

## SEQUENCE LISTING

<110> AMYRIS, INC.

<120> ABC TRANSPORTERS FOR THE HIGH EFFICIENCY PRODUCTION OF  
REBAUDIOSIDES

<130> 107345.00779

<140> PCT/US2020/014859

<141> 2020-01-23

<150> US 62/796,228

<151> 2019-01-24

<160> 30

<170> PatentIn version 3.5

<210> 1

<211> 1559

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: CEN.PK.BPT1 ABC-transporter

<400> 1

Met Ser Ser Leu Glu Val Val Asp Gly Cys Pro Tyr Gly Tyr Arg Pro  
1 5 10 15

Tyr Pro Asp Ser Gly Thr Asn Ala Leu Asn Pro Cys Phe Ile Ser Val  
20 25 30

Ile Ser Ala Trp Gln Ala Val Phe Phe Leu Leu Ile Gly Ser Tyr Gln  
35 40 45

Leu Trp Lys Leu Tyr Lys Asn Asn Lys Val Pro Pro Arg Phe Lys Asn  
50 55 60

Phe Pro Thr Leu Pro Ser Lys Ile Asn Ser Arg His Leu Thr His Leu  
65 70 75 80

Thr Asn Val Cys Phe Gln Ser Thr Leu Ile Ile Cys Glu Leu Ala Leu

85

90

95

Val Ser Gln Ser Ser Asp Arg Val Tyr Pro Phe Ile Leu Lys Lys Ala  
 100 105 110

Leu Tyr Leu Asn Leu Leu Phe Asn Leu Gly Ile Ser Leu Pro Thr Gln  
 115 120 125

Tyr Leu Ala Tyr Phe Lys Ser Thr Phe Ser Met Gly Asn Gln Leu Phe  
 130 135 140

Tyr Tyr Met Phe Gln Ile Leu Leu Gln Leu Phe Leu Ile Leu Gln Arg  
 145 150 155 160

Tyr Tyr His Gly Ser Ser Asn Glu Arg Leu Thr Val Ile Ser Gly Gln  
 165 170 175

Thr Ala Met Ile Leu Glu Val Leu Leu Leu Phe Asn Ser Val Ala Ile  
 180 185 190

Phe Ile Tyr Asp Leu Cys Ile Phe Glu Pro Ile Asn Glu Leu Ser Glu  
 195 200 205

Tyr Tyr Lys Lys Asn Gly Trp Tyr Pro Pro Val His Val Leu Ser Tyr  
 210 215 220

Ile Thr Phe Ile Trp Met Asn Lys Leu Ile Val Glu Thr Tyr Arg Asn  
 225 230 235 240

Lys Lys Ile Lys Asp Pro Asn Gln Leu Pro Leu Pro Pro Val Asp Leu  
 245 250 255

Asn Ile Lys Ser Ile Ser Lys Glu Phe Lys Ala Asn Trp Glu Leu Glu  
 260 265 270

Lys Trp Leu Asn Arg Asn Ser Leu Trp Arg Ala Ile Trp Lys Ser Phe  
 275 280 285

Gly Arg Thr Ile Ser Val Ala Met Leu Tyr Glu Thr Thr Ser Asp Leu  
 290 295 300

Leu Ser Val Val Gln Pro Gln Phe Leu Arg Ile Phe Ile Asp Gly Leu  
 305 310 315 320

Asn Pro Glu Thr Ser Ser Lys Tyr Pro Pro Leu Asn Gly Val Phe Ile  
 325 330 335

Ala Leu Thr Leu Phe Val Ile Ser Val Val Ser Val Phe Leu Thr Asn  
 340 345 350

Gln Phe Tyr Ile Gly Ile Phe Glu Ala Gly Leu Gly Ile Arg Gly Ser  
 355 360 365

Leu Ala Ser Leu Val Tyr Gln Lys Ser Leu Arg Leu Thr Leu Ala Glu  
 370 375 380

Arg Asn Glu Lys Ser Thr Gly Asp Ile Leu Asn Leu Met Ser Val Asp  
 385 390 395 400

