Ile
705 710 715 720

Pro Ser Pro Thr Leu His Ser Arg Gly Ser Ile Gly Asn Thr Gly Gly
725 730 735

Ser Glu Thr Arg Pro Arg Asn Ile Ala Phe Asn Tyr Ile Val Arg Ala
740 745 750

Ala

<210> 52
<211> 925
<212> PRT
<213> Artificial Sequence

<220>
<223> Mulberry Tail Fiber

<400> 52

Met Gly Ala Asp Lys Thr Asn Asn Ile Met Thr Leu Ser Ser Gly Val
1 5 10 15

Ser Gln Pro Leu Leu Ala Asp Val Gln Tyr Phe Glu Leu Tyr Ser Ser
20 25 30

Ser Ala Leu Asn Arg Lys Leu Lys Asn Ile Val Leu Pro Gly Phe Tyr
35 40 45

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

Ser Glu Asn Ser Glu Gly Lys Gly Ala Ala Ser Val Asp Val Asn Asn
65 70 75 80

Val Gln Ile Ser Val Gln Gln Ile Glu Asp Val Thr Val Ser Val Lys
85 90 95

Ala Gly Ala Thr Asn Ile Ile Val Leu Glu Ala Asn Phe Glu His Gly
100 105 110

Val Lys Thr Thr Gln Val Asp Ser Ala Ser Ser Val Ser Ala Ala Arg
115 120 125

Ile Tyr Ala Arg Thr Asp Asn Thr Ile Gly Gln Asn Gln Ile Glu Leu
130 135 140

Cys Arg Val Ile Val Pro Asn Gly Ala Thr Ala Val Thr Lys Glu Met
145 150 155 160

Ile Val Leu Lys Tyr Arg Val Asn Arg Ala Val Gly Val Glu Phe Ser
165 170 175

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

Val Lys Thr Leu His Asp Leu Val Asp Thr Lys Ala Pro Leu Asp Ser
195 200 205

Pro His Leu Ser Gly Thr Pro Thr Ser Pro Thr Pro Glu Pro Gly Thr
210 215 220

Asn Asn Thr Gln Ile Ala Asn Ala Ala Phe Val Tyr Ala Ala Ile Asn
225 230 235 240

Ala Leu Ile Asn Gly Ala Pro Gly Thr Met Asp Thr Leu Lys Glu Ile
245 250 255

Ala Ala Ala Ile Asn Asn Asp Pro Asn Phe Ser Thr Thr Ile Asn Asn
260 265 270

Ala Leu Ala Leu Lys Ala Pro Leu Ala Ser Pro Ala Leu Thr Gly Ile
275 280 285

Pro Thr Ala Pro Thr Ala Ala Gln Gly Thr Asn Asn Thr Gln Ile Ala
290 295 300

Thr Thr Ala Tyr Val Arg Ala Ala Ile Ser Ala Leu Val Gly Ser Ser
305 310 315 320

Pro Glu Ala Leu Asp Thr Leu Asn Glu Leu Ala Ala Ala Leu Gly Asn
325 330 335

Asp Pro Asn Phe Ala Thr Thr Met Thr Asn Ala Leu Ala Gly Lys Gln
340 345 350

Pro Leu Asp Ala Thr Leu Thr Ala Leu Ala Gly Leu Ala Thr Gly Ala
355 360 365

Asn Lys Leu Pro Tyr Phe Thr Gly Lys Asp Thr Val Ala Gln Thr Asp
370 375 380

Leu Thr Ser Val Gly Arg Asp Ile Leu Ala Lys Thr Ser Thr Leu Ala
385 390 395 400

Val Ile Gln Tyr Leu Gly Leu Arg Glu Leu Gly Thr Ser Gly Glu Lys
405 410 415

Ile Pro Leu Leu Ser Thr Ala Asn Thr Trp Ser Ala Arg Gln Thr Phe
420 425 430

Asn Gly Gly Ile Thr Gly Ala Leu Ile Gly Asn Ala Asp Thr Ala Thr
435 440 445

Lys Leu Lys Thr Ala Ile Asn Ile Asn Gly Val Arg Phe Asp Gly Ser
450 455 460

Ala Asp Ile Asn Ile Asn Thr Leu Val Ser Arg Gly Arg Val Thr Ala
465 470 475 480

Leu Gly Ala Asn Ala Gln Gly Thr Ser Gly Ile Gln Leu Tyr Glu Ala
485 490 495

Tyr Asn Asn Gly Tyr Pro Ser Pro Tyr Gly Asn Val Leu His Leu Lys
500 505 510

Gly Ala Thr Ala Ala Gly Glu Gly Glu Leu Phe Ile Gly Trp Ser Val
515 520 525

Ser Ser Gly Asp His Ala Pro Val His Ile Arg Ser Arg Arg Asp Ile
530 535 540

Asp Ser Ala Asn Trp Ser Glu Trp Ala Gln Val Tyr Thr Ser Lys Asp
545 550 555 560

Ser Val Pro Gly Val Asn Ala Lys Gly Asn Gln Asp Thr Ser Gly Asn
565 570 575

Ala Ala Thr Ala Thr Lys Leu Gln Thr Ala Cys Thr Ile Asn Gly Val
580 585 590

Ser Phe Asp Gly Ser Lys Asn Ile Glu Leu Thr Ala Glu Asp Leu Asn
595 600 605

Leu Glu Gln Thr Val Glu Leu Ala Ala Gly Ala Leu Gln Lys Asn Gln
610 615 620

Asn Gly Ala Asp Ile Pro Asn Lys Asp Lys Phe Ile Gln Asn Thr Gly
625 630 635 640

Ala Cys Arg Ala Phe Ser Gly Gln Thr Asp Ile Asp Gly Ser Gln Gly
645 650 655

Glu Trp Ser Thr Val Ala Phe Ile Ser Trp Leu Glu Asn Asn Gly Ala
660 665 670

Phe Arg His Pro Tyr Trp Met Cys Lys Gly Ser Trp Ser Tyr Ala Arg
675 680 685

Asn Arg Val Ile Thr Asp Thr Gly Cys Gly Asn Ile Cys Leu Ala Gly
690 695 700

Ala Val Ile Glu Val Met Gly Thr Arg Gly Ala Met Thr Ile Arg Val
705 710 715 720

Thr Thr Pro Ser Thr Ser Ser Gly Gly Gly Ile Thr Asn Ala Gln Phe
725 730 735

Thr Tyr Ile Asn His Gly Asp Ala Tyr Ala Pro Gly Trp Arg Arg Asp
740 745 750

Tyr Asn Thr Lys Asn Gln Gln Pro Ala Phe Ala Leu Gly Gln Thr Gly
755 760 765

Arg Arg Val Ala Asn Asp Lys Ala Val Gly Trp Asn Trp Asn Ser Gly
770 775 780

Val Tyr Asp Ala Asp Ile Ser Gly Ala Ser Thr Leu Ile Leu His Phe
785 790 795 800

Asn Met Asn Ala Gly Ser Cys Pro Ala Val Gln Phe Arg Val Asn Tyr
805 810 815

Arg Asn Gly Gly Ile Phe Tyr Arg Ser Ala Arg Asp Gly Tyr Gly Phe
820 825 830

Glu Ala Asn Trp Ser Glu Phe Tyr Thr Thr Thr Arg Lys Pro Ser Ala
835 840 845

Gly Asp Val Gly Ala Tyr Thr Gln Ala Glu Cys Asn Ser Arg Phe Ile
850 855 860

Thr Gly Ile Arg Leu Gly Gly Leu Ser Ser Val Gln Thr Trp Asn Gly
865 870 875 880

Pro Gly Trp Ser Asp Arg Ser Gly Tyr Val Val Thr Gly Ser Val Asn
885 890 895

Gly Asn Arg Asp Glu Leu Ile Asp Thr Thr Gln Ala Arg Pro Ile Gln
900 905 910

Tyr Cys Ile Asn Gly Thr Trp Tyr Asn Ala Gly Ser Ile
915 920 925

<210> 53
<211> 972

<212> PRT
<213> Bacteriophage P1

<220>
<221> MISC_FEATURE
<223> P1-S⁺ tail fiber protein

<400> 53

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Ser Glu
1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
50 55 60

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

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

Leu Ser Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Ser Val Ser Ala
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Ser Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Tyr Thr Ala Gln Asp Ala Ser Thr Thr Gln Lys Gly Leu Val Gln Leu
210 215 220

Ser Ser Ala Thr Asn Ser Asp Ser Glu Thr Met Ala Ala Thr Pro Lys
225 230 235 240

Ala Val Lys Ser Ile Lys Asp Leu Ala Asp Thr Lys Ala Pro Ile Glu
245 250 255

Ser Pro Ser Leu Thr Gly Thr Pro Thr Ala Pro Thr Ala Ala Gln Gly
260 265 270

Thr Asn Ser Thr Gln Ile Ala Asn Thr Ala Phe Val Lys Ala Ala Ile
275 280 285

Thr Ala Leu Ile Asn Gly Ala Pro Gly Thr Leu Asp Thr Leu Lys Glu
290 295 300

Ile Ala Ala Ala Ile Asn Asn Asp Pro Asn Tyr Ser Thr Thr Ile Asn
305 310 315 320

Asn Ala Leu Ala Leu Lys Ala Pro Leu Ala Ser Pro Ala Leu Thr Gly
325 330 335

Val Pro Thr Ala Pro Thr Ala Ala Gln Gly Thr Asn Asn Thr Gln Ile
340 345 350

Ala Thr Thr Ala Tyr Val Arg Ala Ala Ile Ser Ala Leu Val Gly Ser
355 360 365

Ser Pro Glu Ala Leu Asp Thr Leu Tyr Glu Leu Ala Ala Ala Leu Gly
370 375 380

Asn Asp Pro Asn Phe Ala Thr Thr Met Thr Asn Ala Leu Ala Gly Lys
385 390 395 400

Gln Pro Leu Asp Ala Thr Leu Thr Ala Leu Ala Gly Leu Ala Thr Gly
405 410 415

Ala Asn Lys Leu Pro Tyr Phe Thr Gly Thr Asp Thr Val Ser Gln Thr
420 425 430

Asp Leu Thr Ser Val Gly Arg Asp Ile Leu Ala Lys Thr Ser Ile Leu
435 440 445

Ala Val Ile Gln Tyr Leu Gly Leu Arg Glu Leu Gly Thr Ser Gly Glu
450 455 460

Lys Ile Pro Leu Leu Ser Thr Ala Asn Thr Trp Ser Ala Arg Gln Thr
465 470 475 480

Phe Asn Gly Gly Ile Thr Gly Ala Leu Thr Gly Asn Ala Asp Thr Ala
485 490 495

Thr Lys Leu Lys Thr Ala Arg Asn Ile Asn Gly Val Arg Phe Asp Gly
500 505 510

Ser Gly Asp Ile Asn Ile Asn Thr Leu Val Ser Arg Gly Arg Val Thr
515 520 525

Ala Leu Glu Ala Asn Ala Gln Gly Thr Ser Gly Ile Gln Leu Tyr Glu
530 535 540

Ala Tyr Asn Asn Gly Tyr Pro Ser Pro Tyr Gly Asn Val Leu His Leu
545 550 555 560

Lys Gly Ala Thr Ala Ala Gly Glu Gly Glu Leu Phe Ile Gly Trp Ser
565 570 575

Gly Thr Ser Gly Ala His Ala Pro Val His Ile Arg Ser Arg Arg Asp
580 585 590

Thr Asp Ser Ala Asn Trp Ser Glu Trp Ala Gln Val Tyr Thr Ser Lys
595 600 605

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

Asn Ala Ala Thr Ala Thr Lys Leu Gln Thr Ala Cys Thr Ile Asn Gly
625 630 635 640

Val Ser Phe Asp Gly Ser Lys Asn Ile Glu Leu Thr Ala Glu Asn Leu
645 650 655

Asn Leu Glu Arg Thr Val Glu Leu Ala Ala Gly Ser Leu Gln Lys Asn
660 665 670

Gln Asn Gly Ala Asp Ile Pro Gly Lys Asp Thr Phe Thr Lys Asn Ile
675 680 685

Gly Ala Cys Arg Ala Phe His Ser Ser Ile Ser Thr Gly Ala Gly Asn
690 695 700

Trp Thr Thr Ala Gln Leu Ile Glu Trp Leu Asp Ser Gln Gly Ala Phe
705 710 715 720

Asn His Pro Tyr Trp Met Cys Lys Cys Ser Trp Ser Tyr Gly Asn Asn
725 730 735

Lys Ile Ile Thr Asp Thr Gly Cys Gly Thr Ile His Leu Ala Gly Cys
740 745 750

Val Ile Glu Val Met Gly Asn Lys Gly Ala Met Thr Ile Arg Val Thr
755 760 765

Thr Pro Ser Thr Ser Ser Gly Gly Gly Ile Thr Asn Ala Gln Phe Thr
770 775 780

Tyr Ile Asn His Gly Asp Ala Tyr Ala Pro Gly Trp Arg Arg Asp Tyr
785 790 795 800

Asn Thr Lys Asn Leu Gln Pro Ala Phe Ala Leu Gly Gln Thr Gly Asn
805 810 815

Arg Val Ala Asn Asp Lys Ala Val Gly Trp Asn Trp Asn Ser Gly Val
820 825 830

Tyr Asp Ala Asp Leu Lys Gly Ala Ser Thr Leu Ile Leu His Phe Asn
835 840 845

Met Asn Ala Gly Ser Cys Pro Ala Val Gln Leu Arg Val Asn Tyr Lys
850 855 860

Asn Gly Gly Ile Tyr Tyr Arg Ser Ala Arg Asp Gly Tyr Gly Phe Glu
865 870 875 880

Ala Asp Trp Ser Glu Phe Tyr Thr Thr Thr Arg Lys Pro Ser Ala Gly
885 890 895

Asp Val Gly Ala Tyr Thr Gln Ala Glu Cys Asn Ser Arg Phe Ile Thr
900 905 910

Gly Ile Arg Leu Gly Gly Leu Ser Ser Val Gln Thr Trp Asn Gly Pro
915 920 925

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

Asn Arg Asp Glu Leu Ile Asp Thr Thr Gln Ala Arg Pro Ile Gln Tyr
945 950 955 960

Cys Ile Asn Gly Thr Trp Tyr Asn Ala Gly Ser Ile
965 970

<210> 54
<211> 744
<212> PRT
<213> Artificial Sequence

<220>
<223> Pine Tail Fiber

<400> 54

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Ser Glu
1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
50 55 60

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

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

Leu Ser Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Ser Val Ser Ala
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Ser Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Tyr Thr Ala Gln Asp Ala Ser Thr Thr Gln Lys Gly Leu Val Gln Leu
210 215 220

Ser Ser Ala Thr Asn Ser Asp Ser Glu Thr Met Ala Ala Thr Pro Lys
225 230 235 240

Ala Val Lys Ser Ile Lys Asp Leu Ala Asp Thr Lys Ala Pro Ile Glu
245 250 255

Ser Pro Ser Leu Thr Gly Thr Pro Thr Ala Pro Thr Ala Ala Gln Gly
260 265 270

Thr Asn Ser Thr Gln Ile Ala Asn Thr Ala Phe Val Lys Ala Ala Ile
275 280 285

Thr Ala Leu Ile Asn Gly Ala Pro Gly Thr Leu Asp Thr Leu Lys Glu
290 295 300

Ile Ala Ala Ala Ile Asn Asn Asp Pro Asn Tyr Ser Thr Thr Ile Asn
305 310 315 320

Asn Ala Leu Ala Leu Lys Ala Pro Leu Asn Ser Pro Ala Leu Thr Gly
325 330 335

Thr Pro Thr Thr Pro Thr Ala Arg Gln Gly Thr Asn Asn Thr Gln Ile
340 345 350

Ala Asn Thr Ala Phe Val Met Ala Ala Ile Ala Ala Leu Val Asp Ser
355 360 365

Ser Pro Asp Ala Leu Asn Thr Leu Asn Glu Leu Ala Ala Ala Leu Gly
370 375 380

Asn Asp Pro Asn Phe Ala Thr Thr Met Thr Asn Ala Leu Ala Gly Lys
385 390 395 400

Gln Pro Lys Asp Ala Thr Leu Thr Ala Leu Ala Gly Leu Ala Thr Ala
405 410 415

Ala Asp Arg Phe Pro Tyr Phe Thr Gly Asn Asp Val Ala Ser Leu Ala
420 425 430

Thr Leu Thr Lys Val Gly Arg Asp Ile Leu Ala Lys Ser Thr Val Ala
435 440 445

Ala Val Ile Glu Tyr Leu Gly Leu Gln Glu Thr Val Asn Arg Ala Gly
450 455 460

Asn Ala Val Gln Lys Asn Gly Asp Thr Leu Ser Gly Gly Leu Thr Phe
465 470 475 480

Glu Asn Asp Ser Ile Leu Ala Trp Ile Arg Asn Thr Asp Trp Ala Lys
485 490 495

Ile Gly Phe Lys Asn Asp Ala Asp Gly Asp Thr Asp Ser Tyr Met Trp
500 505 510

Phe Glu Thr Gly Asp Asn Gly Asn Glu Tyr Phe Lys Trp Arg Ser Arg
515 520 525

Gln Ser Thr Thr Thr Lys Asp Leu Met Thr Leu Lys Trp Asp Ala Leu
530 535 540

Asn Ile Leu Val Asn Ala Val Ile Asn Gly Cys Phe Gly Val Gly Thr
545 550 555 560

Thr Asn Ala Leu Gly Gly Ser Ser Ile Val Leu Gly Asp Asn Asp Thr
565 570 575

Gly Phe Lys Gln Asn Gly Asp Gly Ile Leu Asp Val Tyr Ala Asn Ser
580 585 590

Gln Arg Val Phe Arg Phe Gln Asn Gly Val Ala Ile Ala Phe Lys Asn
595 600 605

Ile Gln Ala Gly Asp Ser Lys Lys Phe Ser Leu Ser Ser Ser Asn Thr
610 615 620

Ser Thr Lys Asn Ile Thr Phe Asn Leu Trp Gly Ala Ser Thr Arg Pro
625 630 635 640

Val Val Ala Glu Leu Gly Asp Glu Ala Gly Trp His Phe Tyr Ser Gln
645 650 655

Arg Asn Thr Asp Asn Ser Val Ile Phe Ala Val Asn Gly Gln Met Gln
660 665 670

Pro Ser Asn Trp Gly Asn Phe Asp Ser Arg Tyr Val Lys Asp Val Arg
675 680 685

Leu Gly Thr Arg Val Val Gln Leu Met Ala Arg Gly Gly Arg Tyr Glu
690 695 700

Lys Ala Gly His Thr Ile Thr Gly Leu Arg Ile Ile Gly Glu Val Asp
705 710 715 720

Gly Asp Asp Glu Ala Ile Phe Arg Pro Ile Gln Lys Tyr Ile Asn Gly
725 730 735

Thr Trp Tyr Asn Val Ala Gln Val
740

<210> 55
<211> 1181
<212> PRT
<213> Artificial Sequence

<220>
<223> Plum Tail Fiber

<400> 55

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Pro Glu
1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
50 55 60

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

Glu Phe Tyr Gln Val Thr Ile Gln His Arg Lys Asp Ile Ser Leu Ala
85 90 95

Leu Ser Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Gly Val Ser Ala
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Thr Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Ser Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Tyr Thr Ala Gln Asp Ala Ser Thr Thr Gln Lys Gly Leu Val Gln Leu
210 215 220

Ser Ser Glu Thr Asn Ser Asp Ser Glu Thr Met Ala Ala Thr Pro Lys
225 230 235 240

Ala Ile Lys Ser Val Lys Asp Leu Ala Asp Thr Lys Ala Pro Ile Glu
245 250 255

Ser Pro Ser Leu Thr Gly Thr Pro Thr Ala Pro Thr Ala Ala Gln Gly
260 265 270

Thr Asn Ser Thr Gln Ile Ala Asn Thr Ala Phe Val Lys Ala Ala Ile
275 280 285

Thr Ala Leu Ile Asn Gly Ala Pro Gly Thr Leu Asp Thr Leu Lys Glu
290 295 300

Ile Ala Ala Ala Ile Asn Asn Asp Pro Asn Phe Ser Thr Thr Ile Asn
305 310 315 320

Asn Ala Leu Ala Leu Lys Ala Pro Leu Ala Ser Pro Ala Leu Thr Gly
325 330 335

Ile Pro Thr Ala Pro Thr Ala Ala Gln Gly Thr Asn Asn Thr Gln Ile
340 345 350

Ala Thr Thr Ala Tyr Val Arg Ala Ala Ile Ser Ala Leu Val Gly Ser
355 360 365

Ser Pro Glu Ala Leu Asp Thr Leu Asn Glu Leu Ala Ala Ala Leu Gly
370 375 380

Asn Asp Pro Asn Phe Ala Thr Thr Met Thr Asn Ala Leu Ala Gly Lys
385 390 395 400

Gln Pro Leu Asp Ala Thr Leu Thr Ala Leu Ala Gly Leu Ala Thr Gly
405 410 415

Ala Asn Lys Leu Pro Tyr Phe Thr Gly Thr Asp Thr Val Ser Gln Thr
420 425 430

Asp Leu Thr Ser Val Gly Arg Asp Ile Leu Ala Lys Thr Ser Val Leu
435 440 445

Ala Val Ile Gln Tyr Leu Gly Leu Arg Glu Leu Gly Thr Ser Gly Glu
450 455 460

Lys Ile Pro Leu Leu Ser Thr Ala Asn Thr Trp Ser Ala Arg Gln Thr
465 470 475 480

Phe Asn Gly Gly Ile Thr Gly Ala Leu Thr Gly Asn Ala Asp Thr Ala
485 490 495

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

Ser Ala Asp Ile Thr Leu Thr Pro Glu Asn Leu Gly Val Thr Ser Leu
515 520 525

Thr Phe Glu Lys Asn Asn Gly Glu Met Pro Ile Asp Ala Asp Leu Asn
530 535 540

Thr Phe Gly Pro Val Glu Ala Tyr Leu Gly Val Trp Ser Lys Ala Thr
545 550 555 560

Ser Thr Asn Ala Thr Leu Glu Lys Asn Phe Pro Glu Asp Asn Ala Val
565 570 575

Gly Val Leu Glu Val Phe Ala Ala Gly Asn Phe Ala Gly Thr Gln Arg
580 585 590

Phe Thr Thr Arg Asp Gly Asn Val Tyr Ile Arg Arg Leu Ala Asn Lys
595 600 605

Trp Asn Gly Ser Asp Gly Pro Trp Gly Ile Trp Arg His Thr Gln Ser
610 615 620

Ala Thr Arg Pro Leu Ser Thr Thr Ile Asp Leu Asn Thr Leu Gly Ala
625 630 635 640

Ala Glu His Leu Gly Leu Trp Arg Asn Ser Ser Ser Ala Ile Ala Ser
645 650 655

Tyr Glu Arg Asn Tyr Pro Glu Glu Gly Gly Phe Ala Gln Gly Val Leu
660 665 670

Glu Ile Leu Glu Gly Gly Asn Tyr Gly Arg Thr Gln Arg Tyr Thr Thr
675 680 685

Arg Arg Gly Asn Met Tyr Val Arg Cys Leu Ala Ala Ser Trp Asp Ala
690 695 700

Ser Asn Pro Gln Trp Glu Pro Trp Leu Lys Val Gly His Gln Ser Glu
705 710 715 720

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

Tyr Ser Val Thr Gly Lys Ala Thr Asn Gly Pro Met Leu Asp Thr Val
740 745 750

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

Val Ser Val Trp Gln Arg Tyr Thr Thr Thr Gly Lys Ser Glu Thr Thr
770 775 780

Gln Gly Arg Thr Phe Glu Arg Val Tyr Ala Gly Ser Lys Trp Thr Glu
785 790 795 800

Trp Arg Glu Val Tyr Asn Ser Phe Ser Leu Pro Leu Asn Leu Gly Ile
805 810 815

Gly Gly Ala Val Ala Lys Leu Ser Ser Leu Asp Trp Gln Thr Tyr Asp
820 825 830

Phe Val Pro Gly Ser Leu Ile Thr Val Arg Leu Asp Asn Met Thr Asn
835 840 845

Ile Pro Asp Gly Met Asp Trp Gly Val Ile Asp Gly Asn Leu Ile Asn
850 855 860

Ile Ala Val Gly Pro Ser Asp Asp Ser Gly Thr Gly Arg Ser Met His
865 870 875 880

Val Trp Arg Ser Thr Val Ser Lys Ala Asn Tyr Arg Phe Phe Met Val
885 890 895

Arg Ile Ser Gly Asn Pro Gly Ser Arg Thr Ile Thr Ala Arg Arg Val
900 905 910

Pro Ile Ile Asp Glu Ala Gln Thr Trp Gly Ala Lys Gln Thr Phe Ser
915 920 925

Ala Gly Leu Ser Gly Glu Leu Ser Gly Asn Ala Ala Thr Ala Thr Lys
930 935 940

Leu Lys Thr Ala Arg Lys Ile Asn Asn Val Ser Phe Asp Gly Ser Gly
945 950 955 960

Asp Ile Glu Val Leu Pro Val Gly Val Pro Leu Pro Trp Pro Ser Asp
965 970 975

Thr Val Pro Ser Gly Tyr Ala Leu Met Gln Gly Gln Thr Phe Asp Lys
980 985 990

Ser Ala Tyr Pro Lys Leu Ala Ala Ala Tyr Pro Ser Gly Val Ile Pro
995 1000 1005

Asp Met Arg Gly Trp Thr Ile Lys Gly Lys Pro Ala Ser Gly Arg
1010 1015 1020

Asp Val Leu Ser Leu Glu Gln Asp Gly Ile Lys Ser His Thr His
1025 1030 1035

Ser Ala Ser Ala Ser Asn Thr Asp Leu Gly Thr Lys Thr Thr Ser
1040 1045 1050

Ser Phe Asp Tyr Gly Thr Lys Ser Thr Asn Asn Thr Gly Ala His
1055 1060 1065

Thr His Asn Val Ser Gly Thr Ala Asn Ser Ala Gly Ala His Thr
1070 1075 1080

His Thr Val Pro Leu Arg Arg Pro Asn Ser Gly Gly Met Asn Phe
1085 1090 1095

Asp Trp Leu Asp Gly Ala Ser Ser Gly Thr Val Val Gly Asn Gly
1100 1105 1110

Thr Val Pro Ser Ser Gly Ala His Thr His Ser Val Ser Gly Thr
1115 1120 1125

Ala Thr Ser Ala Gly Ala His Ala His Thr Val Gly Ile Gly Ala
1130 1135 1140

His Thr His Ser Val Ala Ile Gly Ser His Gly His Thr Ile Thr
1145 1150 1155

Val Asn Ala Ala Gly Asn Ala Glu Asn Thr Val Lys Asn Ile Ala
1160 1165 1170

Phe Asn Tyr Ile Val Arg Leu Ala
1175 1180

<210> 56
<211> 1250
<212> PRT
<213> Artificial Sequence

<220>
<223> Queen Tail Fiber

<220>
<221> misc_feature
<222> (642)..(642)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (647)..(647)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (662)..(662)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (793)..(793)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (940)..(940)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (943)..(943)
<223> Xaa can be any naturally occurring amino acid

<400> 56

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Ser Glu
1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
50 55 60

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

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

Leu Ser Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Ser Val Ser Ala
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Ser Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Tyr Thr Ala Gln Asp Ala Ser Thr Thr Gln Lys Gly Leu Val Gln Leu
210 215 220

Ser Ser Ala Thr Asn Ser Asp Ser Glu Thr Met Ala Ala Thr Pro Lys
225 230 235 240

Ala Val Lys Ser Ile Lys Asp Leu Ala Asp Thr Lys Ala Pro Ile Glu
245 250 255

Ser Pro Ser Leu Thr Gly Thr Pro Thr Ala Pro Thr Ala Ala Gln Gly
260 265 270

Thr Asn Ser Thr Gln Ile Ala Asn Thr Ala Phe Val Lys Ala Ala Ile
275 280 285

Thr Ala Leu Ile Asn Gly Ala Pro Gly Thr Leu Asp Thr Leu Lys Glu
290 295 300

Ile Ala Ala Ala Ile Asn Asn Asp Pro Asn Tyr Ser Thr Thr Ile Asn
305 310 315 320

Asn Ala Leu Ala Leu Lys Ala Pro Leu Ala Ser Pro Ala Leu Thr Gly
325 330 335

Val Pro Thr Ala Pro Thr Ala Ala Gln Gly Thr Asn Asn Thr Gln Ile
340 345 350

Ala Thr Thr Ala Tyr Val Arg Ala Ala Ile Ser Ala Leu Val Gly Ser
355 360 365

Ser Pro Glu Ala Leu Asp Thr Leu Tyr Glu Leu Ala Ala Ala Leu Gly
370 375 380

Asn Asp Pro Asn Phe Ala Thr Thr Met Thr Asn Ala Leu Ala Gly Lys

385 390 395 400

Gln Pro Leu Asp Ala Thr Leu Thr Ala Leu Ala Gly Leu Ala Thr Gly
405 410 415

Ala Asn Lys Leu Pro Tyr Phe Thr Gly Thr Asp Thr Val Ser Gln Thr
420 425 430

Asp Leu Thr Ser Val Gly Arg Asp Ile Leu Ala Lys Thr Ser Ile Leu
435 440 445

Ala Val Ile Gln Tyr Leu Gly Leu Arg Glu Leu Gly Thr Ser Gly Glu
450 455 460

Lys Ile Pro Leu Leu Ser Thr Ala Asn Thr Trp Ser Ala Arg Gln Thr
465 470 475 480

Phe Asn Gly Gly Ile Thr Gly Ala Leu Thr Gly Asn Ala Asp Thr Ala
485 490 495

Thr Lys Leu Lys Thr Lys Arg Ser Leu Gln Val Asp Leu Gln Ser Asp
500 505 510

Asn Ala Ile Asp Phe Asp Gly Ser Ser Asn Ala Leu Leu Gly Ile Lys
515 520 525

Gly Ile Leu Pro Ile Thr His Gly Gly Leu Gly Ala Ser Ser Val Ser
530 535 540

Gly Gly Arg Thr Asn Leu Gly Leu Gly Val Ala Asp Ile Pro Gln Phe
545 550 555 560

Lys Gly Ile Asn Leu Val Asn Ser Thr Asp Ser Asp Leu Ala Ala Ser
565 570 575

Gly Ile Val Ser Gly Tyr Leu Asn Asn Ser Ala Gly Val Gln Arg Ser
580 585 590

Arg Phe Arg Ile Tyr Ser Glu Ile Arg Ser Asp Asn Arg Ser Trp Leu
595 600 605

Thr Leu His Leu Gln Ser Asp Thr Asn Thr Asn Lys Tyr Ala Gly Leu
610 615 620

Asp Ile Asp Gly Asn Phe Leu Ile Thr Gly Asp Ser Lys Cys Arg Ala
625 630 635 640

Leu Xaa Pro Thr Asp Val Xaa Leu Thr Arg Lys Asn Ile Asp Val Tyr
645 650 655

Ser Lys Ala Glu Val Xaa Leu Lys Lys Gly Met Lys Phe Thr Arg Val
660 665 670

Asn Ala Pro Ser Gly Ala Glu Glu Gly Lys Phe Tyr Pro Val Val Ile
675 680 685

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

Ser Thr Ala Pro Arg Gln Ala Ala His Arg Met Asn Asn Cys Glu Phe
705 710 715 720

Asn Gly Phe Val Met Pro Ala Gly Trp Ser Asp Arg Gly Arg Tyr Ala
725 730 735

Tyr Gly Met Phe Trp Gln Tyr Gln Asp Ala Glu Arg Ala Ile His Ser
740 745 750

Ile Ala Met Ser Asn Lys Asp Asp Glu Val Ser Ser Val Phe Tyr Ile
755 760 765

Glu Gly Gly Ala Phe Pro Val Cys Val Leu Val Glu Glu Gly Leu Ser
770 775 780

Val Val Val Pro Thr Thr Asp Tyr Xaa Val Gly Gln Thr Thr Tyr Lys

785		790		795		800
Trp Gly Ala Thr	Asn Pro Lys Ala Glu Cys Ile Ala Ala Asp	Ile Ile				
	805		810			815
Ile Asp Phe Ser	Asn Gly Arg Gly Phe Tyr Ser Ser Gly	Asn Leu Asn				
	820		825			830
Gly Asn Ala Ala Thr	Ala Thr Lys Leu Gln Thr Ala Arg Thr	Ile Asn				
	835		840			845
Gly Val Thr Phe Asp	Gly Thr Thr Asp Ile Ser Leu Thr Pro Glu Asn					
	850		855			860
Ile Gly Ala Leu Ser	Leu Ser Gly Gly Thr Leu Leu Gly Gly Leu Thr					
865		870		875		880
Ala Pro Leu Leu Thr	Thr Lys Ser Asp Leu Ile Phe Ser Ser His Thr					
	885		890			895
Ser Arg His Ile	Arg Phe Thr Tyr Thr Lys Asn Asp Gly Thr Thr Leu					
	900		905			910
Thr Asp Gly Tyr	Ile Phe Lys Asp Gly Val Asp Asn Pro Asn Arg Arg					
	915		920			925
Pro Gly Ile Arg	Ile Asn Cys Ala Ala Pro Asn Xaa Val Leu Xaa Ser					
	930		935			940
Val Val Asp Asp	Ala Lys Met Tyr Leu Arg Arg Phe Arg Ser Ser Thr					
945		950		955		960
Gly Ala Ser Ile	Trp His Glu Thr Ile Glu Asn Asn Val Tyr Arg Leu					
	965		970			975
Cys Thr Gly Thr	Thr Asp Ala Gln Glu Glu Leu Val Leu Arg Thr Gly					
	980		985			990

Ser Tyr Ala Lys Phe Ala Gly Glu Ile Ile Ser Lys Ser Ala Asn Gly
995 1000 1005

Leu Arg Ile Ala Tyr Gly Asn Tyr Gly Phe Phe Ile Arg Asn Asp
1010 1015 1020

Gly Ser Ser Thr Tyr Phe Met Leu Thr Ala Ser Gly Asp Asn Leu
1025 1030 1035

Gly Thr Trp Asn Ser Leu Arg Pro Leu Thr Ile Asn Asn Ala Asn
1040 1045 1050

Gly Ala Val Ser Ile Gly Asn Gly Leu Asn Val Thr Gly Asp Ile
1055 1060 1065

Arg Thr Asn Ala Trp Val Tyr Ala Asn Arg Phe Ser Val Asn Ser
1070 1075 1080

Ser Ser Gly Ser Trp Ile Ser Met Arg Asp Gln Asn Val Ile Phe
1085 1090 1095

Gly Leu Asn Lys Val Ser Thr Ser Ser Ala Gln Ala Leu Leu Arg
1100 1105 1110

Gln Asp His Ala Asp Arg Lys Phe Phe Ile Gly Gly Leu Gly Asn
1115 1120 1125

Ser Gln Phe Gly Phe Tyr Met Ile Asn Asn Ser Arg Thr Ser Asn
1130 1135 1140

Gly Thr Asp Gly Gln Ala Phe Leu Asp Ser Ser Gly Asn Phe Gln
1145 1150 1155

Cys Gly Gly Gln Ile Leu Pro Thr Asn Tyr Ser Asn Phe Asp Ser
1160 1165 1170

Arg Tyr Thr Leu Lys Thr Ala Cys Val Thr Ser Val Arg Met Gly

1175

1180

1185

Ser Ala Ala Ser Tyr Lys Pro Ser Ser Asn Gly Val Ser Trp Thr
 1190 1195 1200

Gln Asn Leu Gly Ser Gly Leu Val Met Thr Gly Ile Ile Val Gln
 1205 1210 1215

Glu Thr Gly Gly Asn Ser Ala Asp Asn Ile Gly Gly Ile Tyr Tyr
 1220 1225 1230

Arg Pro Val Gln Tyr Cys Ile Asn Gly Thr Trp Tyr Thr Ala Ala
 1235 1240 1245

Ser Val
 1250

<210> 57
 <211> 975
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Razzmatazz Tail Fiber

<400> 57

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Pro Glu
 1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
 20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
 35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
 50 55 60

Ser Val Asp Gly Asp Lys Thr Ala Gly Ala Ala Ser Val Asp Ile Gly

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

Thr Asn Ser Thr Gln Ile Ala Asn Thr Ala Phe Val Lys Ala Ala Ile
275 280 285

Thr Ala Leu Ile Asn Gly Ala Pro Gly Thr Leu Asp Thr Leu Lys Glu
290 295 300

Ile Ala Ala Ala Ile Asn Asn Asp Pro Asn Phe Ser Thr Thr Val Asn
305 310 315 320

Asn Ala Leu Ala Leu Lys Ala Pro Leu Ala Ser Pro Ala Leu Thr Gly
325 330 335

Ile Pro Thr Ala Pro Thr Ala Ala Gln Gly Thr Asn Asn Thr Gln Ile
340 345 350

Ala Thr Thr Ala Tyr Val Arg Ala Ala Ile Ser Ala Leu Val Gly Ser
355 360 365

Ser Pro Glu Ala Leu Asp Thr Leu Asn Glu Leu Ala Ala Ala Leu Gly
370 375 380

Asn Asp Pro Asn Phe Ala Thr Thr Met Thr Asn Ala Leu Ala Gly Lys
385 390 395 400

Gln Pro Leu Asp Ala Thr Leu Thr Ala Leu Ala Gly Leu Ala Thr Asp
405 410 415

Ala Asn Lys Leu Pro Tyr Phe Thr Gly Thr Asp Thr Val Ser Gln Thr
420 425 430

Asp Leu Thr Ser Val Gly Arg Asp Ile Leu Ala Lys Thr Ser Val Leu
435 440 445

Ala Val Ile Gln Tyr Leu Gly Leu Arg Glu Leu Gly Thr Ser Gly Glu
450 455 460

Lys Ile Pro Leu Leu Ser Thr Ala Asn Thr Trp Ser Ala Arg Gln Thr

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

Asn Gln Asn Gly Ala Asp Ile Pro Gly Lys Asp Thr Phe Thr Lys Asn
675 680 685

Ile Gly Ala Cys Arg Ala Tyr Ser Ala Trp Leu Asn Ile Gly Gly Asp
690 695 700

Ser Gln Val Trp Thr Thr Ala Gln Phe Ile Ser Trp Leu Glu Ser Gln
705 710 715 720

Gly Ala Phe Asn His Pro Tyr Trp Met Cys Lys Gly Ser Trp Ala Tyr
725 730 735

Ala Asn Asn Lys Val Ile Thr Asp Thr Gly Cys Gly Asn Ile Cys Leu
740 745 750

Ala Gly Ala Val Val Glu Val Ile Gly Thr Arg Gly Ala Met Thr Ile
755 760 765

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

Gln Phe Thr Tyr Ile Asn His Gly Asp Ala Tyr Ala Pro Gly Trp Arg
785 790 795 800

Arg Asp Tyr Asn Thr Lys Asn Gln Gln Pro Ala Phe Ala Leu Gly Gln
805 810 815

Thr Gly Ser Arg Val Ala Asn Asp Lys Ala Val Gly Trp Asn Trp Asn
820 825 830

Ser Gly Val Tyr Asp Ala Asp Ile Ser Gly Ala Ser Thr Leu Ile Leu
835 840 845

His Phe Asn Met Asn Ala Gly Ser Cys Pro Ala Val Gln Phe Arg Val
850 855 860

Asn Tyr Lys Asn Gly Gly Ile Phe Tyr Arg Ser Ala Arg Asp Gly Tyr

865 870 875 880

Gly Phe Glu Ala Asn Trp Ser Glu Phe Tyr Thr Thr Thr Arg Lys Pro
 885 890 895

Ser Ala Gly Asp Val Gly Ala Tyr Thr Gln Ala Glu Cys Asn Ser Arg
 900 905 910

Phe Ile Thr Gly Ile Arg Leu Gly Gly Leu Ser Ser Val Gln Thr Trp
 915 920 925

Asn Gly Pro Gly Trp Ser Asp Arg Ser Gly Tyr Val Val Thr Gly Ser
 930 935 940

Val Asn Gly Asn Arg Asp Glu Leu Ile Asp Thr Thr Gln Ala Arg Pro
945 950 955 960

Ile Gln Tyr Cys Ile Asn Gly Thr Trp Tyr Asn Ala Gly Ser Ile
 965 970 975

<210> 58
<211> 901
<212> PRT
<213> Artificial Sequence

<220>
<223> Salmon Tail Fiber

<400> 58

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Ser Glu
1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
 20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
 35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr

50

55

60

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

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

Leu Ser Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Ser Val Ser Ala
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Ser Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Tyr Thr Ala Gln Asp Ala Ser Thr Thr Gln Lys Gly Leu Val Gln Leu
210 215 220

Ser Ser Ala Thr Asn Ser Asp Ser Glu Thr Met Ala Ala Thr Pro Lys
225 230 235 240

Ala Val Lys Ser Ile Lys Asp Leu Ala Asp Thr Lys Ala Pro Ile Glu
245 250 255

Ser Pro Ser Leu Thr Gly Thr Pro Thr Ala Pro Thr Ala Ala Gln Gly
260 265 270

Thr Asn Ser Thr Gln Ile Ala Asn Thr Ala Phe Val Lys Ala Ala Ile
275 280 285

Thr Ala Leu Ile Asn Gly Ala Pro Gly Thr Leu Asp Thr Leu Lys Glu
290 295 300

Ile Ala Ala Ala Ile Asn Asn Asp Pro Asn Tyr Ser Thr Thr Ile Asn
305 310 315 320

Asn Ala Leu Ala Leu Lys Ala Pro Leu Ala Ser Pro Ala Leu Thr Gly
325 330 335

Val Pro Thr Ala Pro Thr Ala Ala Gln Gly Thr Asn Asn Thr Gln Ile
340 345 350

Ala Thr Thr Ala Tyr Val Arg Ala Ala Ile Ser Ala Leu Val Gly Ser
355 360 365

Ser Pro Glu Ala Leu Asp Thr Leu Tyr Glu Leu Ala Ala Ala Leu Gly
370 375 380

Asn Asp Pro Asn Phe Ala Thr Thr Met Thr Asn Ala Leu Ala Gly Lys
385 390 395 400

Gln Pro Leu Asp Ala Thr Leu Thr Ala Leu Ala Gly Leu Ala Thr Gly
405 410 415

Ala Asn Lys Leu Pro Tyr Phe Thr Gly Thr Asp Thr Val Ser Gln Thr
420 425 430

Asp Leu Thr Ser Val Gly Arg Asp Ile Leu Ala Lys Thr Ser Ile Leu
435 440 445

Ala Val Ile Gln Tyr Leu Gly Leu Arg Glu Leu Gly Thr Ser Gly Glu

450

455

460

Lys Ile Pro Leu Leu Ser Thr Ala Asn Thr Trp Ser Ala Arg Gln Thr
465 470 475 480

Phe Asn Gly Gly Ile Thr Gly Ala Leu Thr Gly Asn Ala Asp Thr Ala
485 490 495

Thr Lys Leu Lys Thr Ala Arg Thr Ile Gly Gly Val Ala Phe Asp Gly
500 505 510

Thr Ala Asn Ile Asn Leu Pro Gly Val Asn Val Ala Gly Asn Gln Asn
515 520 525

Thr Ser Gly Asn Ala Ala Thr Ala Thr Lys Leu Gln Thr Ala Cys Thr
530 535 540

Ile Asn Gly Val Ser Phe Asp Gly Ser Lys Asn Ile Glu Leu Thr Ala
545 550 555 560

Glu Asp Leu Asn Leu Gln Glu Phe Ile Asn Lys Ala Asn Asn Ala Val
565 570 575

Gln Arg Ser Gly Asp Ile Leu Ser Gly Gly Leu Thr Phe Glu Asn Asp
580 585 590

Ser Ile Leu Ala Trp Ile Arg Asn Thr Asp Trp Ala Lys Ile Gly Phe
595 600 605

Lys Asn Asp Ala Asp Ser Asp Thr Asp Ser Tyr Met Trp Phe Glu Thr
610 615 620

Gly Asp Asn Gly Asn Glu Tyr Phe Lys Trp Arg Ser Lys Gln Ser Thr
625 630 635 640

Thr Thr Lys Asp Leu Met Asn Leu Lys Trp Asp Ala Leu Ser Val Leu
645 650 655

Val Lys Ala Leu Phe Ser Ser Glu Val Lys Ile Ser Thr Val Asn Ala
660 665 670

Leu Arg Ile Phe Asn Ser Ser Phe Gly Ala Ile Phe Arg Arg Ser Glu
675 680 685

Glu Cys Leu His Ile Ile Pro Thr Arg Glu Asn Glu Gly Glu Asn Gly
690 695 700

Asp Ile Gly Pro Leu Arg Pro Phe Thr Leu Asn Leu Arg Thr Gly Arg
705 710 715 720

Ile Thr Met Gly His Gly Leu Asp Val Thr Gly Asp Ile Thr Thr Asn
725 730 735

Ala Trp Val Tyr Ala Asn Arg Phe Ala Ile Asn Ser Gly Ser Thr Ser
740 745 750

Trp Ile Asp Met Arg Asn Gln Asn Val Ile Phe Gly Arg Asn Ala Val
755 760 765

Ser Thr Ser Ser Ala Gln Ala Leu Leu Arg Gln Asp His Ala Glu Arg
770 775 780

Lys Phe Phe Val Gly Gly Leu Gly Asn Tyr Gln Phe Gly Phe Tyr Met
785 790 795 800

Ile Asn Asn Ser Arg Thr Ala Asn Gly Thr Asp Gly Gln Ala Tyr Met
805 810 815

Asp Asn Asn Gly Asn Trp Leu Cys Gly Ser Gln Val Ile Pro Gly Asn
820 825 830

Tyr Gly Asn Phe Asp Ser Arg Tyr Val Arg Asp Val Arg Leu Gly Thr
835 840 845

Arg Val Val Gln Leu Met Ala Arg Gly Gly Arg Tyr Glu Lys Ala Gly

850

855

860

His Ala Ile Thr Gly Leu Arg Ile Ile Gly Glu Val Asp Gly Asp Asp
 865 870 875 880

Glu Ala Ile Phe Arg Pro Ile Gln Lys Tyr Ile Asn Gly Thr Trp Tyr
 885 890 895

Asn Val Ala Gln Val
 900

<210> 59
 <211> 747
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Scarlet Tail Fiber

<400> 59

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Pro Glu
 1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
 20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
 35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
 50 55 60

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

Glu Phe Tyr Gln Val Thr Ile Gln His Arg Lys Asp Ile Ser Leu Ala
 85 90 95

Leu Asn Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu

100

105

110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
 115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
 130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Gly Val Ser Thr
 145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Thr Ile
 165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
 180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
 195 200 205

Tyr Thr Ala Gln Asp Ala Ser Thr Thr Gln Lys Gly Leu Val Gln Leu
 210 215 220

Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala Ala Thr Pro Lys
 225 230 235 240

Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys Tyr Thr Ala Gln
 245 250 255

Asp Ala Thr Thr Thr Gln Lys Gly Ile Val Gln Leu Ser Ser Asp Thr
 260 265 270

Asn Ser Thr Ser Glu Thr Leu Ala Ala Thr Pro Lys Ala Val Lys Ala
 275 280 285

Ala Tyr Asp Leu Ala Ala Gly Lys Ala Pro Ser Ser His Thr His Pro
 290 295 300

Trp Asn Gln Ile Thr Gly Val Pro Thr Ala Ser Leu Thr Ala Lys Gly
305 310 315 320

Ile Thr Gln Leu Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala
325 330 335

Ala Thr Pro Lys Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys
340 345 350

Tyr Thr Ala Gln Asp Ala Thr Thr Ala Gln Lys Gly Ile Val Gln Leu
355 360 365

Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala Ala Thr Pro Lys
370 375 380

Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys Tyr Thr Ala Gln
385 390 395 400

Asp Ala Thr Thr Thr Gln Lys Gly Ile Val Gln Leu Ser Ser Asp Thr
405 410 415

Asn Ser Thr Ser Glu Thr Leu Ala Ala Thr Pro Lys Ala Val Lys Ala
420 425 430

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

Trp Asn Gln Ile Thr Val Val Pro Thr Ala Ser Leu Thr Ala Lys Gly
450 455 460

Ile Thr Gln Leu Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala
465 470 475 480

Ala Thr Pro Lys Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys
485 490 495

Tyr Thr Ala Gln Asp Ala Thr Thr Ala Gln Lys Gly Ile Val Gln Leu

500

505

510

Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala Ala Thr Pro Lys
 515 520 525

Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys Gln Ala Ala Asp
 530 535 540

Ala Thr Leu Thr Ala Leu Ala Ala Leu Ala Thr Ala Ala Asp Lys Leu
 545 550 555 560

Pro Tyr Phe Thr Gly Val Asp Arg Ala Ala Leu Thr Ala Leu Thr Ser
 565 570 575

Val Gly Arg Ala Ile Leu Gly Lys Thr Ser Ile Gln Ser Val Leu Asp
 580 585 590

Tyr Leu Gly Leu Gly Glu Gly Ser Ala Leu Pro Val Gly Val Pro Val
 595 600 605

Pro Trp Pro Leu Glu Thr Pro Pro Thr Gly Trp Leu Lys Cys Asn Gly
 610 615 620

Ala Ala Phe Ser Ser Glu Met Tyr Pro Lys Leu Ala Lys Ala Tyr Pro
 625 630 635 640

Thr Asn Lys Leu Pro Asp Leu Arg Gly Glu Phe Ile Arg Gly Trp Asp
 645 650 655

Asp Gly Arg Gly Val Asp Ala Gly Arg Val Ile Leu Ser Ile Gln Gly
 660 665 670

Trp Leu Thr Gly Ser His Tyr His Asn Ile Arg Ser Trp Asp Ala Trp
 675 680 685

Asp Asn Thr Val Leu Val Pro Asn Asp Arg Gly Gly Asp Ser Leu Leu
 690 695 700

Ser Thr Asp Asn Ala Val Arg Gln Gly Ala Ile Asn Gly Lys Phe Thr
705 710 715 720

Ser Gln Tyr Arg Thr Glu Leu Ser Gly Gly Asn Glu Thr Arg Pro Arg
725 730 735

Asn Ile Ala Phe Asn Tyr Ile Val Arg Ala Ala
740 745

<210> 60
<211> 996
<212> PRT
<213> Artificial Sequence

<220>
<223> Shamrock Tail Fiber

<400> 60

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Ser Glu
1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
50 55 60

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

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

Leu Ser Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Ser Val Ser Ala
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Ser Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Tyr Thr Ala Gln Asp Ala Ser Thr Thr Gln Lys Gly Leu Val Gln Leu
210 215 220

Ser Ser Ala Thr Asn Ser Asp Ser Glu Thr Met Ala Ala Thr Pro Lys
225 230 235 240

Ala Val Lys Ser Ile Lys Asp Leu Ala Asp Thr Lys Ala Pro Ile Glu
245 250 255

Ser Pro Ser Leu Thr Gly Thr Pro Thr Ala Pro Thr Ala Ala Gln Gly
260 265 270

Thr Asn Ser Thr Gln Ile Ala Asn Thr Ala Phe Val Lys Ala Ala Ile
275 280 285

Thr Ala Leu Ile Asn Gly Ala Pro Gly Thr Leu Asp Thr Leu Lys Glu
290 295 300

Ile Ala Ala Ala Ile Asn Asn Asp Pro Asn Tyr Ser Thr Thr Ile Asn

305		310		315		320									
Asn	Ala	Leu	Ala	Leu	Lys	Ala	Pro	Leu	Ala	Ser	Pro	Ala	Leu	Thr	Gly
				325					330					335	
Val	Pro	Thr	Ala	Pro	Thr	Ala	Ala	Gln	Gly	Thr	Asn	Asn	Thr	Gln	Ile
			340					345					350		
Ala	Thr	Thr	Ala	Tyr	Val	Arg	Ala	Ala	Ile	Ser	Ala	Leu	Val	Gly	Ser
			355				360					365			
Ser	Pro	Glu	Ala	Leu	Asp	Thr	Leu	Tyr	Glu	Leu	Ala	Ala	Ala	Leu	Gly
		370				375					380				
Asn	Asp	Pro	Asn	Phe	Ala	Thr	Thr	Met	Thr	Asn	Ala	Leu	Ala	Gly	Lys
385					390					395					400
Gln	Pro	Leu	Asp	Ala	Thr	Leu	Thr	Ala	Leu	Ala	Gly	Leu	Ala	Thr	Gly
				405					410					415	
Ala	Asn	Lys	Leu	Pro	Tyr	Phe	Thr	Gly	Thr	Asp	Thr	Val	Ser	Gln	Thr
			420					425				430			
Asp	Leu	Thr	Ser	Val	Gly	Arg	Asp	Ile	Leu	Ala	Lys	Thr	Ser	Ile	Leu
		435					440					445			
Ala	Val	Ile	Gln	Tyr	Leu	Gly	Leu	Arg	Glu	Leu	Gly	Thr	Ser	Gly	Glu
		450				455					460				
Lys	Ile	Pro	Leu	Leu	Ser	Thr	Ala	Asn	Thr	Trp	Ser	Ala	Arg	Gln	Thr
465					470					475					480
Phe	Asn	Gly	Gly	Ile	Thr	Gly	Ala	Leu	Thr	Gly	Asn	Ala	Asp	Thr	Ala
				485					490					495	
Thr	Lys	Leu	Lys	Thr	Ala	Arg	Asn	Ile	Asn	Gly	Val	Arg	Phe	Asp	Gly
			500					505					510		

Ser Gly Asp Ile Asn Ile Asn Thr Leu Val Ser Arg Gly Arg Val Thr
515 520 525

Ala Leu Glu Ala Asn Ala Gln Gly Thr Ser Gly Ile Gln Leu Tyr Glu
530 535 540

Ala Tyr Asn Asn Gly Tyr Pro Ser Pro Tyr Gly Asn Val Leu His Leu
545 550 555 560

Lys Gly Ala Thr Ala Ala Gly Glu Gly Glu Leu Phe Ile Gly Trp Ser
565 570 575

Gly Thr Ser Gly Ala His Ala Pro Val His Ile Arg Ser Arg Arg Asp
580 585 590

Thr Asp Ser Ala Asn Trp Ser Glu Trp Ala Gln Val Tyr Thr Ser Lys
595 600 605

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

Asn Ala Ala Thr Ala Thr Lys Leu Gln Thr Ala Cys Thr Ile Asn Gly
625 630 635 640

Val Ser Phe Asp Gly Ser Lys Asn Ile Glu Leu Thr Ala Glu Asp Leu
645 650 655

Asn Leu Gln Glu Thr Val Asn Lys Ala Asp Asn Ala Val Gln Lys Thr
660 665 670

Gly Asp Thr Leu Ser Gly Gly Leu Thr Phe Glu Asn Asp Ser Ile Leu
675 680 685

Ala Trp Ile Arg Asn Thr Asp Trp Ala Lys Ile Gly Phe Lys Asn Asn
690 695 700

Ser Asp Ala Asp Thr Asp Ser Tyr Met Trp Phe Glu Thr Gly Asn Asn

705		710		715		720
Gly Asn Glu Tyr Phe Lys Trp Arg His Arg Ile Ile Gly Thr Arg Pro						
		725		730		735
Lys Asp Leu Met Asn Leu Lys Trp Asn Ala Leu Ser Val Leu Val Glu						
		740		745		750
Ala Leu Phe Ser Ser Glu Val Lys Ile Ser Thr Val Asn Ala Leu Arg						
		755		760		765
Ile Phe Asn Ser Ser Phe Gly Ala Ile Phe Arg Arg Ser Glu Glu Cys						
		770		775		780
Leu His Ile Ile Pro Thr Arg Glu Asn Glu Gly Glu Asn Gly Asn Ile						
		785		790		800
Gly Pro Leu Arg Pro Phe Thr Leu Asn Leu Arg Thr Gly Arg Ile Ser						
		805		810		815
Met Gly His Gly Leu Asp Val Thr Gly Asp Ile Phe Ala Asn Arg Phe						
		820		825		830
Ala Ile Asn Ser Ser Thr Gly Met Trp Ile His Met Arg Asp Gln Asn						
		835		840		845
Val Ile Leu Gly Arg Asn Ala Val Ser Thr Asp Gly Ala Gln Ala Leu						
		850		855		860
Leu Arg Gln Asp His Ala Asp Arg Lys Phe Met Ile Gly Gly Leu Gly						
		865		870		880
Asn Lys Gln Phe Gly Ile Tyr Met Ile Asn Asn Ser Arg Thr Ala Asn						
		885		890		895
Gly Thr Asp Gly Gln Ala Tyr Met Asp Asn Asn Gly Asn Trp Leu Cys						
		900		905		910

Gly Ala Gln Val Ile Pro Gly Asn Tyr Gly Asn Phe Asp Ser Arg Tyr
915 920 925

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

Trp Gln Thr Trp Asn Phe Gln Cys Pro Ser Gly His Val Leu Ser Gly
945 950 955 960

Ile Asn Val Gln Asp Thr Gly Lys Asn Ser Ala Asp Asn Ile Ala Gly
965 970 975

Val Tyr Tyr Arg Pro Val Gln Lys Tyr Ile Asn Gly Thr Trp Tyr Asn
980 985 990

Val Ala Ser Val
995

<210> 61
<211> 760
<212> PRT
<213> Artificial Sequence

<220>
<223> Sunset Tail Fiber

<400> 61

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Pro Glu
1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
50 55 60

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

Glu Phe Tyr Gln Val Thr Ile Gln His Arg Lys Asp Ile Ser Leu Ala
85 90 95

Leu Asn Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Gly Val Ser Thr
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Thr Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Tyr Thr Ala Gln Asp Ala Ser Thr Thr Gln Lys Gly Leu Val Gln Leu
210 215 220

Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala Ala Thr Pro Lys
225 230 235 240

Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys Tyr Thr Ala Gln
245 250 255

Asp Ala Thr Thr Thr Gln Lys Gly Ile Val Gln Leu Ser Ser Asp Thr

260

265

270

Asn Ser Thr Ser Glu Thr Leu Ala Ala Thr Pro Lys Ala Val Lys Ala
 275 280 285

Ala Tyr Asp Leu Ala Ala Gly Lys Ala Pro Ser Ser His Thr His Pro
 290 295 300

Trp Asn Gln Ile Thr Gly Val Pro Thr Ala Ser Leu Thr Ala Lys Gly
 305 310 315 320

Ile Thr Gln Leu Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala
 325 330 335

Ala Thr Pro Lys Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys
 340 345 350

Tyr Thr Ala Gln Asp Ala Thr Thr Ala Gln Lys Gly Ile Val Gln Leu
 355 360 365

Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala Ala Thr Pro Lys
 370 375 380

Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys Tyr Thr Ala Gln
 385 390 395 400

Asp Ala Thr Thr Thr Gln Lys Gly Ile Val Gln Leu Ser Ser Asp Thr
 405 410 415

Asn Ser Thr Ser Glu Thr Leu Ala Ala Thr Pro Lys Ala Val Lys Ala
 420 425 430

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

Trp Asn Gln Ile Thr Val Val Pro Thr Ala Ser Leu Thr Ala Lys Gly
 450 455 460

Ile Thr Gln Leu Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala
465 470 475 480

Ala Thr Pro Lys Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys
485 490 495

Tyr Thr Ala Gln Asp Ala Thr Thr Ala Gln Lys Gly Ile Val Gln Leu
500 505 510

Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala Ala Thr Pro Lys
515 520 525

Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys Gln Ala Ala Asp
530 535 540

Ala Thr Leu Thr Ala Leu Ala Ala Leu Ala Thr Ala Ala Asp Lys Leu
545 550 555 560

Pro Tyr Phe Thr Gly Val Asp Arg Ala Ala Leu Thr Ala Leu Thr Ser
565 570 575

Val Gly Arg Ala Ile Leu Gly Lys Thr Ser Ile Gln Ser Val Leu Asp
580 585 590

Tyr Leu Gly Leu Gly Glu Gly Ser Ala Leu Pro Val Gly Val Pro Val
595 600 605

Pro Trp Pro Ser Ala Thr Pro Pro Thr Gly Trp Leu Lys Cys Asn Gly
610 615 620

Ala Ala Phe Ser Ser Glu Lys Tyr Pro Asn Leu Ala Lys Val Tyr Pro
625 630 635 640

Thr Leu Lys Leu Pro Asp Leu Arg Gly Glu Phe Ile Arg Gly Trp Asp
645 650 655

Asp Gly Arg Gly Ile Asp Ser Gly Arg Ser Ile Leu Ser Glu Gln Gly

660

665

670

Tyr Ala Thr Glu Asp His Ala His Gly Leu Pro Ser Lys Ser Thr Val
 675 680 685

Ala Thr Asp Arg Ser Ile Asn Phe Tyr Phe Asp Glu Ala Trp Ala Thr
 690 695 700

Ser Gly Asn Thr Gly Val Ile Arg Trp Gly Asn Thr Ser Asp Ala Gly
 705 710 715 720

Leu Pro Ala Pro Asn Tyr Gly Thr Phe Lys Thr Tyr Lys Gln Ser Val
 725 730 735

Ala Asn Leu Gly Thr Ala Gly Leu Glu Thr Arg Pro Arg Asn Ile Ala
 740 745 750

Phe Asn Tyr Ile Val Arg Ala Asp
 755 760

<210> 62
 <211> 762
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Tangerine Tail Fiber

<400> 62

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Pro Glu
 1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
 20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
 35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr

50

55

60

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

Glu Phe Tyr Gln Val Thr Ile Gln His Arg Lys Asp Ile Ser Leu Ala
85 90 95

Leu Asn Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Gly Val Ser Thr
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Thr Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Tyr Thr Ala Gln Asp Ala Ser Thr Thr Gln Lys Gly Leu Val Gln Leu
210 215 220

Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala Ala Thr Pro Lys
225 230 235 240

Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys Tyr Thr Ala Gln
245 250 255

Asp Ala Thr Thr Thr Gln Lys Gly Ile Val Gln Leu Ser Ser Asp Thr
260 265 270

Asn Ser Thr Ser Glu Thr Leu Ala Ala Thr Pro Lys Ala Val Lys Ala
275 280 285

Ala Tyr Asp Leu Ala Ala Gly Lys Ala Pro Ser Ser His Thr His Pro
290 295 300

Trp Asn Gln Ile Thr Gly Val Pro Thr Ala Ser Leu Thr Ala Lys Gly
305 310 315 320

Ile Thr Gln Leu Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala
325 330 335

Ala Thr Pro Lys Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys
340 345 350

Tyr Thr Ala Gln Asp Ala Thr Thr Ala Gln Lys Gly Ile Val Gln Leu
355 360 365

Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala Ala Thr Pro Lys
370 375 380

Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys Tyr Thr Ala Gln
385 390 395 400

Asp Ala Thr Thr Thr Gln Lys Gly Ile Val Gln Leu Ser Ser Asp Thr
405 410 415

Asn Ser Thr Ser Glu Thr Leu Ala Ala Thr Pro Lys Ala Val Lys Ala
420 425 430

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

Trp Asn Gln Ile Thr Val Val Pro Thr Ala Ser Leu Thr Ala Lys Gly

450

455

460

Ile Thr Gln Leu Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala
 465 470 475 480

Ala Thr Pro Lys Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys
 485 490 495

Tyr Thr Ala Gln Asp Ala Thr Thr Ala Gln Lys Gly Ile Val Gln Leu
 500 505 510

Ser Ser Ala Thr Asn Ser Thr Ser Glu Val Leu Ala Ala Thr Pro Lys
 515 520 525

Ala Val Lys Ala Ala Tyr Asp Leu Ala Asn Gly Lys Gln Ala Ala Asp
 530 535 540

Ala Thr Leu Thr Ala Leu Ala Ala Leu Ala Thr Ala Ala Asp Lys Leu
 545 550 555 560

Pro Tyr Phe Thr Gly Val Asp Arg Ala Ala Leu Thr Ala Leu Thr Ser
 565 570 575

Val Gly Arg Ala Ile Leu Gly Lys Thr Ser Ile Gln Ser Val Leu Asp
 580 585 590

Tyr Leu Gly Leu Gly Glu Gly Ser Ala Leu Pro Val Gly Val Pro Val
 595 600 605

Pro Trp Pro Ser Ala Thr Pro Pro Thr Gly Trp Leu Lys Cys Asn Gly
 610 615 620

Ala Ala Phe Ser Ser Glu Lys Tyr Pro Asn Leu Ala Lys Val Tyr Pro
 625 630 635 640

Thr Leu Lys Leu Pro Asp Leu Arg Gly Glu Phe Ile Arg Gly Trp Asp
 645 650 655

Asp Ser Arg Gly Ile Asp Thr Gly Arg Ser Leu Leu Ser Gly Gln Thr
660 665 670

Ala Thr Phe Ile Arg Thr Ala Leu Gln Asp Tyr Tyr Gly Val Asp Leu
675 680 685

Thr Thr Asn Val Lys Val Gly Ile Ala Tyr Ala Thr Ala Asp Ser Val
690 695 700

Ile Thr Val Gly Asn Pro Ala Asn Pro Lys Ala Gly Asp Asn Ser Asp
705 710 715 720

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

Ala Glu Asp Asn Phe Thr Gly Ala Trp Ile Ser Met Arg Pro Arg Asn
740 745 750

Val Ala Phe Asn Tyr Ile Val Arg Ala Thr
755 760

<210> 63
<211> 1181
<212> PRT
<213> Artificial Sequence

<220>
<223> Thistle Tail Fiber

<400> 63

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Ser Glu
1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
50 55 60

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

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

Leu Ser Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Ser Val Ser Ala
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Ser Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Tyr Thr Ala Gln Asp Ala Ser Thr Thr Gln Lys Gly Leu Val Gln Leu
210 215 220

Ser Ser Ala Thr Asn Ser Asp Ser Glu Thr Met Ala Ala Thr Pro Lys
225 230 235 240

Ala Val Lys Ser Ile Lys Asp Leu Ala Asp Thr Lys Ala Pro Ile Glu

245

250

255

Ser Pro Ser Leu Thr Gly Thr Pro Thr Ala Pro Thr Ala Ala Gln Gly
 260 265 270

Thr Asn Ser Thr Gln Ile Ala Asn Thr Ala Phe Val Lys Ala Ala Ile
 275 280 285

Thr Ala Leu Ile Asn Gly Ala Pro Gly Thr Leu Asp Thr Leu Lys Glu
 290 295 300

Ile Ala Ala Ala Ile Asn Asn Asp Pro Asn Tyr Ser Thr Thr Ile Asn
 305 310 315 320

Asn Ala Leu Ala Leu Lys Ala Pro Leu Ala Ser Pro Ala Leu Thr Gly
 325 330 335

Val Pro Thr Ala Pro Thr Ala Ala Gln Gly Thr Asn Asn Thr Gln Ile
 340 345 350

Ala Thr Thr Ala Tyr Val Arg Ala Ala Ile Ser Ala Leu Val Gly Ser
 355 360 365

Ser Pro Glu Ala Leu Asp Thr Leu Tyr Glu Leu Ala Ala Ala Leu Gly
 370 375 380

Asn Asp Pro Asn Phe Ala Thr Thr Met Thr Asn Ala Leu Ala Gly Lys
 385 390 395 400

Gln Pro Leu Asp Ala Thr Leu Thr Ala Leu Ala Gly Leu Ala Thr Gly
 405 410 415

Ala Asn Lys Leu Pro Tyr Phe Thr Gly Thr Asp Thr Val Ser Gln Thr
 420 425 430

Asp Leu Thr Ser Val Gly Arg Asp Ile Leu Ala Lys Thr Ser Ile Leu
 435 440 445

Ala Val Ile Gln Tyr Leu Gly Leu Arg Glu Leu Gly Thr Ser Gly Glu
450 455 460

Lys Ile Pro Leu Leu Ser Thr Ala Asn Thr Trp Ser Ala Arg Gln Thr
465 470 475 480

Phe Asn Gly Gly Ile Thr Gly Ala Leu Thr Gly Asn Ala Asp Thr Ala
485 490 495

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

Ser Ala Asp Ile Thr Leu Thr Pro Glu Asn Leu Gly Val Thr Ser Leu
515 520 525

Thr Phe Glu Lys Asn Asn Gly Glu Met Pro Ile Asp Ala Asp Leu Asn
530 535 540

Thr Phe Gly Pro Val Glu Ala Tyr Leu Gly Val Trp Ser Lys Ala Thr
545 550 555 560

Ser Thr Asn Ala Thr Leu Glu Lys Asn Phe Pro Glu Asp Asn Ala Val
565 570 575

Gly Val Leu Glu Val Phe Ala Ala Gly Asn Phe Ala Gly Thr Gln Arg
580 585 590

Phe Thr Thr Arg Asp Gly Asn Val Tyr Ile Arg Arg Leu Ala Asn Lys
595 600 605

Trp Asn Gly Ser Asp Gly Pro Trp Gly Ile Trp Arg His Thr Gln Ser
610 615 620

Ala Thr Arg Pro Leu Ser Thr Thr Ile Asp Leu Asn Thr Leu Gly Ala
625 630 635 640

Ala Glu His Leu Gly Leu Trp Arg Asn Ser Ser Ser Ala Ile Ala Ser

645

650

655

Tyr Glu Arg Asn Tyr Pro Glu Glu Gly Gly Phe Ala Gln Gly Val Leu
 660 665 670

Glu Ile Leu Glu Gly Gly Asn Tyr Gly Arg Thr Gln Arg Tyr Thr Thr
 675 680 685

Arg Arg Gly Asn Met Tyr Val Arg Cys Leu Ala Ala Ser Trp Asp Ala
 690 695 700

Ser Asn Pro Gln Trp Glu Pro Trp Leu Lys Val Gly His Gln Ser Glu
 705 710 715 720

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

Tyr Ser Val Thr Gly Lys Ala Thr Asn Gly Pro Met Leu Asp Thr Val
 740 745 750

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

Val Ser Val Trp Gln Arg Tyr Thr Thr Thr Gly Lys Ser Glu Thr Thr
 770 775 780

Gln Gly Arg Thr Phe Glu Arg Val Tyr Ala Gly Ser Lys Trp Thr Glu
 785 790 795 800

Trp Arg Glu Val Tyr Asn Ser Phe Ser Leu Pro Leu Asn Leu Gly Ile
 805 810 815

Gly Gly Ala Val Ala Lys Leu Ser Ser Leu Asp Trp Gln Thr Tyr Asp
 820 825 830

Phe Val Pro Gly Ser Leu Ile Thr Val Arg Leu Asp Asn Met Thr Asn
 835 840 845

Ile Pro Asp Gly Met Asp Trp Gly Val Ile Asp Gly Asn Leu Ile Asn
850 855 860

Ile Ala Val Gly Pro Ser Asp Asp Ser Gly Thr Gly Arg Ser Met His
865 870 875 880

Val Trp Arg Ser Thr Val Ser Lys Ala Asn Tyr Arg Phe Phe Met Val
885 890 895

Arg Ile Ser Gly Asn Pro Gly Ser Arg Thr Ile Thr Ala Arg Arg Val
900 905 910

Pro Ile Ile Asp Glu Ala Gln Thr Trp Gly Ala Lys Gln Thr Phe Ser
915 920 925

Ala Gly Leu Ser Gly Glu Leu Ser Gly Asn Ala Ala Thr Ala Thr Lys
930 935 940

Leu Lys Thr Ala Arg Lys Ile Asn Asn Val Ser Phe Asp Gly Ser Gly
945 950 955 960

Asp Ile Glu Val Leu Pro Val Gly Val Pro Leu Pro Trp Pro Ser Asp
965 970 975

Thr Val Pro Ser Gly Tyr Ala Leu Met Gln Gly Gln Thr Phe Asp Lys
980 985 990

Ser Ala Tyr Pro Lys Leu Ala Ala Ala Tyr Pro Ser Gly Val Ile Pro
995 1000 1005

Asp Met Arg Gly Trp Thr Ile Lys Gly Lys Pro Ala Ser Gly Arg
1010 1015 1020

Asp Val Leu Ser Leu Glu Gln Asp Gly Ile Lys Ser His Thr His
1025 1030 1035

Ser Ala Ser Ala Ser Asn Thr Asp Leu Gly Thr Lys Thr Thr Ser

1040

1045

1050

Ser Phe Asp Tyr Gly Thr Lys Ser Thr Asn Asn Thr Gly Ala His
 1055 1060 1065

Thr His Asn Val Ser Gly Thr Ala Asn Ser Ala Gly Ala His Thr
 1070 1075 1080

His Thr Val Pro Leu Arg Arg Pro Asn Ser Gly Gly Met Asn Phe
 1085 1090 1095

Asp Trp Leu Asp Gly Ala Ser Ser Gly Thr Val Val Gly Asn Gly
 1100 1105 1110

Thr Val Pro Ser Ser Gly Ala His Thr His Ser Val Ser Gly Thr
 1115 1120 1125

Ala Thr Ser Ala Gly Ala His Ala His Thr Val Gly Ile Gly Ala
 1130 1135 1140

His Thr His Ser Val Ala Ile Gly Ser His Gly His Thr Ile Thr
 1145 1150 1155

Val Asn Ala Ala Gly Asn Ala Glu Asn Thr Val Lys Asn Ile Ala
 1160 1165 1170

Phe Asn Tyr Ile Val Arg Leu Ala
 1175 1180

<210> 64

<211> 561

<212> PRT

<213> Artificial Sequence

<220>

<223> Tropical_pNS88 Tail Fiber

<400> 64

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Ser Glu

1	5	10	15
Ser	Leu	Ala	Leu
	Val	Ala	Asp
	Val	Gln	Tyr
		His	Glu
		Pro	Tyr
		Leu	Ser
	20	25	30
Ala	Ala	Leu	Asn
	Arg	Lys	Phe
	Arg	Gly	Ile
	Val	Asp	Pro
		Gly	Phe
		Tyr	
	35	40	45
Ala	Gly	Phe	Leu
	Pro	Lys	Pro
	Gly	Gly	Gly
	Met	Asn	Leu
		Leu	Ile
		Thr	
	50	55	60
Ser	Val	Asp	Gly
	Asp	Lys	Thr
	Ala	Gly	Ala
	Ala	Ser	Val
	Asp	Ile	Gly
	65	70	75
Glu	Phe	Tyr	Gln
	Val	Thr	Ile
	Gln	Gln	Arg
	Lys	Asp	Ile
	Ser	Leu	Ala
	85	90	95
Leu	Ser	Ala	Gly
	Lys	Lys	Tyr
	Ala	Ile	Val
	Leu	Lys	Gly
	Arg	Tyr	Leu
	100	105	110
Leu	Gly	Glu	Asp
	Thr	Tyr	Gln
	Val	Asn	Thr
	Ala	Ser	His
	Ile	His	Ala
	115	120	125
Ala	Glu	Phe	Val
	Ala	Arg	Thr
	Tyr	Thr	Asp
	Ser	Tyr	Gln
	Leu	Gly	Asp
	130	135	140
Gly	Glu	Leu	Leu
	Val	Cys	Thr
	Val	Asn	Ile
	Pro	Ala	Ser
	Val	Ser	Ala
	145	150	155
Ile	Thr	Gln	Glu
	Met	Ile	Asp
	Thr	Ser	Glu
	Arg	Ile	Asn
	Arg	Ser	Ile
	165	170	175
Gly	Ile	Asp	Ile
	Ser	Asp	Ser
	Val	Thr	Ser
	Thr	Arg	Ser
	Asp	Val	Ala
	180	185	190
Ala	Ser	Ser	Leu
	Ala	Val	Lys
	Lys	Lys	Ala
	Tyr	Asp	Leu
	Ala	Lys	Ser
	Lys		
	195	200	205

Tyr Thr Ala Gln Asp Ala Leu Ile Lys Glu Tyr Asp Glu Asn Ile Gly
210 215 220

Ala Trp Glu Thr Phe Ala Thr Thr Ser Ala Asn Gln Ser Ile Thr Val
225 230 235 240

Thr Ile Asn Gly Thr Pro Val Thr Ile Pro Gly Ile Gly Lys Leu Ala
245 250 255

Gln Lys Gly Thr Asn Gly Ala Leu Pro Ile Asp Gln Gly Gly Thr Gly
260 265 270

Ala Thr Asn Ala Ala Asp Val Arg Thr Asn Leu Gly Leu Gly Asp Ser
275 280 285

Val Thr Ala Asn Phe Gly Ser Leu Glu Ile Gly Ala Lys Asn Ala Ser
290 295 300

Ser Ala Ser Phe Val Asp Phe His Phe Leu Gly Thr Asn Asp Tyr Asp
305 310 315 320

Ala Arg Ile Leu Cys Gly Gly Asn Ser Asn Gly Gly Met Gly Lys Gly
325 330 335

Asp Phe Thr Phe Tyr Ala Gly Lys Tyr Thr Phe Ile Gly Asp Ser Phe
340 345 350

Glu Phe Arg Asn Pro Ile Thr Cys Gln Asn Ser Ile Thr Ala Ser Gly
355 360 365

Ser Ile Ser Ala Gly Gly Ser Leu Arg Ala Val Thr Ser Ser Asn Val
370 375 380

Trp Ala Ser Ser Asp Thr Gln Asn Ala His Val Trp Phe Tyr Gly Ala
385 390 395 400

Gly Gly Ile Glu Ser Arg Gly Val Ile Tyr Ala Pro Arg Glu Gly Thr

405

410

415

Ile Arg Leu Arg Pro Asp Asn Asn Asp Asn Gly Gly Ala Asn Gly Tyr
 420 425 430

Ser Phe Ser Phe Gly Ala Asp Gly Arg Phe Thr Cys Ile Ser Val Asn
 435 440 445

Gln Thr Ser Asp Glu Arg Val Lys Phe Asp Lys Glu Pro Val Ser Asn
 450 455 460

Ala Leu Glu Lys Ile Cys Ser Leu Thr Gly Tyr Thr Phe Gly Ile Gln
 465 470 475 480

Leu Thr Glu Ser Glu Ser Val His Ser Ala Gly Ile Ile Ala Gln Asp
 485 490 495

Leu Glu Lys Val Leu Pro Val Ala Val Ser Ser Gly Gly Thr Gly Thr
 500 505 510

Thr Pro Thr Gly Glu Glu Ile Asn Asp Leu Lys Thr Val Asp Tyr Ser
 515 520 525

Ala Met Ser Ala Leu Tyr Val Glu Ala Met Lys Glu Leu Ala Asn Arg
 530 535 540

Val Lys Ser Ile Glu Ser Glu Phe Ala Glu Leu Lys Ala Arg Ser Ala
 545 550 555 560

Ile

<210> 65

<211> 556

<212> PRT

<213> Artificial Sequence

<220>

<223> Tropical_pNS92 Tail Fiber

<400> 65

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Ser Glu
1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
50 55 60

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

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

Leu Ser Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Ser Val Ser Ala
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Ser Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Tyr Thr Ala Gln Asp Ala Asp Glu Asn Ile Gly Ala Trp Glu Thr Phe
210 215 220

Ala Thr Thr Ser Ala Asn Gln Ser Ile Thr Val Thr Ile Asn Gly Thr
225 230 235 240

Pro Val Thr Ile Pro Gly Ile Gly Lys Leu Ala Gln Lys Gly Thr Asn
245 250 255

Gly Ala Leu Pro Ile Asp Gln Gly Gly Thr Gly Ala Thr Asn Ala Ala
260 265 270

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

Gly Ser Leu Glu Ile Gly Ala Lys Asn Ala Ser Ser Ala Ser Phe Val
290 295 300

Asp Phe His Phe Leu Gly Thr Asn Asp Tyr Asp Ala Arg Ile Leu Cys
305 310 315 320

Gly Gly Asn Ser Asn Gly Gly Met Gly Lys Gly Asp Phe Thr Phe Tyr
325 330 335

Ala Gly Lys Tyr Thr Phe Ile Gly Asp Ser Phe Glu Phe Arg Asn Pro
340 345 350

Ile Thr Cys Gln Asn Ser Ile Thr Ala Ser Gly Ser Ile Ser Ala Gly
355 360 365

Gly Ser Leu Arg Ala Val Thr Ser Ser Asn Val Trp Ala Ser Ser Asp
370 375 380

Thr Gln Asn Ala His Val Trp Phe Tyr Gly Ala Gly Gly Ile Glu Ser

385 390 395 400

Arg Gly Val Ile Tyr Ala Pro Arg Glu Gly Thr Ile Arg Leu Arg Pro
405 410 415

Asp Asn Asn Asp Asn Gly Gly Ala Asn Gly Tyr Ser Phe Ser Phe Gly
420 425 430

Ala Asp Gly Arg Phe Thr Cys Ile Ser Val Asn Gln Thr Ser Asp Glu
435 440 445

Arg Val Lys Phe Asp Lys Glu Pro Val Ser Asn Ala Leu Glu Lys Ile
450 455 460

Cys Ser Leu Thr Gly Tyr Thr Phe Gly Ile Gln Leu Thr Glu Ser Glu
465 470 475 480

Ser Val His Ser Ala Gly Ile Ile Ala Gln Asp Leu Glu Lys Val Leu
485 490 495

Pro Val Ala Val Ser Ser Gly Gly Thr Gly Thr Thr Pro Thr Gly Glu
500 505 510

Glu Ile Asn Asp Leu Lys Thr Val Asp Tyr Ser Ala Met Ser Ala Leu
515 520 525

Tyr Val Glu Ala Met Lys Glu Leu Ala Asn Arg Val Lys Ser Ile Glu
530 535 540

Ser Glu Phe Ala Glu Leu Lys Ala Arg Ser Ala Ile
545 550 555

<210> 66
<211> 975
<212> PRT
<213> Artificial Sequence

<220>
<223> Violet Tail Fiber

<400> 66

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Pro Glu
1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
50 55 60

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

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

Leu Ser Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Gly Val Ser Ala
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Thr Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Tyr Thr Ala Gln Asp Ala Ser Ile Thr Gln Lys Gly Leu Val Gln Leu
210 215 220

Ser Ser Ala Thr Asn Ser Asp Ser Glu Thr Met Ala Ala Thr Pro Lys
225 230 235 240

Ala Val Lys Ser Ile Lys Asp Leu Ala Asp Thr Lys Ala Pro Ile Glu
245 250 255

Ser Pro Ser Leu Thr Gly Thr Pro Ser Ala Pro Thr Ala Ala Gln Gly
260 265 270

Thr Asn Ser Thr Gln Ile Ala Asn Thr Ala Phe Val Lys Ala Ala Ile
275 280 285

Thr Ala Leu Ile Asn Gly Ala Pro Gly Thr Leu Asp Thr Leu Lys Glu
290 295 300

Ile Ala Ala Ala Ile Asn Asn Asp Pro Asn Phe Ser Thr Thr Val Asn
305 310 315 320

Asn Ala Leu Ala Leu Lys Ala Pro Leu Ala Ser Pro Ala Leu Thr Gly
325 330 335

Ile Pro Thr Ala Pro Thr Ala Ala Gln Gly Thr Asn Asn Thr Gln Ile
340 345 350

Ala Thr Thr Ala Tyr Val Arg Ala Ala Ile Ser Ala Leu Val Gly Ser
355 360 365

Ser Pro Glu Ala Leu Asp Thr Leu Asn Glu Leu Ala Ala Ala Leu Gly
370 375 380

Asn Asp Pro Asn Phe Ala Thr Thr Met Thr Asn Ala Leu Ala Gly Lys

385 390 395 400

Gln Pro Leu Asp Ala Thr Leu Thr Ala Leu Ala Gly Leu Ala Thr Gly
405 410 415

Ala Asn Lys Leu Pro Tyr Phe Thr Gly Lys Asp Thr Val Ala Gln Thr
420 425 430

Asp Leu Thr Ser Val Gly Arg Asp Ile Leu Ala Lys Thr Ser Val Leu
435 440 445

Ala Val Ile Gln Tyr Leu Gly Leu Arg Glu Leu Gly Thr Ser Gly Glu
450 455 460

Lys Ile Pro Leu Leu Ser Thr Ala Asn Thr Trp Ser Ala Arg Gln Thr
465 470 475 480

Phe Asn Gly Gly Ile Thr Gly Ala Leu Thr Gly Asn Ala Asp Thr Ala
485 490 495

Thr Lys Leu Lys Thr Ala Ile Asn Ile Asn Gly Val Arg Phe Asp Gly
500 505 510

Ser Thr Asn Ile Ser Ile Pro Thr Ile Thr Ser Arg Gly Arg Val Thr
515 520 525

Ala Leu Thr Gly Thr Thr Gln Gly Ala Ala Thr Gly Leu Gln Met Tyr
530 535 540

Glu Ala Tyr Asn Asn Gly Tyr Pro Thr Thr Tyr Gly Asn Val Leu His
545 550 555 560

Leu Lys Gly Ala Ala Ser Thr Gly Glu Gly Glu Leu Leu Ile Gly Trp
565 570 575

Ser Gly Thr Asn Gly Ala His Ala Pro Ala Phe Ile Arg Ser Lys Arg
580 585 590

Asp Ile Thr Ala Ala Ala Trp Ser Glu Trp Ala Gln Ile Tyr Thr Ser
595 600 605

Lys Asp Ser Val Pro Gly Val Asn Thr Lys Gly Asn Gln Asp Thr Ser
610 615 620

Gly Asn Ala Ala Thr Ala Thr Lys Leu Gln Thr Ala Cys Thr Ile Asn
625 630 635 640

Gly Val Ser Phe Asp Gly Ser Lys Asn Ile Glu Leu Thr Ala Ala Asp
645 650 655

Leu Asn Leu Glu Gln Thr Val Glu Leu Ala Ala Gly Ala Leu Gln Lys
660 665 670

Asn Gln Asn Gly Ala Asp Ile Pro Gly Lys Asp Thr Phe Thr Lys Asn
675 680 685

Ile Gly Ala Cys Arg Ala Tyr Ser Ala Trp Leu Asn Ile Gly Gly Asp
690 695 700

Ser Gln Val Trp Thr Thr Ala Gln Phe Ile Ser Trp Leu Glu Ser Gln
705 710 715 720

Gly Ala Phe Asn His Pro Tyr Trp Met Cys Lys Gly Ser Trp Ala Tyr
725 730 735

Ala Asn Asn Lys Val Ile Thr Asp Thr Gly Cys Gly Asn Ile Cys Leu
740 745 750

Ala Gly Ala Val Val Glu Val Ile Gly Thr Arg Gly Ala Met Thr Ile
755 760 765

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

Gln Phe Thr Tyr Ile Asn His Gly Asp Ala Tyr Ala Pro Gly Trp Arg

785 790 795 800

Arg Asp Tyr Asn Thr Lys Asn Gln Gln Pro Ala Phe Ala Leu Gly Gln
805 810 815

Thr Gly Ser Arg Val Ala Asn Asp Lys Ala Val Gly Trp Asn Trp Asn
820 825 830

Ser Gly Val Tyr Asp Ala Asp Ile Ser Gly Ala Ser Thr Leu Ile Leu
835 840 845

His Phe Asn Met Asn Ala Gly Ser Cys Pro Ala Val Gln Phe Arg Val
850 855 860

Asn Tyr Lys Asn Gly Gly Ile Phe Tyr Arg Ser Ala Arg Asp Gly Tyr
865 870 875 880

Gly Phe Glu Ala Asn Trp Ser Glu Phe Tyr Thr Thr Thr Arg Lys Pro
885 890 895

Ser Ala Gly Asp Val Gly Ala Tyr Thr Gln Ala Glu Cys Asn Ser Arg
900 905 910

Phe Ile Thr Gly Ile Arg Leu Gly Gly Leu Ser Ser Val Gln Thr Trp
915 920 925

Asn Gly Pro Gly Trp Ser Asp Arg Ser Gly Tyr Val Val Thr Gly Ser
930 935 940

Val Asn Gly Asn Arg Asp Glu Leu Ile Asp Thr Thr Gln Ala Arg Pro
945 950 955 960

Ile Gln Tyr Cys Ile Asn Gly Thr Trp Tyr Asn Ala Gly Ser Ile
965 970 975

<210> 67
<211> 175
<212> PRT

<213> Artificial Sequence

<220>

<223> Asparagus Chaperone

<400> 67

Met Met His Leu Lys Asn Ile Lys Ser Glu Asn Pro Lys Thr Lys Glu
1 5 10 15

Gln Tyr Gln Leu Thr Lys Asn Phe Asp Val Ile Trp Leu Trp Ser Glu
20 25 30

Asp Gly Lys Asn Trp Tyr Glu Glu Val Asn Asn Phe Gln Asp Asp Thr
35 40 45

Ile Lys Ile Val Tyr Asp Glu Asn Asn Ile Ile Val Ala Ile Thr Lys
50 55 60

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

Asp Ile Thr Ala Asn Arg Arg Ala Asp Asp Ser Gly Lys Trp Met Phe
85 90 95

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

Gln Gln Ala Glu Ser Gln Lys Ala Ala Leu Leu Ser Glu Ala Glu Ser
115 120 125

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

Glu Glu Arg Ala Arg Leu Glu Ser Trp Glu Arg Tyr Ser Val Leu Val
145 150 155 160

Ser Arg Val Asp Thr Ala Asn Pro Glu Trp Pro Gln Lys Pro Glu
165 170 175

<210> 68
<211> 140
<212> PRT
<213> Artificial Sequence

<220>
<223> Banana Chaperone

<400> 68

Met Arg Ile Tyr Phe Ser Pro Ser Glu Ile Gly Phe Tyr His Glu Ser
1 5 10 15

Asp Lys Gln Ala Tyr Leu Leu Ala Gly Thr Trp Pro Asn Asp Leu Leu
20 25 30

Glu Ile Ser Glu Lys Trp Phe Leu Tyr Leu Leu Glu Gly Gln Gln Lys
35 40 45

Gly Lys Val Ile Thr Val Asn Asp Tyr Asp Gln Pro Val Leu Val Asp
50 55 60

Pro Pro Thr Ala Thr Lys Glu Gln Leu Leu Ala Glu Ala Asp Ala Gln
65 70 75 80

Lys Glu Ala Leu Met Asn Ser Ala Ser Ala Val Ile Glu Pro Leu Lys
85 90 95

Asp Ala Val Glu Leu Gly Met Ser Thr Asp Glu Glu Glu Gly Leu Leu
100 105 110

Leu Ala Trp Gln Gln Tyr Arg Val Leu Leu Met Arg Val Asp Thr Ser
115 120 125

His Ala Pro Asp Ile Glu Trp Pro Val Leu Pro Ala
130 135 140

<210> 69
<211> 203
<212> PRT

<213> Artificial Sequence

<220>

<223> Bittersweet Chaperone

<400> 69

Met Asp Asn Ala Ile Leu Asn Ser Glu Leu Ile Ala Ile Gln Ala Gly
1 5 10 15

Asn Ile Ile Val Tyr Asn Tyr Asp Gly Gly Asn Arg Glu Tyr Ile Ser
20 25 30

Ala Ser Thr Glu Tyr Leu Ala Val Gly Val Gly Ile Pro Ala Asn Ser
35 40 45

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

Ser Glu Asp Leu Ser Ser Trp Glu Tyr Val Pro Asp His Arg Gly Glu
65 70 75 80

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

Gly Asp Tyr Pro Glu Asn Thr Thr Thr Ile Ala Pro Leu Thr Pro Tyr
100 105 110

Asp Lys Trp Asp Gly Glu Lys Trp Val Val Asp Thr Glu Ala Gln His
115 120 125

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

Thr Ala Met Asp Ser Ile Ser Leu Ile Gln Leu Lys Leu Arg Ala Gly
145 150 155 160

Arg Lys Leu Thr Gln Ala Glu Thr Thr Gln Leu Asn Ser Val Leu Asp
165 170 175

Tyr Ile Asp Glu Leu Asn Ala Met Asp Leu Thr Thr Ala Pro Asp Leu
180 185 190

Asn Trp Pro Glu Lys Gln Leu Ser Thr Ala Ser
195 200

<210> 70
<211> 203
<212> PRT
<213> Artificial Sequence

<220>
<223> Cobalt Chaperone

<400> 70

Met Asp Asn Ala Ile Leu Asn Ser Glu Leu Ile Ala Ile Gln Ala Gly
1 5 10 15

Asn Ile Ile Val Tyr Asn Tyr Asp Gly Gly Asn Arg Glu Tyr Ile Ser
20 25 30

Ala Ser Thr Glu Tyr Leu Ala Val Gly Val Gly Ile Pro Ala Asn Ser
35 40 45

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

Ser Glu Asp Leu Ser Ser Trp Glu Tyr Val Pro Asp His Arg Gly Glu
65 70 75 80

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

Gly Asp Tyr Pro Glu Asn Thr Thr Thr Ile Ala Pro Leu Thr Pro Tyr
100 105 110

Asp Lys Trp Asp Gly Glu Lys Trp Val Val Asp Thr Glu Ala Gln His
115 120 125

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

Thr Ala Met Asp Ser Ile Ser Leu Ile Gln Leu Lys Leu Arg Ala Gly
145 150 155 160

Arg Lys Leu Thr Gln Ala Glu Thr Thr Gln Leu Asn Ser Val Leu Asp
165 170 175

Tyr Ile Asp Glu Leu Asn Ala Met Asp Leu Thr Thr Ala Pro Asp Leu
180 185 190

Asn Trp Pro Glu Lys Gln Leu Ser Thr Ala Ser
195 200

<210> 71
<211> 203
<212> PRT
<213> Artificial Sequence

<220>
<223> Denim Chaperone

<400> 71

Met Asp Asn Ala Ile Leu Asn Ser Glu Leu Ile Ala Ile Gln Ala Gly
1 5 10 15

Asn Ile Ile Val Tyr Asn Tyr Asp Gly Gly Asn Arg Glu Tyr Ile Ser
20 25 30

Ala Ser Thr Glu Tyr Leu Ala Val Gly Val Gly Ile Pro Ala Asn Ser
35 40 45

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

Ser Glu Asp Leu Ser Ser Trp Glu Tyr Val Pro Asp His Arg Gly Glu
65 70 75 80

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

Gly Asp Tyr Pro Glu Asn Thr Thr Thr Ile Ala Pro Leu Thr Pro Tyr
100 105 110

Asp Lys Trp Asp Gly Glu Lys Trp Val Val Asp Thr Glu Ala Gln His
115 120 125

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

Thr Ala Met Asp Ser Ile Ser Leu Ile Gln Leu Lys Leu Arg Ala Gly
145 150 155 160

Arg Lys Leu Thr Gln Ala Glu Thr Thr Gln Leu Asn Ser Val Leu Asp
165 170 175

Tyr Ile Asp Glu Leu Asn Ala Met Asp Leu Thr Thr Ala Pro Asp Leu
180 185 190

Asn Trp Pro Glu Lys Gln Leu Ser Thr Ala Ser
195 200

<210> 72
<211> 175
<212> PRT
<213> Artificial Sequence

<220>
<223> Eggplant Chaperone

<400> 72

Met Gln His Leu Lys Asn Ile Arg Ser Gly Asn Pro Lys Thr Lys Glu
1 5 10 15

Gln Tyr Gln Leu Thr Lys Asn Phe Asp Val Ile Trp Leu Trp Ser Glu
20 25 30

Asp Gly Lys Asn Trp Tyr Glu Glu Val Lys Asn Phe Gln Pro Asp Thr
35 40 45

Ile Lys Ile Val Tyr Asp Glu Asn Asn Ile Ile Val Ala Ile Thr Lys
50 55 60

Asp Ala Ser Thr Leu Asn Pro Glu Gly Phe Ser Val Val Glu Val Pro
65 70 75 80

Asp Ile Thr Ala Asn Arg Arg Ala Asp Asp Ser Gly Lys Trp Met Phe
85 90 95

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

Gln Gln Ala Glu Ser Gln Lys Ala Ala Leu Leu Ser Glu Ala Glu Ser
115 120 125

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

Glu Glu Arg Thr Arg Leu Glu Ala Trp Glu Arg Tyr Ser Val Leu Val
145 150 155 160

Ser Arg Val Asp Thr Ala Asn Pro Glu Trp Pro Gln Lys Pro Glu
165 170 175

<210> 73
<211> 175
<212> PRT
<213> Artificial Sequence

<220>
<223> Fern Chaperone

<400> 73

Met Gln His Leu Lys Asn Ile Lys Ser Gly Asn Pro Lys Thr Lys Glu
1 5 10 15

Gln Tyr Gln Leu Thr Lys Asn Phe Asp Val Ile Trp Leu Trp Ser Glu
20 25 30

Asp Gly Lys Asn Trp Tyr Glu Glu Val Lys Asn Phe Gln Pro Asp Thr
35 40 45

Ile Lys Ile Val Tyr Asp Ala Asn Asn Ile Ile Val Ala Ile Thr Lys
50 55 60

Asp Ala Ser Thr Leu Asn Pro Glu Gly Tyr Ser Val Val Glu Val Pro
65 70 75 80

Asp Ile Thr Ala Asn Arg Arg Ala Asp Asp Ser Gly Lys Trp Met Phe
85 90 95

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

Gln Gln Ala Glu Ser Gln Lys Ala Ala Leu Leu Ser Glu Ala Glu Asn
115 120 125

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

Glu Glu Arg Ala Arg Leu Glu Ser Trp Glu Arg Tyr Ser Val Leu Val
145 150 155 160

Ser Arg Val Asp Thr Ala Asn Pro Glu Trp Pro Gln Lys Pro Glu
165 170 175

<210> 74
<211> 177
<212> PRT
<213> Artificial Sequence

<220>
<223> Fuchsia Chaperone

<400> 74

Met Met His Leu Arg Asn Ile Thr Ala Gly Asn Pro Lys Thr Lys Glu
1 5 10 15

Gln Tyr Gln Leu Thr Lys Gln Phe Asn Ile Lys Trp Leu Tyr Thr Glu
20 25 30

Asp Gly Lys Asn Trp Tyr Glu Glu Gln Lys Asn Phe Gln Tyr Asp Thr
35 40 45

Leu Lys Met Ala Tyr Asp His Asn Gly Val Ile Ile Cys Ile Glu Lys
50 55 60

Asp Val Ser Ala Ile Asn Pro Glu Gly Ala Ser Val Val Glu Leu Pro
65 70 75 80

Asp Ile Thr Ala Asn Arg Arg Ala Asp Ile Ser Gly Lys Trp Met Phe
85 90 95

Lys Asp Gly Val Val Val Lys Arg Thr Tyr Thr Glu Glu Glu Gln Arg
100 105 110

Gln Gln Ala Glu Asn Glu Lys Gln Ser Leu Leu Gln Leu Val Arg Asp
115 120 125

Lys Thr Gln Leu Trp Asp Ser Gln Leu Arg Leu Gly Ile Ile Ser Ala
130 135 140

Glu Asn Lys Gln Lys Leu Thr Glu Trp Met Leu Phe Ala Gln Lys Val
145 150 155 160

Glu Ser Thr Asp Thr Ser Ser Leu Pro Val Thr Phe Pro Glu Gln Pro
165 170 175

Glu

<210> 75

<211> 197
<212> PRT
<213> Artificial Sequence

<220>
<223> Fuzzy Chaperone

<400> 75

Met Gln Glu Thr Met Thr Arg Ile Glu Leu Ser Gly Val Leu Gly Lys
1 5 10 15

Thr Phe Gly Lys Val His Tyr Arg Leu Ile Lys Asn Ile Asn Glu Ala
20 25 30

Gly Glu Ala Leu Ser Ala Thr Ile Pro Gly Phe Glu Arg Phe Met Ile
35 40 45

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

Asn Ile Gly His Asp Asp Leu Gly Phe Pro Val Ser Gly Glu Ile Ile
65 70 75 80

Arg Ile Val Pro Val Ile Ile Gly Ser Lys Lys Ala Gly Ile Leu Gln
85 90 95

Thr Ile Leu Gly Ala Val Ile Val Ala Ala Ser Val Ala Tyr Gly Phe
100 105 110

Phe Thr Glu Asp Trp Ala Asn Ala Ala Tyr Gly Ile Gln Ala Gly Gly
115 120 125

Ala Met Met Leu Gly Gly Val Val Gln Met Leu Ser Pro Gln Pro Ala
130 135 140

Gly Leu Ala Arg Lys Glu Ser Ala Asp Asn Lys Ala Ser Tyr Ala Phe
145 150 155 160

Gly Gly Val Thr Asn Thr Ala Ser Gln Gly Tyr Pro Val Pro Leu Leu

165

170

175

Tyr Gly Lys Arg Arg Ile Gly Gly Ala Ile Ile Ser Ala Gly Ile Tyr
 180 185 190

Val Glu Asp Gln Gln
 195

<210> 76
 <211> 152
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Inchworm Chaperone

<400> 76

Met Lys Gly Glu Tyr Tyr Phe Ser Pro Ser Gln Val Ala Phe Tyr Pro
 1 5 10 15

Ala Ser Leu Arg Glu Val Tyr Glu Tyr Ala Gly Cys Trp Pro Val Asp
 20 25 30

Gly Glu Trp Val Ser Ala Glu Leu His Glu Gln Leu Met Asn Glu Gln
 35 40 45

Ala Ala Gly Arg Ala Ile Ser Ser Asp Val Asn Gly Asn Pro Val Ala
 50 55 60

Ile Glu Arg Pro Pro Leu Ser Arg Gln Gln Arg Ser Thr His Glu Arg
 65 70 75 80

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

His Arg Asp Gln Leu Glu Thr Gly Lys Glu Thr Thr Leu Leu Pro Val
 100 105 110

Gln Tyr His Glu Leu Met Ser Tyr Arg Ala Ser Leu Arg Asp Trp Pro

115

120

125

Glu Glu Pro Leu Phe Pro Asp Ser Gly Gly Arg Pro Ser Val Pro Asp
 130 135 140

Trp Leu Arg Arg Tyr Val Thr Pro
 145 150

<210> 77

<211> 203

<212> PRT

<213> Artificial Sequence

<220>

<223> Indian Chaperone

<400> 77

Met Asp Asn Ala Ile Leu Asn Ser Glu Leu Ile Ala Ile Gln Ala Gly
 1 5 10 15

Asn Ile Ile Val Tyr Asn Tyr Asp Gly Gly Asn Arg Glu Tyr Ile Ser
 20 25 30

Ala Ser Thr Glu Tyr Leu Ala Val Gly Val Gly Ile Pro Ala Asn Ser
 35 40 45

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

Ser Glu Asp Leu Ser Ser Trp Glu Tyr Val Pro Asp His Arg Gly Glu
 65 70 75 80

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

Gly Asp Tyr Pro Glu Asn Thr Thr Thr Ile Ala Pro Leu Thr Pro Tyr
 100 105 110

Asp Lys Trp Asp Gly Glu Lys Trp Val Val Asp Thr Glu Ala Gln His

115

120

125

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

Thr Ala Met Asp Ser Ile Ser Leu Ile Gln Leu Lys Leu Arg Ala Gly
 145 150 155 160

Arg Lys Leu Thr Gln Ala Glu Thr Thr Gln Leu Asn Ser Val Leu Asp
 165 170 175

Tyr Ile Asp Glu Leu Asn Ala Met Asp Leu Thr Thr Ala Pro Asp Leu
 180 185 190

Asn Trp Pro Glu Lys Gln Leu Ser Thr Ala Ser
 195 200

<210> 78
 <211> 203
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Indigo Chaperone

<400> 78

Met Asp Asn Ala Ile Leu Asn Ser Glu Leu Ile Ala Ile Gln Ala Gly
 1 5 10 15

Asn Ile Ile Val Tyr Asn Tyr Asp Gly Gly Asn Arg Glu Tyr Ile Ser
 20 25 30

Ala Ser Thr Glu Tyr Leu Ala Val Gly Val Gly Ile Pro Ala Asn Ser
 35 40 45

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

Ser Glu Asp Leu Ser Ser Trp Glu Tyr Val Pro Asp His Arg Gly Glu

65		70		75		80
Thr Val Tyr Ser	Ile Asp Thr Gly Asn Pro Glu Glu Ile Thr Val Leu					
	85		90			95
Gly Asp Tyr Pro	Glu Asn Thr Thr Thr Ile Ala Pro Leu Thr Pro Tyr					
	100		105			110
Asp Lys Trp Asp	Gly Glu Lys Trp Val Val Asp Thr Glu Ala Gln His					
	115		120			125
Ser Ala Ala Val	Glu Ala Ala Glu Thr Lys Arg Gln Ser Leu Ile Asp					
	130		135			140
Thr Ala Met Asp	Ser Ile Ser Leu Ile Gln Leu Lys Leu Arg Ala Gly					
	145		150		155	160
Arg Lys Leu Thr	Gln Ala Glu Thr Thr Gln Leu Asn Ser Val Leu Asp					
	165		170			175
Tyr Ile Asp Glu	Leu Asn Ala Met Asp Leu Thr Thr Ala Pro Asp Leu					
	180		185			190
Asn Trp Pro Glu	Lys Gln Leu Ser Thr Ala Ser					
	195		200			

<210> 79
 <211> 205
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Jazzberry Chaperone

<400> 79

Met Ala Phe Arg	Met Ser Glu Gln Ser Arg Thr Val Lys Ile Tyr Asn
1	5 10 15

Leu Leu Ala Gly Thr Asn Glu Phe Ile Gly Glu Gly Asp Ala Tyr Ile

20

25

30

Pro Pro His Thr Gly Leu Pro Ala Asn Ser Thr Asp Ile Ala Pro Pro
 35 40 45

Glu Ile Pro Ala Gly Phe Val Ala Val Phe Asn Ser Glu Asn Glu Ser
 50 55 60

Trp Asn Ile Val Glu Asp His Arg Gly Lys Thr Val Tyr Asp Val Ala
 65 70 75 80

Ser Gly Asp Ala Leu Phe Ile Ser Glu Pro Gly Pro Leu Pro Glu Asn
 85 90 95

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

Ser Trp Val Lys Asp Glu Glu Ala Glu Lys Leu Phe Arg Ile Arg Glu
 115 120 125

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

Ala Ile Leu Gln Asp Ala Val Asn Leu Glu Ile Ala Thr Asn Glu Glu
 145 150 155 160

Asn Ser Gln Leu Asp Ser Trp Arg Lys Tyr Arg Val Leu Val Ser Arg
 165 170 175

Ile Asp Thr Ser Thr Ala Pro Asp Ile Val Trp Pro Glu Leu Met Asn
 180 185 190

Gln Gly Tyr Val Arg Glu Asp Glu Gln Ile Thr Ser Asp
 195 200 205

<210> 80

<211> 177

<212> PRT

<213> Artificial Sequence

<220>

<223> Jungle Chaperone

<400> 80

Met Met His Leu Lys Asn Ile Thr Ala Gly Asn Pro Lys Thr Lys Glu
1 5 10 15

Gln Tyr Gln Leu Thr Lys Gln Phe Asn Ile Lys Trp Leu Tyr Thr Glu
20 25 30

Asp Gly Lys Asn Trp Tyr Glu Glu Gln Lys Asn Phe Gln Pro Asp Thr
35 40 45

Leu Lys Met Val Tyr Asp His Asn Gly Val Ile Ile Cys Ile Glu Lys
50 55 60

Asp Val Ser Ala Ile Asn Pro Glu Gly Ala Asn Val Val Glu Val Pro
65 70 75 80

Asp Ile Thr Ala Asn Arg Arg Ala Asp Ile Ser Gly Lys Trp Met Phe
85 90 95

Lys Asp Gly Val Val Ile Lys Arg Thr Tyr Thr Glu Glu Glu Gln Arg
100 105 110

Gln Gln Ala Glu Asn Glu Lys Gln Ser Leu Leu Gln Leu Val Arg Asp
115 120 125

Lys Thr Gln Leu Trp Asp Ser Gln Leu Arg Leu Gly Ile Ile Ser Asp
130 135 140

Glu Asn Lys Gln Lys Leu Thr Glu Trp Met Leu Tyr Ala Gln Lys Val
145 150 155 160

Glu Ser Thr Asp Thr Ser Ser Leu Pro Val Thr Phe Pro Glu Gln Pro
165 170 175

Glu

<210> 81
<211> 140
<212> PRT
<213> Artificial Sequence

<220>
<223> Mango Chaperone

<400> 81

Met Gly Tyr Val Tyr Cys His Ala Thr Gly Ala Phe Tyr Asn Asp Ala
1 5 10 15

Leu Val Ala Asp Tyr Arg Ser Ala Gly Ser Trp Pro Asp Asn Tyr Val
20 25 30

Thr Val Leu Asp Asp Asp Tyr Glu Ser Leu Met Ala Gly Gln Ala Val
35 40 45

Gly Lys Met Ile Val Ser Asp Asn Asn Gly Tyr Pro Val Leu Thr Glu
50 55 60

Pro Pro Glu Pro Thr His Glu Glu Gln Val Asn Gln Ala Ser Ser Gln
65 70 75 80

Lys Leu Phe Leu Met Lys Thr Ala Asn Glu Ile Ile Thr Pro Leu Glu
85 90 95

Asp Ala Val Glu Leu Gly Ile Ala Thr Asp Glu Glu Ala Ala Thr Leu
100 105 110

Leu Leu Trp Lys Arg Tyr Arg Val Leu Leu Asn Arg Leu Asp Leu Ser
115 120 125

Lys Ala Pro Asp Ile Gln Trp Pro Glu Arg Pro Ala
130 135 140

<210> 82
<211> 203
<212> PRT
<213> Artificial Sequence

<220>
<223> Maroon Chaperone

<400> 82

Met Asp Asn Ala Ile Leu Asn Ser Glu Leu Ile Ala Ile Gln Ala Gly
1 5 10 15

Asn Ile Ile Val Tyr Asn Tyr Asp Gly Gly Asn Arg Glu Tyr Ile Ser
20 25 30

Ala Ser Thr Glu Tyr Leu Ala Val Gly Val Gly Ile Pro Ala Asn Ser
35 40 45

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

Ser Glu Asp Leu Ser Ser Trp Glu Tyr Val Pro Asp His Arg Gly Glu
65 70 75 80

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

Gly Asp Tyr Pro Glu Asn Thr Thr Thr Ile Ala Pro Leu Thr Pro Tyr
100 105 110

Asp Lys Trp Asp Gly Glu Lys Trp Val Val Asp Thr Glu Ala Gln His
115 120 125

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

Thr Ala Met Asp Ser Ile Ser Leu Ile Gln Leu Lys Leu Arg Ala Gly
145 150 155 160

Arg Lys Leu Thr Gln Ala Glu Thr Thr Gln Leu Asn Ser Val Leu Asp
165 170 175

Tyr Ile Asp Glu Leu Asn Ala Met Asp Leu Thr Thr Ala Pro Asp Leu
180 185 190

Asn Trp Pro Glu Lys Gln Leu Ser Thr Ala Ser
195 200

<210> 83
<211> 177
<212> PRT
<213> Artificial Sequence

<220>
<223> Mulberry Chaperone

<400> 83

Met Met His Leu Arg Asn Ile Thr Ala Gly Asn Pro Lys Thr Lys Glu
1 5 10 15

Gln Tyr Gln Leu Thr Lys Gln Phe Asn Ile Lys Trp Leu Tyr Thr Glu
20 25 30

Asp Gly Lys Asn Trp Tyr Glu Glu Gln Lys Asn Phe Gln Tyr Asp Thr
35 40 45

Leu Lys Met Ala Tyr Asp His Asn Gly Val Ile Ile Cys Ile Glu Lys
50 55 60

Asp Val Ser Ala Ile Asn Pro Glu Gly Ala Ser Val Val Glu Leu Pro
65 70 75 80

Asp Ile Thr Ala Asn Arg Arg Ala Asp Ile Ser Gly Lys Trp Met Phe
85 90 95

Lys Asp Gly Val Val Val Lys Arg Thr Tyr Thr Glu Glu Glu Gln Arg
100 105 110

Gln Gln Ala Glu Asn Glu Lys Gln Ser Leu Leu Gln Leu Val Arg Asp
115 120 125

Lys Thr Gln Leu Trp Asp Ser Gln Leu Arg Leu Gly Ile Ile Ser Ala
130 135 140

Glu Asn Lys Gln Lys Leu Thr Glu Trp Met Leu Phe Ala Gln Lys Val
145 150 155 160

Glu Ser Thr Asp Thr Ser Ser Leu Pro Val Thr Phe Pro Glu Gln Pro
165 170 175

Glu

<210> 84
<211> 177
<212> PRT
<213> Bacteriophage P1

<220>
<221> MISC_FEATURE
<223> P1_U` Chaperone

<400> 84

Met Met His Leu Arg Asn Ile Thr Ala Gly Asn Pro Lys Thr Lys Glu
1 5 10 15

Gln Tyr Gln Leu Thr Lys Gln Phe Asn Ile Lys Trp Leu Tyr Thr Glu
20 25 30

Asp Gly Lys Asn Trp Tyr Glu Glu Gln Lys Asn Phe Gln Tyr Asp Thr
35 40 45

Leu Lys Met Ala Tyr Asp His Asn Gly Val Ile Ile Cys Ile Glu Lys
50 55 60

Asp Val Ser Ala Ile Asn Pro Glu Gly Ala Ser Val Val Glu Leu Pro

65		70		75		80									
Asp	Ile	Thr	Ala	Asn	Arg	Arg	Ala	Asp	Ile	Ser	Gly	Lys	Trp	Met	Phe
				85					90					95	
Lys	Asp	Gly	Val	Val	Val	Lys	Arg	Thr	Tyr	Thr	Glu	Glu	Glu	Gln	Arg
			100					105					110		
Gln	Gln	Ala	Glu	Asn	Glu	Lys	Gln	Ser	Leu	Leu	Gln	Leu	Val	Arg	Asp
		115					120					125			
Lys	Thr	Gln	Leu	Trp	Asp	Ser	Gln	Leu	Arg	Leu	Gly	Ile	Ile	Ser	Ala
	130					135					140				
Glu	Asn	Lys	Gln	Lys	Leu	Thr	Glu	Trp	Met	Leu	Phe	Ala	Gln	Lys	Val
145					150					155					160
Glu	Ser	Thr	Asp	Thr	Ser	Ser	Leu	Pro	Val	Thr	Phe	Pro	Glu	Gln	Pro
				165					170					175	

Glu

<210> 85
 <211> 175
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Pine Chaperone

<400> 85

Met	Gln	His	Leu	Lys	Asn	Ile	Lys	Ser	Gly	Asn	Pro	Lys	Thr	Lys	Glu
1				5					10					15	
Gln	Tyr	Gln	Leu	Thr	Lys	Asn	Phe	Asp	Val	Ile	Trp	Leu	Trp	Ser	Glu
			20					25					30		
Asp	Gly	Lys	Asn	Trp	Tyr	Glu	Glu	Val	Lys	Asn	Phe	Gln	Pro	Asp	Thr

35

40

45

Ile Lys Ile Val Tyr Asp Glu Asn Asn Ile Ile Val Ala Ile Thr Arg
 50 55 60

Asp Ala Ser Thr Leu Asn Pro Glu Gly Phe Ser Val Val Glu Val Pro
 65 70 75 80

Asp Ile Thr Ser Asn Arg Arg Ala Asp Asp Ser Gly Lys Trp Met Phe
 85 90 95

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

Gln Gln Ala Glu Ser Gln Lys Ala Ala Leu Leu Ser Glu Ala Glu Asn
 115 120 125

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

Glu Glu Arg Ala Arg Leu Glu Ser Trp Glu Arg Tyr Ser Val Leu Val
 145 150 155 160

Ser Arg Val Asp Pro Ala Asn Pro Glu Trp Pro Glu Met Pro Gln
 165 170 175

<210> 86

<211> 205

<212> PRT

<213> Artificial Sequence

<220>

<223> Plum Chaperone

<400> 86

Met Ala Phe Arg Met Ser Glu Gln Ser Arg Thr Val Lys Ile Tyr Asn
 1 5 10 15

Leu Leu Ala Gly Thr Asn Glu Phe Ile Gly Glu Gly Asp Ala Tyr Ile

20

25

30

Pro Pro His Thr Gly Leu Pro Ala Asn Ser Thr Asp Ile Ala Pro Pro
35 40 45

Glu Ile Pro Ala Gly Phe Val Ala Val Phe Asn Ser Glu Asn Glu Ser
50 55 60

Trp Asn Ile Val Glu Asp His Arg Gly Lys Thr Val Tyr Asp Val Ala
65 70 75 80

Ser Gly Asp Ala Leu Phe Ile Ser Glu Pro Gly Pro Leu Pro Glu Asn
85 90 95

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

Ser Trp Val Lys Asp Glu Glu Ala Glu Lys Leu Phe Arg Ile Arg Glu
115 120 125

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

Ala Ile Leu Gln Asp Ala Val Asn Leu Glu Ile Ala Thr Asn Glu Glu
145 150 155 160

Asn Ser Gln Leu Asp Ser Trp Arg Lys Tyr Arg Val Leu Val Ser Arg
165 170 175

Ile Asp Thr Ser Thr Ala Pro Asp Ile Val Trp Pro Glu Leu Met Asn
180 185 190

Gln Gly Tyr Val Arg Glu Asp Glu Gln Ile Thr Ser Asp
195 200 205

<210> 87

<211> 170

<212> PRT

<213> Artificial Sequence

<220>

<223> Queen Chaperone

<400> 87

Met Asn Asn Phe Lys Asn Phe Ala Pro Tyr Thr Pro Gly Glu Asp Lys
1 5 10 15

Arg Glu Leu Val Asp Ala Gly Val Leu Phe Leu Leu Asp Glu Asn Gly
20 25 30

Asn Asp Trp Tyr Glu Cys Gln Lys Leu Phe Ser Glu Cys Thr Lys Val
35 40 45

Ile Ala Tyr Asp Ser Asn Asn Ile Val Val Ser Ile Thr Asp Asp Ala
50 55 60

Ser Thr Leu Trp Pro Ile Gly Leu Ser Val Ala Glu Val Asp Ser Leu
65 70 75 80

Pro Glu Asp Val Asp Ile Asn Gly Gly Trp Val Phe Arg Asp Asn Ser
85 90 95

Val Val Lys Arg Ile Tyr Ser Asp Thr Glu Leu Gln Gln Gln Ala Glu
100 105 110

Ser Lys Lys Ala Ala Leu Leu Ser His Ala Glu Ser Val Ile Val Thr
115 120 125

Leu Glu Arg Ala Val Lys Leu Asn Met Ala Thr Asp Glu Glu Arg Ala
130 135 140

Lys Leu Glu Ala Trp Glu Arg Tyr Ser Val Leu Val Tyr Arg Val Asp
145 150 155 160

Thr Ala Lys Pro Glu Trp Pro Glu Glu Pro
165 170

<210> 88
<211> 93
<212> PRT
<213> Artificial Sequence

<220>
<223> Razzmatazz Chaperone A

<400> 88

Met Met His Leu Lys Asn Ile Thr Ala Gly Asn Pro Lys Thr Lys Glu
1 5 10 15

Gln Tyr Gln Leu Thr Lys Gln Phe Asn Ile Lys Trp Leu Tyr Thr Glu
20 25 30

Asp Gly Lys Asn Trp Tyr Glu Glu Gln Lys Asn Phe Gln Pro Asp Thr
35 40 45

Leu Lys Met Val Tyr Asp His Asn Asp Val Ile Ile Cys Ile Glu Lys
50 55 60

Asp Val Ser Ala Ile Asn Pro Glu Gly Ala Ser Val Val Glu Val Pro
65 70 75 80

Asp Ile Thr Ala Asn Arg Arg Ala Asp Ile Ser Gly Lys
85 90

<210> 89
<211> 83
<212> PRT
<213> Artificial Sequence

<220>
<223> Razzmatazz Chaperone B

<400> 89

Met Phe Lys Asp Gly Val Val Ile Lys Arg Thr Tyr Thr Glu Glu Glu
1 5 10 15

Gln Arg Gln Gln Ala Glu Asn Glu Lys Gln Ser Leu Leu Gln Leu Val

20

25

30

Arg Asp Lys Thr Gln Leu Trp Asp Ser Gln Leu Arg Leu Gly Ile Ile
 35 40 45

Ser Asp Glu Asn Lys Gln Lys Leu Thr Glu Trp Met Leu Tyr Ala Gln
 50 55 60

Lys Val Glu Ser Thr Asp Thr Ser Ser Leu Pro Val Thr Phe Pro Glu
 65 70 75 80

Gln Pro Glu

<210> 90

<211> 176

<212> PRT

<213> Artificial Sequence

<220>

<223> Salmon Chaperone

<400> 90

Met Met Gln His Leu Lys Asn Ile Lys Ser Gly Asn Pro Lys Thr Lys
 1 5 10 15

Glu Gln Tyr Gln Leu Thr Lys Asn Phe Asp Val Ile Trp Leu Trp Ser
 20 25 30

Glu Asp Asp Lys Asn Trp Tyr Glu Glu Val Lys Asn Phe Gln Pro Asp
 35 40 45

Thr Ile Lys Ile Val Tyr Asp Ala Asn Asn Ile Ile Val Ala Ile Thr
 50 55 60

Lys Asp Ala Ser Thr Leu Asn Pro Glu Gly Phe Ser Val Val Glu Val
 65 70 75 80

Pro Asp Ile Thr Ala Asn Arg Arg Ala Asp Asp Ser Gly Lys Trp Met

85

90

95

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

Gln Gln Gln Ala Glu Ser Gln Lys Ala Ala Leu Leu Ser Glu Ala Glu
 115 120 125

Ser Val Ile Gln Pro Leu Glu Arg Ala Val Arg Leu Asn Met Ala Thr
 130 135 140

Asp Glu Glu Arg Thr Arg Leu Glu Ala Trp Glu Arg Tyr Ser Val Leu
 145 150 155 160

Val Ser Arg Val Asp Thr Ala Asn Pro Glu Trp Pro Gln Lys Pro Glu
 165 170 175

<210> 91
 <211> 203
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Scarlet Chaperone

<400> 91

Met Asp Asn Ala Ile Leu Asn Ser Glu Leu Ile Ala Ile Gln Ala Gly
 1 5 10 15

Asn Ile Ile Val Tyr Asn Tyr Asp Gly Gly Asn Arg Glu Tyr Ile Ser
 20 25 30

Ala Ser Thr Glu Tyr Leu Ala Val Gly Val Gly Ile Pro Ala Asn Ser
 35 40 45

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

Ser Glu Asp Leu Ser Ser Trp Glu Tyr Val Pro Asp His Arg Gly Glu

65		70		75		80
Thr Val Tyr Ser	Ile Asp Thr Gly Asn Pro Glu Glu Ile Thr Val Leu					
	85		90			95
Gly Asp Tyr Pro	Glu Asn Thr Thr Thr Ile Ala Pro Leu Thr Pro Tyr					
	100		105			110
Asp Lys Trp Asp	Gly Glu Lys Trp Val Val Asp Thr Glu Ala Gln His					
	115		120			125
Ser Ala Ala Val	Glu Ala Ala Glu Thr Lys Arg Gln Ser Leu Ile Asp					
	130		135			140
Thr Ala Met Asp	Ser Ile Ser Leu Ile Gln Leu Lys Leu Arg Ala Gly					
	145		150		155	160
Arg Lys Leu Thr	Gln Ala Glu Thr Thr Gln Leu Asn Ser Val Leu Asp					
	165		170			175
Tyr Ile Asp Glu	Leu Asn Ala Met Asp Leu Thr Thr Ala Pro Asp Leu					
	180		185			190
Asn Trp Pro Glu	Lys Gln Leu Ser Thr Ala Ser					
	195		200			

<210> 92
 <211> 175
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Shamrock Chaperone

<400> 92

Met Met His Leu	Lys Asn Ile Lys Ala Gly Asn Ala Lys Thr Leu Glu
1	5 10 15

Gln Tyr Glu Leu Thr Lys Lys His Gly Val Ile Trp Leu Tyr Ala Glu

20

25

30

Asp Gly Lys Asn Trp Tyr Glu Glu Val Lys Asn Phe Gln Pro Asp Thr
 35 40 45

Ile Lys Ile Val Tyr Asp Glu Asn Asn Ile Ile Val Ala Val Thr Lys
 50 55 60

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

Asp Ile Thr Ala Asn Arg Arg Ala Asp Asp Ser Gly Lys Trp Met Phe
 85 90 95

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

Gln Gln Ala Glu Ser Gln Lys Ala Ala Leu Leu Ser Glu Ala Glu Ser
 115 120 125

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

Glu Glu His Ala Arg Leu Glu Ser Trp Glu Arg Tyr Ser Val Leu Val
 145 150 155 160

Ser Arg Val Asp Thr Ala Asn Pro Glu Trp Pro Gln Lys Pro Glu
 165 170 175

<210> 93

<211> 203

<212> PRT

<213> Artificial Sequence

<220>

<223> Sunset Chaperone

<400> 93

Met Asp Asn Ala Ile Leu Asn Ser Glu Leu Ile Ala Ile Gln Ala Gly

1	5	10	15
Asn Ile Ile Val Tyr Asn Tyr Asp Gly Gly Asn Arg Glu Tyr Ile Ser	20	25	30
Ala Ser Thr Glu Tyr Leu Ala Val Gly Val Gly Ile Pro Ala Asn Ser	35	40	45
Cys Leu Asp Ala Pro Gly Ser His Lys Ala Gly Tyr Ala Ile Leu Arg	50	55	60
Ser Glu Asp Leu Ser Ser Trp Glu Tyr Val Pro Asp His Arg Gly Glu	65	70	75
Thr Val Tyr Ser Ile Asp Thr Gly Asn Pro Glu Glu Ile Thr Val Leu	85	90	95
Gly Asp Tyr Pro Glu Asn Thr Thr Thr Ile Ala Pro Leu Thr Pro Tyr	100	105	110
Asp Lys Trp Asp Gly Glu Lys Trp Val Val Asp Thr Glu Ala Gln His	115	120	125
Ser Ala Ala Val Glu Ala Ala Glu Thr Lys Arg Gln Ser Leu Ile Asp	130	135	140
Thr Ala Met Asp Ser Ile Ser Leu Ile Gln Leu Lys Leu Arg Ala Gly	145	150	155
Arg Lys Leu Thr Gln Ala Glu Thr Thr Gln Leu Asn Ser Val Leu Asp	165	170	175
Tyr Ile Asp Glu Leu Asn Ala Met Asp Leu Thr Thr Ala Pro Asp Leu	180	185	190
Asn Trp Pro Glu Lys Gln Leu Ser Thr Ala Ser	195	200	

<210> 94
<211> 203
<212> PRT
<213> Artificial Sequence

<220>
<223> Tangerine Chaperone

<400> 94

Met Asp Asn Ala Ile Leu Asn Ser Glu Leu Ile Ala Ile Gln Ala Gly
1 5 10 15

Asn Ile Ile Val Tyr Asn Tyr Asp Gly Gly Asn Arg Glu Tyr Ile Ser
20 25 30

Ala Ser Thr Glu Tyr Leu Ala Val Gly Val Gly Ile Pro Ala Asn Ser
35 40 45

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

Ser Glu Asp Leu Ser Ser Trp Glu Tyr Val Pro Asp His Arg Gly Glu
65 70 75 80

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

Gly Asp Tyr Pro Glu Asn Thr Thr Thr Ile Ala Pro Leu Thr Pro Tyr
100 105 110

Asp Lys Trp Asp Gly Glu Lys Trp Val Val Asp Thr Glu Ala Gln His
115 120 125

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

Thr Ala Met Asp Ser Ile Ser Leu Ile Gln Leu Lys Leu Arg Ala Gly
145 150 155 160

Arg Lys Leu Thr Gln Ala Glu Thr Thr Gln Leu Asn Ser Val Leu Asp
165 170 175

Tyr Ile Asp Glu Leu Asn Ala Met Asp Leu Thr Thr Ala Pro Asp Leu
180 185 190

Asn Trp Pro Glu Lys Gln Leu Ser Thr Ala Ser
195 200

<210> 95
<211> 175
<212> PRT
<213> Artificial Sequence

<220>
<223> Thistle Chaperone

<400> 95

Met Gln His Leu Lys Asn Ile Arg Ser Gly Asn Pro Lys Thr Lys Glu
1 5 10 15

Gln Tyr Gln Leu Thr Lys Asn Phe Asp Val Ile Trp Leu Trp Ser Glu
20 25 30

Asp Gly Lys Asn Trp Tyr Glu Glu Val Lys Asn Phe Gln Pro Asp Thr
35 40 45

Ile Lys Ile Val Tyr Asp Glu Asn Asn Ile Ile Val Ala Ile Thr Lys
50 55 60

Asp Ala Ser Thr Leu Asn Pro Glu Gly Phe Ser Val Val Glu Val Pro
65 70 75 80

Asp Ile Thr Ala Asn Arg Arg Ala Asp Asp Ser Gly Lys Trp Met Phe
85 90 95

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

Gln Gln Ala Glu Ser Gln Lys Ala Ala Leu Leu Ser Glu Ala Glu Ser
115 120 125

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

Glu Glu Arg Thr Arg Leu Glu Ala Trp Glu Arg Tyr Ser Val Leu Val
145 150 155 160

Ser Arg Val Asp Thr Ala Asn Pro Glu Trp Pro Gln Lys Pro Glu
165 170 175

<210> 96
<211> 177
<212> PRT
<213> Artificial Sequence

<220>
<223> Violet Chaperone

<400> 96

Met Met His Leu Lys Asn Ile Thr Ala Gly Asn Pro Lys Thr Lys Glu
1 5 10 15

Gln Tyr Gln Leu Thr Lys Gln Phe Asn Ile Lys Trp Leu Tyr Thr Glu
20 25 30

Asp Gly Lys Asn Trp Tyr Glu Glu Gln Lys Asn Phe Gln Pro Asp Thr
35 40 45

Leu Lys Met Val Tyr Asp His Asn Asp Val Ile Ile Cys Ile Glu Lys
50 55 60

Asp Val Ser Ala Ile Asn Pro Glu Gly Ala Ser Val Val Glu Val Pro
65 70 75 80

Asp Ile Thr Ala Asn Arg Arg Ala Asp Ile Ser Gly Lys Trp Met Phe
85 90 95

Lys Asp Gly Val Val Ile Lys Arg Thr Tyr Thr Glu Glu Glu Gln Arg
100 105 110

Gln Gln Ala Glu Asn Glu Lys Gln Ser Leu Leu Gln Leu Val Arg Asp
115 120 125

Lys Thr Gln Leu Trp Asp Ser Gln Leu Arg Leu Gly Ile Ile Ser Asp
130 135 140

Glu Asn Lys Gln Lys Leu Thr Glu Trp Met Leu Tyr Ala Gln Lys Val
145 150 155 160

Glu Ser Thr Asp Thr Ser Ser Leu Pro Val Thr Phe Pro Glu Gln Pro
165 170 175

Glu

<210> 97
<211> 4494
<212> DNA
<213> Artificial Sequence

<220>
<223> P1 Bald Chassis Tail Fiber Region

<400> 97
taatcacccc gtccgcaggg cggggtgaca agttacttat cttacaatga ggcttcacaa 60
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gactattact atcagcggcg cgctgaatcg tccattaaca aaggctctcg atttttaatc 180
agcaaggccg ttttcggtac cagttcgctg gttactaaga aaggagatgg cacttatgag 240
attggagaac tgccaaaggc tttcgaactg gcagaactga ccagtcaatt ttgcaccatc 300
aacctcgtcc caacctactc aggcgggata attactgtcc gaatggacct tgatcaaagc 360
cagttgcagg aagggaacaa ctaccattc aacactctgg ttgttctgga taacgagaac 420
aagccaatcg ccattatttg tgtccaggaa gactcgctgt atgtgggcaa aacatatacc 480

gcagttatgg ccataaacac gactacagca taaggatatg cttgcggaat ctgtgggtaa	540
ctttgtatgt gtccgcagcg cccgccgcag tctcacgccc ggagcgtagc gaccgagtga	600
gctagctatt tgtttatfff tctaaataca ttcaaatatg tatccgctca tgagacaata	660
accctgataa atgcttcaat aatattgaaa aaggaagagt atgagggaag cgggtgatcgc	720
cgaagtatcg actcaactat cagaggtagt tggcgctcatc gagcgccatc tcgaaccgac	780
gttgctggcc gtacatttgt acggctccgc agtggatggc ggcctgaagc cacacagtga	840
tattgatttg ctggttacgg tgaccgtaag gcttgatgaa acaacgcggc gagctttgat	900
caacgacctt ttggaaactt cggcttcccc tggagagagc gagattctcc gcgctgtaga	960
agtcaccatt gttgtgcacg acgacatcat tccgtggcgt tatccagcta agcgcgaact	1020
gcaatttgga gaatggcagc gcaatgacat tcttgcaggc atcttcgagc cagccacgat	1080
cgacattgat ctggctatct tgctgacaaa agcaagagaa catagcgttg ccttggtagg	1140
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tgaaacctta acgctatgga actcgccgcc cgactgggct ggcgatgagc gaaatgtagt	1260
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cgctacagtg ttctggtcag ccgtgtggat acggcaaatac ctgaatggcc aaaaaagcct	1620
gaataaaaaat taaggcccg c tatcgggcct tgtctcattc aggttggtcg ggaaatgtta	1680
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ttttatccct gacgagctgt agcagacttt gcttttcatt ttccgcttgt tgcctctgct	1860
cttcctcggg ataagttcgc ttaccacta cgccatcttt gaacatccat ttaccagaaa	1920
tatcagcccc gcgatttgct gtaatatcag gtaattcaac gacgcttgcg ccttctggat	1980

taattgctga aacatccttt tcaatacaaa taataacgcc gttgtggtca taggccat	2040
tcaacgtatc atactggaaa ttcttttggt cctcatacca gttttttcca tcctctgtat	2100
aaagccat	2160
cagctgtaat atttcttaag tgcatacataa ttaaataactc cccgcgttat accacgtccc	2220
attaatgcaa tactgaattg gccttgccctg tgttgatca attaattcat cacggttccc	2280
gttaactgaa cccgtaacga cataacctga cctgtcagac cagccggggc cattccatgt	2340
ctggacagat gacagaccgc ccaggcgaat acctgtaata aaccttgagt tacattctgc	2400
ctgcgtatat gcaccaacat ccccgacaga gggtttgagg gttgtggtgt aaaactctga	2460
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taatgttgat gcgcctttta ggtctgcac ataaacaccg ctattccagt tccagccaac	2640
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gaattgagcg ttagtgattc cgccaccgct ggaagtgcct ggtgttggtta cacggatggt	2820
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gccagtatcg gttataattt tattattgcc gtacgaccat gaacatttgc acatccagta	2940
tgggtgattg aatgccccct gagaatccag ccattcaatc aattgtgccg ttgtccagtt	3000
ccctgcacct gtactaatag aactgtgaaa agcgcgacat gcaccaatat tttttgtgaa	3060
ggtatctttt ccaggaatat ccgcgccgtt ctgatttttc tgcaatgacc cagcggctaa	3120
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ctgcgccccat tcagaccagt tggcagaatc agtatccgc gcggaacgga tatgtacggg	3360
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atacagctga atccccggatg ttccctgtgc attcgctcc agggccgtta cgcgaccgcg	3540
cgataccaga gtattgatat taatgtcacc agaaccatcg aacctgacgc cattaatgtt	3600
tctggctgtt ttcaatttcg ttgcggtatc ggcgttccct gtcagcgccc cggatgaccc	3660
gccgttgaaa gtctggcgtg cactccatgt gttagccgtg ctcaacaggg ggatcttttc	3720
accgctggta ccgagttctc ttaaaccaag gtttaggatt gaaatgatga cgccggaaac	3780
ttcttataaa gcgtggaaac agccacatca tagatgattg caacctgctt acgggggatg	3840
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ccacctatac gaccttctgc gcgagctgca tcaagtccag cgcgtgtacg ttcaacgata	3960
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tccaccagca caactaagtg acgcatgctg cgccaagac ggtctaactt ccatacgacc	4140
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ttgccgctcg cttgtcctc aaaaattagc tcacatcctg cgctttcaag agcgtttcgt	4260
tgtaaagcag tgttttgttc atttgttgat acgcgtacat agcctattag catattttct	4320
gctcactatc gttatttata gcaagctgcg gattttaatt aacaaaaacc agtatgtgtg	4380
gaaatcacia agtacatacc gtttcccaat gatatttaat tcactattaa ggaaatagtt	4440
atgtgtgatt tcacaataat gtcctctcc atccttggcg gggatgcattc gttt	4494

<210> 98
 <211> 1950
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Rio Tail Fiber S gene

<400> 98	
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gtggccgatg tgcaatacca cgaaccatat ctgtcagccg cgctaaaccg aaaattcagg	120
gggattgttg acccgggatt ttatgccggt ttcttaccta agcctggcgg tgggatgaac	180

ctgttaatta cctcagtgga tgggtgataaa accgcaggcg cggcgtcggg ggatattggg	240
gaattttacc aggtaactat tcagcaacgt aaggatattt ctcttgact tagtgcaggc	300
aagaaatatg caattgtgct gaagggaaga tacctccttg gagaagatac ctaccagggtg	360
aataccgcgt cacatattca tgcggctgaa tttgttgcca gaacctatac cgattcatat	420
cagttaggag atggggagct gcttgtttgt acggtgaata tccctgctag tgtatctgcc	480
attacccagg agatgattga tacatccgag cgtatcaacc gtcgatcgg cattgatatt	540
tcagactctg taaccagtac cagaagtgat gttgctgcaa gttcgctggc agttaaaaaa	600
gcctacgatc tggcgaaaag caagtatacg gcacaggatg caacaacaac agtaaaaggc	660
tttacaaagt taaataatca ggtgggtgac agtgaaaata ccgcattaac tccttacggc	720
gctaaaaaag aattagaaaa ctatcaaccc aaaggcaatt atcaaccgc tggtattat	780
gtcactactg cgacatttaa tttagaaatc aataaaaaaa tagataaagc aagtctctca	840
cagcaacttg gtaatgatgt aaataaagta cctagtttag atttggtgac taaagagcta	900
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aacaaatggc ataaagcaat taattatatc ggtattacag gtactgataa tgacggtggt	1860
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<210> 99
 <211> 621
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Rio Tail Fiber U gene

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accatggaaa atgtcatgtt tgatgtttca ttatctgcgg gtgcttattt agatgaacca	180
ccattacccc aaaaagaaaa tcaagccggt agacgtagag aagatggtag tgcatgggag	240
attgttgacg attgccgagg tttaaccgcc tacaatacgc aaacaaagca acctatcatc	300
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gataaatggg atggtaagaa ctggattggt gacacagaag cccaaaaagc ggcactcatt	420
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ttgcaagaag ctgttgatgt tgacttagcc acagaagaag aggctacagc actgcaaaaa	540
tggaaaaaat accgagttct gttaaatacgt gttgatattt caacggcgcc agatatcgaa	600
tggccggaga aaccgcaatg a	621

<210> 100
 <211> 1746
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Limon Tail Fiber S gene

<400> 100

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gaattttacc aggtaactat tcagcaacgt aaggatattt ctcttgact tagtgcaggc	300
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cagttaggag atggggagct gcttgtttgt acggtgaata tccctgctag tgtatctgcc	480
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gtccaaaata ttgacctgac agcacctgct gaagttggat ttcgtgatgg gtgggggtat	1620
ccacgaggga cagatggcgc agccatgtac aactttaata tggttggtgg tagcagtaac	1680
gttggttaatt ttatcattcg ttatatgcgg aaacaggtga ataacacctg gtatgtgatt	1740
aattaa	1746

<210> 101
 <211> 534
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Limon Tail Fiber U gene

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attgaattat ttgatgaatc aaaaacgctg aaaattggat atgacgatga tggtcgtgta	180
agaacgttca cgacaaatat tcatgcgctt ttcccggtca atctgagtgt tgtcgagctt	240
ccggccacaa aagctaattt gcgcgtcacg ctgggtgatg actggtttta taaagacggc	300
aaattacagc aaatccgcaa ttacctggct gacgctgaag cggaacgtgg caaccgtatg	360
gcggagggtta caacgcgtat tgactggctg gaggatgcgc aaaaagacgg tgatatttca	420
tcctatgagg aaacagaact ggcaacacta cgcgcttacc gcactgcttt gcgccgtctg	480
gatctgagca cagcgccaga tattaactgg ccggaggtgc ctgatgtggc gtga	534

<210> 102
 <211> 3210
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Orchid Tail Fiber S gene

<400> 102

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gggattgttg acccgggatt ttatgccggt ttcttaccta agcctggcgg tgggatgaac	180
ctgttaatta cctcagtgga tggtgataaa accgcaggcg cggcgtcggg ggatattggt	240
gaattttacc aggtaactat tcagcaacgt aaggatattt ctcttgcact tagtgcaggc	300
aagaaatatg caattgtgct gaagggaaga tacctccttg gagaagatac ctaccagggtg	360
aataccgcgt cacatattca tgcggctgaa tttgttgcca gaacctatac cgattcatat	420
cagttaggag atggggagct gcttgtttgt acggtgaata tccctgctag tgtatctgcc	480
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tcagactctg taaccagtac cagaagtgat gttgctgcaa gttcgctggc agttaaaaaa	600
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ttagttcagc tcagtagcgc aactaacagc gacagcgaaa caatggcggc taccctaata	720
gctgttaagt ctataaaaaga tctggctgat accaaagcgc caatagaaaag cccgagtctg	780
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ggcacatggg ataacgtagc acaggtgtaa	3210

<210> 103
 <211> 528
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Orchid Tail Fiber U gene

<400> 103	
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gtaaataact ttcaggacga caccataaag attgtatacg acgaaaataa tattattggt	180
gccataacca aagatgcctc aacgcttaat cccgaaggct ttagtgctgt tgagattcca	240
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gcattgcttt ccgaagctga atcagtcac cagccgctgg aacgcgctgt caggttgaat	420
atggcaacag acgaggaacg cacacgactg gaagcatggg aacgctacag tgttctggtc	480
agccgtgtgg atacggcaaa tcctgaatgg ccacaaaagc ctgaataa	528

<210> 104
 <211> 2016
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Gold Tail Fiber S gene

<400> 104	
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attggtggca attgggttac cgtctggagc gtataa	2016

<210> 105
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 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Gold Tail Fiber U gene

<400> 105	
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ccgcaaccac cgcaataa	558

<210> 106
 <211> 2760
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Bluetiful Tail Fiber S gene

<400> 106

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gggattgttg acccgggatt ttatgccgtt ttcttaccta agcctggcgg tgggatgaac	180
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acgcgcgcgc ctttttacca gactgatttt cagtgggaag caaacagcgg cgcgatttat	2280
gtgccactgg tgaaaggtaa atcgacgcgt aagggcaagg gctggccgac cgcagttagc	2340
tacggctatt tgatgccggg cgagaatatg catgctcatc ccgttattca tgcgcttggt	2400
gatggagtgg aaagtatttg gcagtttaat acccaaactg gcggcattat tagtgggaaa	2460
atgggcgagt tcgcgagtca ggcatgggtt aacaatgggt tgaatggtcg gggtgactgg	2520
ccctccttta atcagcatgt gggcgccaga gcgacaattg actgggttaa tcagaacttt	2580
attcaaaatg tcagatacag cgcggaaatg catgtcggcg cgaccgggat ttatacctat	2640
cacgataata ccgtactaac cggtttcaat aacaaagacg gcgattactc tgctgaggaa	2700
ctgttttga gctacatcca aatttataaa aatggtcagt ggatcacagt aggacgataa	2760

<210> 107

<211> 546

<212> DNA

<213> Artificial Sequence

<220>

<223> Bluetiful Tail Fiber U gene

<400> 107

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gtgaagaata ttaaaaactt tcagctcggc gagccaaaaa caccggagca attaaaatta      60
cgcaatcagc ataatgccat gttccttttc tctgacgatg gtaaggagtg gtatcactgc      120
cagaaaagatt ttgcggccga tacgataaaa gttgcctacg atgaaaaagg tattatccgc      180
agcattgccg ccaacaacga tatttctacg ttgtggcctg tcgggctaag cgtcgcggaa      240
gtggcaaaca caaccgcaa tcgccgggcc gatatttcag gcggttgggt atttgatggg      300
aaagccattg ttaaacgcag ttattcgctt gacgaatatc aggaacaagc gaaaaaggaa      360
caggttgccc gcattgcggc ggtggcgcgg catatcgcgc cattacagga tgctgttgat      420
ttggacatgg cgaccgagga agaaaaagcg ctgttggcgg actggaaaaa ataccgtgtg      480
atgctgaatc gtctggatat gtcgtcggcc ccgatattg actggccagt ggcgcccagt      540
gcctaa                                          546
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<210> 108

<211> 649

<212> PRT

<213> Artificial Sequence

<220>

<223> Rio Tail Fiber (S)

<400> 108

```
Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Ser Glu
1           5           10          15
```

```
Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
20          25          30
```

```
Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
35          40          45
```

```
Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
```


50

55

60

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

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

Leu Ser Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Ser Val Ser Ala
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Ser Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Tyr Thr Ala Gln Asp Ala Thr Thr Thr Val Lys Gly Phe Thr Lys Leu
210 215 220

Asn Asn Gln Val Gly Asp Ser Glu Asn Thr Ala Leu Thr Pro Tyr Gly
225 230 235 240

Ala Lys Lys Glu Leu Glu Asn Tyr Gln Pro Lys Gly Asn Tyr Gln Pro
245 250 255

Ala Gly Asn Tyr Val Thr Thr Ala Thr Phe Asn Leu Glu Ile Asn Lys
260 265 270

Lys Ile Asp Lys Ala Ser Leu Ser Gln Gln Leu Gly Asn Asp Val Asn
275 280 285

Lys Val Pro Ser Leu Asp Leu Val Thr Lys Glu Leu Gly Asn Lys Gln
290 295 300

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

Lys Arg Asp Asp Ser Pro Ser Phe Asn Glu Ile Ser Ala Thr Ala Ile
325 330 335

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

Ser Glu Ser Asp Asn Lys Tyr Ser Pro Lys Leu Pro Phe Val Tyr Ser
355 360 365

Ser Gly Glu Glu Ser Lys Ile Ile Ser Pro Asn Asn Lys Ile Leu Ile
370 375 380

Phe Val Asn Asp Asn Gly Thr Thr Gly Gly Tyr Asp Arg Asp Thr Gln
385 390 395 400

Ala Thr Val Trp Gly Phe Asp Lys Arg Gly Phe Met Thr Arg Gly Thr
405 410 415

Val His Phe Asp Arg Met Ser Gly Val Tyr Ser Gln Ser Gln Val Asp
420 425 430

Ala Lys Leu Lys Glu Cys Leu Asn Leu Lys Thr Ser Ser Lys Gln Phe
435 440 445

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

450

455

460

Gly Glu Arg Ser Tyr Leu Glu His Lys Ser Asp Glu Leu Thr Ile Thr
 465 470 475 480

His Ile Ser Pro Lys Ser Gly Ala Thr Asn Ile Thr Cys Arg Asn Lys
 485 490 495

Ser Gly Thr Leu Ala Leu Leu Gly Asp Leu Glu Asp Val Asn Asn Ile
 500 505 510

Pro Val Gly Ser Pro Ile Pro Trp Ser Leu Ala Thr Ala Pro Ser Gly
 515 520 525

Tyr Leu Ile Cys Asn Gly Gln Thr Phe Asn Lys Ser Thr Tyr Pro Lys
 530 535 540

Leu Ala Val Ala Tyr Pro Ser Gly Lys Leu Pro Asp Leu Arg Gly Glu
 545 550 555 560

Phe Ile Arg Gly Leu Asp Ser Gly Arg Gly Ile Asp Ala Gly Arg Ser
 565 570 575

Val Leu Ser Val Gln Lys Gly Asn Ser Leu Leu Ser Ser Asn Ile Phe
 580 585 590

Gly Gly Leu Ser Ser Ser Glu Ser Asn Lys Trp His Lys Ala Ile Asn
 595 600 605

Tyr Ile Gly Ile Thr Gly Thr Asp Asn Asp Gly Gly Tyr Gly Val His
 610 615 620

Gln Gln Ile Glu Gly Ala Asn Gly Asn Glu Thr Arg Pro Arg Asn Ile
 625 630 635 640

Ala Phe Leu Tyr Ile Val Arg Ala Ala
 645

<210> 109
<211> 581
<212> PRT
<213> Artificial Sequence

<220>
<223> Limon Tail Fiber (S)

<400> 109

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Ser Glu
1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
50 55 60

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

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

Leu Ser Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Ser Val Ser Ala
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Ser Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Tyr Thr Ala Gln Asp Ala Thr Thr Ala Arg Lys Gly Ile Val Gln Leu
210 215 220

Ser Ser Ala Thr Asp Ser Thr Ser Glu Glu Leu Ala Ala Thr Leu Lys
225 230 235 240

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

Arg Asn Gly Gly Asp Val Pro Asn Lys Pro Leu Phe Ile Gln Asn Ile
260 265 270

Gly Leu Gln Glu Thr Val Asn Lys Ala Ala Gly Ala Val Gln Arg Ser
275 280 285

Glu Val Gln Thr Ser Gln Asp Asp Ile Thr Ala Gly Lys Leu Leu Val
290 295 300

Asn Gly Ser Ala Ile Ala Val Arg Gly Ile Arg Ala Ile Asn Gly Gly
305 310 315 320

Gln Val Asp Asp Ala Asn Asn Leu Pro Val Asn Ala Val Ser Phe Val
325 330 335

Tyr Gly Asp Ala Lys Asn Ser Pro Ser Gly Asn Thr Gly Thr Ile Leu
340 345 350

Asp Val Ser Gly Leu Gly Ser Gly Tyr Ser Ile Gln Leu Phe Ala Asn

355

360

365

Tyr Ser Thr Gly Glu Ile Leu Ala Phe Arg Ala Arg Asn Gly Asp Asn
 370 375 380

Arg Thr Trp Asn Lys Trp Asn Tyr Val Phe His Thr Gly Asn Lys Pro
 385 390 395 400

Thr Ser Thr Asp Val Gly Ala Leu Pro Ile Thr Gly Gly Asp Leu Lys
 405 410 415

Gly Gln Leu Ser Phe Ser Phe Ser Gln Pro Arg Asn Gly Ala Asn His
 420 425 430

Leu Ile Tyr Asn Gly Asp Asp Asn Gly Val Leu Ala Cys Gly Tyr Gly
 435 440 445

Tyr Tyr Gln Asp Arg Phe Asp Ile His Phe Tyr Asp Ile Lys Gly Ala
 450 455 460

Trp Glu Ser Asn Pro Leu Thr Ile Gly Arg Asn Gly Asn Thr Thr Val
 465 470 475 480

Ser Gly Asn Leu Ser Gly Arg Ala Val Tyr Glu Gly Asn Thr Arg Val
 485 490 495

Tyr Ser Pro Asn Asn Pro Gln Pro Val Ser Phe Glu Gly Tyr Ala Thr
 500 505 510

Gln Ser Trp Val Leu Gln Asn Phe Val Gln Asn Ile Asp Leu Thr Ala
 515 520 525

Pro Ala Glu Val Gly Phe Arg Asp Gly Trp Gly Tyr Pro Arg Gly Thr
 530 535 540

Asp Gly Ala Ala Met Tyr Asn Phe Asn Met Val Gly Gly Ser Ser Asn
 545 550 555 560

Val Gly Asn Phe Ile Ile Arg Tyr Met Arg Lys Gln Val Asn Asn Thr
565 570 575

Trp Tyr Val Ile Asn
580

<210> 110
<211> 1069
<212> PRT
<213> Artificial Sequence

<220>
<223> Orchid Tail Fiber (S)

<400> 110

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Ser Glu
1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
50 55 60

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

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

Leu Ser Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Ser Val Ser Ala
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Ser Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
195 200 205

Tyr Thr Ala Gln Asp Ala Ser Thr Thr Gln Lys Gly Leu Val Gln Leu
210 215 220

Ser Ser Ala Thr Asn Ser Asp Ser Glu Thr Met Ala Ala Thr Pro Lys
225 230 235 240

Ala Val Lys Ser Ile Lys Asp Leu Ala Asp Thr Lys Ala Pro Ile Glu
245 250 255

Ser Pro Ser Leu Thr Gly Thr Pro Thr Ala Pro Thr Ala Ala Gln Gly
260 265 270

Thr Asn Ser Thr Gln Ile Ala Asn Thr Ala Phe Val Lys Ala Ala Ile
275 280 285

Thr Ala Leu Ile Asn Gly Ala Pro Gly Thr Leu Asp Thr Leu Lys Glu
290 295 300

Ile Ala Ala Ala Ile Asn Asn Asp Pro Asn Tyr Ser Thr Thr Ile Asn
305 310 315 320

Asn Ala Leu Ala Leu Lys Ala Pro Leu Ala Ser Pro Ala Leu Thr Gly

325

330

335

Val Pro Thr Ala Pro Thr Ala Ala Gln Gly Thr Asn Asn Thr Gln Ile
 340 345 350

Ala Thr Thr Ala Tyr Val Arg Ala Ala Ile Ser Ala Leu Val Gly Ser
 355 360 365

Ser Pro Glu Ala Leu Asp Thr Leu Tyr Glu Leu Ala Ala Ala Leu Gly
 370 375 380

Asn Asp Pro Asn Phe Ala Thr Thr Met Thr Asn Ala Leu Ala Gly Lys
 385 390 395 400

Gln Pro Leu Asp Ala Thr Leu Thr Ala Leu Ala Gly Leu Ala Thr Gly
 405 410 415

Ala Asn Lys Leu Pro Tyr Phe Thr Gly Thr Asp Thr Val Ser Gln Thr
 420 425 430

Asp Leu Thr Ser Val Gly Arg Asp Ile Leu Ala Lys Thr Ser Ile Leu
 435 440 445

Ala Val Ile Gln Tyr Leu Gly Leu Arg Glu Leu Gly Thr Ser Gly Glu
 450 455 460

Lys Ile Pro Leu Leu Ser Thr Ala Asn Thr Trp Ser Ala Arg Gln Thr
 465 470 475 480

Phe Asn Gly Gly Ile Thr Gly Ala Leu Thr Gly Asn Ala Asp Thr Ala
 485 490 495

Thr Lys Leu Lys Thr Ala Ala Arg Ser Ile Gly Gly Val Ala Phe Asp
 500 505 510

Gly Ser Ala Asn Ile Asn Leu Pro Gly Val Asn Thr Thr Gly Asn Gln
 515 520 525

Asn Thr Thr Gly Asn Ala Ala Thr Ala Thr Lys Leu Ala Thr Ala Arg
530 535 540

Asn Ile Asn Gly Val Lys Phe Asp Gly Ser Val Asp Ile Ser Ile Pro
545 550 555 560

Thr Ile Thr Ser Arg Gly Arg Val Thr Ala Leu Thr Gly Thr Thr Gln
565 570 575

Gly Ala Ala Thr Gly Leu Gln Met Tyr Glu Ala Tyr Asn Asn Gly Tyr
580 585 590

Pro Ser Ala Tyr Gly Asn Val Leu His Leu Lys Gly Ala Thr Ala Val
595 600 605

Gly Glu Gly Glu Leu Phe Ile Gly Trp Ser Gly Thr Ser Gly Ala His
610 615 620

Ala Pro Val His Val Arg Ser Arg Arg Asp Thr Asp Thr Ala Ser Trp
625 630 635 640

Ser Glu Trp Ala Gln Val Tyr Thr Ser Lys Asp Ser Ile Pro Gly Val
645 650 655

Asn Thr Thr Gly Asn Gln Asn Thr Thr Gly Asn Ala Ala Ser Ala Thr
660 665 670

Lys Leu Gln Thr Ala Arg Thr Ile Gly Gly Val Ser Phe Asn Gly Thr
675 680 685

Ala Asn Ile Asp Leu Pro Gly Val Asn Lys Thr Gly Asn Gln Asn Thr
690 695 700

Thr Gly Asn Ala Ala Thr Ala Thr Lys Leu Gln Thr Ala Arg Thr Ile
705 710 715 720

Asn Gly Val Ser Phe Asp Gly Ser Lys Asn Ile Glu Leu Thr Ala Glu

725

730

735

Asp Leu Asn Leu Gln Glu Phe Ile Asn Lys Ala Asn Asn Ala Val Gln
740 745 750

Arg Ser Gly Asp Thr Leu Ser Gly Gly Leu Thr Phe Lys Asn Asp Ser
755 760 765

Ile Leu Ala Trp Ile Arg Asn Thr Asp Trp Ala Lys Ile Gly Phe Lys
770 775 780

Asn Asp Ala Asp Gly Asp Thr Asp Ser Tyr Met Trp Phe Glu Thr Gly
785 790 795 800

Asp Asn Gly Asn Glu Tyr Phe Lys Trp Arg Ser Lys Gln Ser Thr Thr
805 810 815

Thr Lys Asp Leu Met Asn Leu Lys Trp Asp Ala Leu Tyr Val Leu Val
820 825 830

Asn Ala Ile Val Asn Gly Glu Val Ile Ser Lys Ser Ala Asn Gly Leu
835 840 845

Arg Ile Ala Tyr Gly Asn Tyr Gly Phe Phe Ile Arg Asn Asp Gly Ser
850 855 860

Asp Thr Tyr Phe Met Leu Thr Asn Ser Gly Asp Asn Met Gly Thr Tyr
865 870 875 880

Asn Gly Leu Arg Pro Leu Trp Ile Asn Asn Ala Thr Gly Ala Val Ser
885 890 895

Met Gly Arg Gly Leu Asn Val Ser Gly Glu Thr Leu Ser Asp Arg Phe
900 905 910

Ala Ile Asn Ser Ser Thr Gly Met Trp Ile Asn Met Arg Asp Gln Asn
915 920 925

Val Ile Met Gly Arg Asn Ala Val Ser Thr Asp Gly Ala Gln Ala Leu
930 935 940

Leu Arg Gln Asp His Ala Asp Arg Lys Phe Met Ile Gly Gly Leu Gly
945 950 955 960

Asn Lys Gln Phe Gly Ile Tyr Met Ile Asn Asn Ser Arg Thr Ala Asn
965 970 975

Gly Thr Asp Gly Gln Ala Tyr Met Asp Asn Asn Gly Asn Trp Leu Cys
980 985 990

Gly Ala Gln Ile Ile Pro Gly Asn Tyr Gly Asn Phe Asp Ser Arg Tyr
995 1000 1005

Val Lys Asp Val Arg Leu Gly Thr Arg Val Val Gln Leu Met Ala
1010 1015 1020

Arg Gly Gly Arg Tyr Glu Lys Ala Gly His Ala Ile Thr Gly Leu
1025 1030 1035

Arg Ile Ile Gly Glu Val Asp Gly Asp Asp Glu Ala Ile Phe Arg
1040 1045 1050

Pro Ile Gln Lys Tyr Ile Asn Gly Thr Trp Tyr Asn Val Ala Gln
1055 1060 1065

Val

<210> 111
<211> 671
<212> PRT
<213> Artificial Sequence

<220>
<223> Gold Tail Fiber (S)

<400> 111

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Ser Glu
1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
50 55 60

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

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

Leu Ser Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Ser Val Ser Ala
145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Ser Ile
165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys

195

200

205

Tyr Thr Ala Gln Asp Ala Thr Leu Leu Ala Lys Gly Phe Thr Gln Leu
 210 215 220

Ser Asn Asp Ser Asn Ser Gly Ser Glu Thr Leu Ala Ala Thr Pro Lys
 225 230 235 240

Ala Val Lys Ala Val Asn Asp Ala Ser Leu Lys Ile Ala Ala Asn Leu
 245 250 255

Lys Asp Leu Pro Asn Lys Ser Val Ala Arg Gly Asn Leu Glu Leu Gly
 260 265 270

Thr Ala Ala Thr Arg Asn Val Gly Ala Gln Lys Thr Asn Leu Met Glu
 275 280 285

Val Gly Ala Phe Gly Leu Gly Gly Gly Pro Ile His Arg Glu Asp Ala
 290 295 300

Leu Ser Asn Arg Gly Glu Ile Tyr Arg Val Thr Gly Ala Ser Lys Asn
 305 310 315 320

Ala Pro Gly Gly Gly Val Tyr Gly Val Leu Asn Leu Pro Cys Asp Gly
 325 330 335

Gly Pro Ser Ser Gly Tyr Leu Ala Ile Gln Pro Asn Gly Ser Ser Tyr
 340 345 350

Ile Gly Thr Ser Thr Thr Pro Asp Lys Pro Leu Asn Trp Tyr Arg Ile
 355 360 365

Tyr Thr Thr Gly Phe Lys Pro Thr Ala Thr Asp Val Asp Ala Tyr Ser
 370 375 380

Lys Ala Glu Ala Asp Gly Lys Phe Val Lys Gln Ser Gly Asp Thr Ile
 385 390 395 400

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

Thr Thr Pro Ser Leu Ala Val Asn Gly Ser Val Thr Ile Ala Gly Ala
420 425 430

Leu Thr Thr Lys Ala Gly Val Glu Leu Phe Gly Thr Thr Pro Tyr Leu
435 440 445

Asp Phe His Tyr Gly Asn Ser Asn Gly Asp Phe Asp Val Arg Leu Ile
450 455 460

Asn Asp Asn Lys Gly Thr Leu Ala Phe His Gly Asn Glu Tyr Tyr Val
465 470 475 480

Asn Gly Lys Leu Ser Ala Thr Gly Asp Ala Trp Ile Gly Gly Lys Ala
485 490 495

Asn Ile Asn Gly Met Ala Ala Phe Tyr Ser Ser Asp Phe Ile Thr Lys
500 505 510

Gln Gly Asn Leu Thr His Pro Asp Gly Asn Arg Gln Thr Asn Gly Met
515 520 525

Arg Leu Gln Gly Gln Gly Asn Leu Leu Val Asp Leu Tyr His Tyr Glu
530 535 540

Lys Val Gly Ser His His Glu Phe Gly Ile His Val Ala Asn Gly Gly
545 550 555 560

Ala Asp Gly Trp Phe Ser Phe Arg Asn Asn Gly Glu Leu Arg Ala Asn
565 570 575

Gly Thr Leu Phe Ala Ala Gly Ala Ala Tyr Gln Thr Asp Gly Asn Ile
580 585 590

Asn Gly Gly Ile Trp Gly Gly Tyr Leu Ser Asn Tyr Leu Asn His Asn

595

600

605

Phe Val Arg Asp Val Arg Leu Gly Asn Val Glu Ser Ile Ala Thr Trp
 610 615 620

Arg Gly Pro Gly Tyr Ser Asp Ser Ala Gly Tyr Val Leu Thr Gly Ala
 625 630 635 640

Ala Asn Asn Asn Val Asp Glu Tyr Ile Asp Val Ile Phe Arg Arg Pro
 645 650 655

Leu Gln Lys His Ile Gly Gly Asn Trp Val Thr Val Trp Ser Val
 660 665 670

<210> 112

<211> 919

<212> PRT

<213> Artificial Sequence

<220>

<223> Bluetiful Tail Fiber (S)

<400> 112

Met Asn Asp Val Thr Val Val Thr Ser Val Thr Tyr Pro Ser Ser Glu
 1 5 10 15

Ser Leu Ala Leu Val Ala Asp Val Gln Tyr His Glu Pro Tyr Leu Ser
 20 25 30

Ala Ala Leu Asn Arg Lys Phe Arg Gly Ile Val Asp Pro Gly Phe Tyr
 35 40 45

Ala Gly Phe Leu Pro Lys Pro Gly Gly Gly Met Asn Leu Leu Ile Thr
 50 55 60

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

Glu Phe Tyr Gln Val Thr Ile Gln Gln Arg Lys Asp Ile Ser Leu Ala

85

90

95

Leu Ser Ala Gly Lys Lys Tyr Ala Ile Val Leu Lys Gly Arg Tyr Leu
 100 105 110

Leu Gly Glu Asp Thr Tyr Gln Val Asn Thr Ala Ser His Ile His Ala
 115 120 125

Ala Glu Phe Val Ala Arg Thr Tyr Thr Asp Ser Tyr Gln Leu Gly Asp
 130 135 140

Gly Glu Leu Leu Val Cys Thr Val Asn Ile Pro Ala Ser Val Ser Ala
 145 150 155 160

Ile Thr Gln Glu Met Ile Asp Thr Ser Glu Arg Ile Asn Arg Ser Ile
 165 170 175

Gly Ile Asp Ile Ser Asp Ser Val Thr Ser Thr Arg Ser Asp Val Ala
 180 185 190

Ala Ser Ser Leu Ala Val Lys Lys Ala Tyr Asp Leu Ala Lys Ser Lys
 195 200 205

Tyr Thr Ala Gln Asp Ala Ser Thr Thr Ala Lys Gly Leu Val Gln Leu
 210 215 220

Ser Ser Ala Thr Thr Ser Thr Asp Glu Thr Lys Ala Ser Thr Pro Lys
 225 230 235 240

Ala Leu Lys Thr Val Ser Asp Ala Ser Met Lys Lys Ala Ala Asn Leu
 245 250 255

Ser Asp Val Ala Asp Lys Ala Ala Ala Arg Gly Asn Leu Ala Leu Gly
 260 265 270

Thr Ala Ala Thr Lys Asn Val Gly Val Asp Gly Gly Gln Leu Met Glu
 275 280 285

Val Gly Ala Phe Gly Leu Gly Ser Gly Ser Arg His Arg Glu Asp Ala
290 295 300

Tyr Cys Asn Gln Gly Glu Ile Tyr Arg Val Asn Gly Ser Ser Lys Asn
305 310 315 320

Ala Pro Gly Gly Asp Val Tyr Gly Val Leu Ser Leu Pro Cys Asp Gly
325 330 335

Gly Pro Ser Gly Ala Tyr Leu Ala Val Gln Asn Ser Gly Asn Ala Phe
340 345 350

Phe Gly Arg Ser Asn Ile Ala Glu Asn Gly Val Thr Trp Phe Gln Ala
355 360 365

Tyr Thr Thr Lys Phe Lys Pro Thr Ala Ala Asp Val Gly Ala Trp Ser
370 375 380

Lys Ala Glu Ala Asp Gly Arg Phe Leu Met Leu Ser Gly Gly Thr Val
385 390 395 400

Lys Lys Leu Ala Ile Lys Pro Gly Asn Ala Glu Thr Glu Gly Ser Thr
405 410 415

Leu Asn Ile Glu Gly Asn Gln His Thr Pro Leu Val Met Ser Arg Leu
420 425 430

Ser Ala Gln Gly Asn Leu Ser Ile Gly Phe Gln Val Ala Gly Lys Ala
435 440 445

Leu Met Arg Leu Gly Phe Gly Ala Asp Asp Glu Leu His Trp Gly Thr
450 455 460

Glu Ala Asn Gln Ala Ser Asn Pro Arg Ile Tyr Thr Thr Ala Lys Pro
465 470 475 480

Pro Thr Ala Gln Glu Thr Gly Ala Leu Thr Asp Ala Gln Ala Val Lys

485

490

495

Lys Tyr Ala Leu Arg Ser Ile Lys Val Asn Gly Lys Pro Leu Ser Gly
 500 505 510

Asp Val Asn Leu Leu Ala Gly Asp Val Asn Ala Trp Asn Lys Thr Glu
 515 520 525

Ala Asp Gly Arg Tyr Val Lys Gln Ser Gly Asp Thr Met Lys Gly Ala
 530 535 540

Leu Thr Leu Pro Arg Ile Val Phe Pro Asn Glu Asn Thr Ala Asn Ala
 545 550 555 560

Asp Asp Asp Leu Asn Arg Glu Asn Gly Phe Thr Val Glu Ser Leu Val
 565 570 575

Ala Thr Thr Asn Lys Gly Tyr Pro Val Pro Gly Gly Met Gly Val Leu
 580 585 590

Phe Thr Gly Lys Val Asn Glu Phe Arg Asn Val Gln Phe Ala Val Gly
 595 600 605

Ser Gly Asp Met Ala Phe Tyr Leu Arg Ser Met Arg Lys Asp Asn Ser
 610 615 620

Ala Ser Leu Arg Trp Ala Arg Val Tyr Thr Thr Asp Tyr Lys Pro Thr
 625 630 635 640

Ala Ala Asp Val Gly Ala Leu Thr Asp Ala Gln Ala Ala Gln Lys Tyr
 645 650 655

Ala Leu Arg Ser Ile Lys Val Asn Gly Lys Pro Leu Ser Ala Asp Val
 660 665 670

Asn Leu Leu Ala Gly Asp Val Asn Ala Trp Asn Lys Thr Glu Ala Asp
 675 680 685

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

Ser Ser Ser Trp Val Ser Ala Ala Ala Leu Thr Ser Asp Tyr His Gly
705 710 715 720

Thr Gly Asp Asn Thr Asn Lys Ala Pro Glu Gly Ala Gly Ala Tyr Ser
725 730 735

Asn Gln Leu Ala Thr Arg Ala Pro Phe Tyr Gln Thr Asp Phe Gln Trp
740 745 750

Glu Ala Asn Ser Gly Ala Ile Tyr Val Pro Leu Val Lys Gly Lys Ser
755 760 765

Thr Arg Lys Gly Lys Gly Trp Pro Thr Ala Val Ser Tyr Gly Tyr Leu
770 775 780

Met Pro Gly Glu Asn Met His Ala His Pro Val Ile His Ala Leu Gly
785 790 795 800

Asp Gly Val Glu Ser Ile Trp Gln Phe Asn Thr Gln Thr Gly Gly Ile
805 810 815

Ile Ser Gly Lys Met Gly Glu Phe Ala Ser Gln Ala Trp Val Asn Asn
820 825 830

Gly Leu Asn Gly Arg Val Asp Trp Pro Ser Phe Asn Gln His Val Gly
835 840 845

Ala Arg Ala Thr Ile Asp Trp Val Asn Gln Asn Phe Ile Gln Asn Val
850 855 860

Arg Tyr Ser Ala Glu Met His Val Gly Ala Thr Gly Ile Tyr Thr Tyr
865 870 875 880

His Asp Asn Thr Val Leu Thr Gly Phe Asn Asn Lys Asp Gly Asp Tyr

885

890

895

Ser Ala Glu Glu Leu Phe Trp Ser Tyr Ile Gln Ile Tyr Lys Asn Gly
 900 905 910

Gln Trp Ile Thr Val Gly Arg
 915

<210> 113
 <211> 206
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Rio Chaperone (U)

<400> 113

Met Ser Lys Tyr Ser Leu Asp Ile Gln Lys Gly Lys Ile Gly Asp Asn
 1 5 10 15

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

Ile Thr His Glu Tyr Met Gly Ala Thr Met Glu Asn Val Met Phe Asp
 35 40 45

Val Ser Leu Ser Ala Gly Ala Tyr Leu Asp Glu Pro Pro Leu Pro Gln
 50 55 60

Lys Glu Asn Gln Ala Val Arg Arg Arg Glu Asp Gly Ser Ala Trp Glu
 65 70 75 80

Ile Val Asp Asp Cys Arg Gly Leu Thr Ala Tyr Asn Thr Gln Thr Lys
 85 90 95

Gln Pro Ile Ile Ile Asp Phe Met Gly Pro Leu Pro Glu Ser Leu Thr
 100 105 110

Leu Leu Lys Pro Asn Ser Glu Phe Asp Lys Trp Asp Gly Lys Asn Trp

115

120

125

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

Gln Glu Lys Ser Arg Arg Leu Asp Glu Ala Asp Asn Ile Ile Thr Tyr
 145 150 155 160

Leu Gln Glu Ala Val Asp Val Asp Leu Ala Thr Glu Glu Glu Ala Thr
 165 170 175

Ala Leu Gln Lys Trp Lys Lys Tyr Arg Val Leu Leu Asn Arg Val Asp
 180 185 190

Ile Ser Thr Ala Pro Asp Ile Glu Trp Pro Glu Lys Pro Gln
 195 200 205

<210> 114

<211> 177

<212> PRT

<213> Artificial Sequence

<220>

<223> Limon Chaperone (U)

<400> 114

Met Gln Arg Phe Gly Lys Phe Thr Pro Tyr Thr Pro Asp Thr Thr Asp
 1 5 10 15

Arg Pro Arg Ile Ile Asp Gly Gln Asn Val Met Phe Leu Gln Asp Asp
 20 25 30

Lys Gly Asn Asp Trp Tyr Asp Val Ile Glu Leu Phe Asp Glu Ser Lys
 35 40 45

Thr Leu Lys Ile Gly Tyr Asp Asp Asp Gly Arg Val Arg Thr Phe Thr
 50 55 60

Thr Asn Ile His Ala Leu Phe Pro Val Asn Leu Ser Val Val Glu Leu

65		70		75		80									
Pro	Ala	Thr	Lys	Ala	Asn	Leu	Arg	Val	Thr	Leu	Gly	Asp	Asp	Trp	Phe
			85						90					95	
Tyr	Lys	Asp	Gly	Lys	Leu	Gln	Gln	Ile	Arg	Asn	Tyr	Leu	Ala	Asp	Ala
			100					105					110		
Glu	Ala	Glu	Arg	Gly	Asn	Arg	Met	Ala	Glu	Val	Thr	Thr	Arg	Ile	Asp
		115					120					125			
Trp	Leu	Glu	Asp	Ala	Gln	Lys	Asp	Gly	Asp	Ile	Ser	Ser	Tyr	Glu	Glu
	130					135					140				
Thr	Glu	Leu	Ala	Thr	Leu	Arg	Ala	Tyr	Arg	Thr	Ala	Leu	Arg	Arg	Leu
145					150					155					160
Asp	Leu	Ser	Thr	Ala	Pro	Asp	Ile	Asn	Trp	Pro	Glu	Val	Pro	Asp	Val
				165					170					175	

Ala

<210> 115
 <211> 175
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Orchid Chaperone (U)

<400> 115

Met	Gln	His	Leu	Lys	Asn	Ile	Lys	Ser	Gly	Asn	Pro	Lys	Thr	Lys	Glu
1				5					10					15	

Gln	Tyr	Gln	Leu	Thr	Lys	Asn	Phe	Asp	Val	Ile	Trp	Leu	Trp	Ser	Glu
		20						25					30		

Asp Gly Lys Asn Trp Tyr Glu Glu Val Asn Asn Phe Gln Asp Asp Thr

35

40

45

Ile Lys Ile Val Tyr Asp Glu Asn Asn Ile Ile Val Ala Ile Thr Lys
 50 55 60

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

Asp Ile Thr Ala Asn Arg Arg Ala Asp Asp Ser Gly Lys Trp Met Phe
 85 90 95

Lys Asp Gly Ser Val Val Lys Arg Ile Tyr Thr Ala Asp Glu Gln Gln
 100 105 110

Gln Gln Ala Glu Ser Gln Lys Ala Ala Leu Leu Ser Glu Ala Glu Ser
 115 120 125

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

Glu Glu Arg Thr Arg Leu Glu Ala Trp Glu Arg Tyr Ser Val Leu Val
 145 150 155 160

Ser Arg Val Asp Thr Ala Asn Pro Glu Trp Pro Gln Lys Pro Glu
 165 170 175

<210> 116

<211> 185

<212> PRT

<213> Artificial Sequence

<220>

<223> Gold Chaperone (U)

<400> 116

Met Met Asn Asn Met Lys Asn Phe Thr Leu Ala Ala Pro Glu Thr Val
 1 5 10 15

Glu Gln Lys Gln Leu Ala Ala Ser His Gly Val Leu Phe Leu Lys Ser

20

25

30

Asp Ala Gly Glu Asp Trp Tyr Glu Cys Gln Lys Ser Phe Arg Pro Glu
 35 40 45

Thr Val Lys Leu Met Tyr Asp Lys Asp Gly Ile Ile Arg Ser Ile Thr
 50 55 60

Ala Lys Pro Asn Ala Glu Gly His Tyr Asp Val Ser Gly Phe Phe Pro
 65 70 75 80

Glu Asn Met Ser Val Ala Glu Val Glu Asn Leu Pro Glu Gly Ala Asp
 85 90 95

Ile Asn Gly Arg Trp Ile Phe Asp Gly Glu Asn Ile Ile Pro Arg Ser
 100 105 110

Tyr Ser Thr Gln Glu Leu Arg Gln Gln Ala Ala Asn Lys Lys Gln Glu
 115 120 125

Leu Ile Lys Gln Ser Ser Leu Gln Ile Glu Thr Leu Asn Asp Ala Thr
 130 135 140

Asp Leu Gly Met Ala Ser Glu Glu Glu Leu Arg Leu Leu Thr Arg Trp
 145 150 155 160

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

Asp Ile Asp Trp Pro Gln Pro Pro Gln
 180 185

<210> 117

<211> 181

<212> PRT

<213> Artificial Sequence

<220>

<223> Bluetiful Chaperone (U)

<400> 117

Val Lys Asn Ile Lys Asn Phe Gln Leu Gly Glu Pro Lys Thr Pro Glu
1 5 10 15

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

Asp Gly Lys Glu Trp Tyr His Cys Gln Lys Asp Phe Ala Ala Asp Thr
35 40 45

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

Asn Asn Asp Ile Ser Thr Leu Trp Pro Val Gly Leu Ser Val Ala Glu
65 70 75 80

Val Ala Asn Thr Thr Ala Asn Arg Arg Ala Asp Ile Ser Gly Gly Trp
85 90 95

Val Phe Asp Gly Lys Ala Ile Val Lys Arg Ser Tyr Ser Pro Asp Glu
100 105 110

Tyr Gln Glu Gln Ala Lys Lys Glu Gln Val Ala Arg Ile Ala Ala Val
115 120 125

Ala Arg His Ile Ala Pro Leu Gln Asp Ala Val Asp Leu Asp Met Ala
130 135 140

Thr Glu Glu Glu Lys Ala Leu Leu Ala Asp Trp Lys Lys Tyr Arg Val
145 150 155 160

Met Leu Asn Arg Leu Asp Met Ser Ser Ala Pro Asp Ile Asp Trp Pro
165 170 175

Val Ala Pro Ser Ala
180