Val Leu Arg Ile Gln Arg Phe Phe Glu Asn Ala Gln Thr Ile Ile Gly  
 405 410 415

Ala Pro Ile Gln Ile Ile Val Val Leu Thr Ser Leu Tyr Trp Leu Leu  
 420 425 430

Gly Lys Ala Val Ile Gly Gly Leu Val Thr Met Ala Ile Met Met Pro  
 435 440 445

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

Met Lys Tyr Lys Asp Met Arg Ile Lys Thr Ile Thr Glu Leu Leu Asn  
 465 470 475 480

Ala Ile Lys Ser Ile Lys Leu Tyr Ala Trp Glu Glu Pro Met Met Ala

485

490

495

Arg Leu Asn His Val Arg Asn Asp Met Glu Leu Lys Asn Phe Arg Lys  
 500 505 510

Ile Gly Ile Val Ser Asn Leu Ile Tyr Phe Ala Trp Asn Cys Val Pro  
 515 520 525

Leu Met Val Thr Cys Ser Thr Phe Gly Leu Phe Ser Leu Phe Ser Asp  
 530 535 540

Ser Pro Leu Ser Pro Ala Ile Val Phe Pro Ser Leu Ser Leu Phe Asn  
 545 550 555 560

Ile Leu Asn Ser Ala Ile Tyr Ser Val Pro Ser Met Ile Asn Thr Ile  
 565 570 575

Ile Glu Thr Ser Val Ser Met Glu Arg Leu Lys Ser Phe Leu Leu Ser  
 580 585 590

Asp Glu Ile Asp Asp Ser Phe Ile Glu Arg Ile Asp Pro Ser Ala Asp  
 595 600 605

Glu Arg Ala Leu Pro Ala Ile Glu Met Asn Asn Ile Thr Phe Leu Trp  
 610 615 620

Lys Ser Lys Glu Val Leu Thr Ser Ser Gln Ser Gly Asp Asn Leu Arg  
 625 630 635 640

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

Ile Asp His Phe Glu Ala Lys Arg Gly Asp Leu Val Cys Val Val Gly  
 660 665 670

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

Leu Pro Cys Met Ser Gly Ser Arg Asp Ser Ile Pro Pro Lys Leu Ile  
 690 695 700

Ile Arg Ser Ser Ser Val Ala Tyr Cys Ser Gln Glu Ser Trp Ile Met  
 705 710 715 720

Asn Ala Ser Val Arg Glu Asn Ile Leu Phe Gly His Lys Phe Asp Gln  
 725 730 735

Asp Tyr Tyr Asp Leu Thr Ile Lys Ala Cys Gln Leu Leu Pro Asp Leu  
 740 745 750

Lys Ile Leu Pro Asp Gly Asp Glu Thr Leu Val Gly Glu Lys Gly Ile  
 755 760 765

Ser Leu Ser Gly Gly Gln Lys Ala Arg Leu Ser Leu Ala Arg Ala Val  
 770 775 780

Tyr Ser Arg Ala Asp Ile Tyr Leu Leu Asp Asp Ile Leu Ser Ala Val  
 785 790 795 800

Asp Ala Glu Val Ser Lys Asn Ile Ile Glu Tyr Val Leu Ile Gly Lys  
 805 810 815

Thr Ala Leu Leu Lys Asn Lys Thr Ile Ile Leu Thr Thr Asn Thr Val  
 820 825 830

Ser Ile Leu Lys His Ser Gln Met Ile Tyr Ala Leu Glu Asn Gly Glu  
 835 840 845

Ile Val Glu Gln Gly Asn Tyr Glu Asp Val Met Asn Arg Lys Asn Asn  
 850 855 860

Thr Ser Lys Leu Lys Lys Leu Leu Glu Glu Phe Asp Ser Pro Ile Asp  
 865 870 875 880

Asn Gly Asn Glu Ser Asp Val Gln Thr Glu His Arg Ser Glu Ser Glu

885

890

895

Val Asp Glu Pro Leu Gln Leu Lys Val Thr Glu Ser Glu Thr Glu Asp  
                   900                  905                  910

Glu Val Val Thr Glu Ser Glu Leu Glu Leu Ile Lys Ala Asn Ser Arg  
           915                  920                  925

Arg Ala Ser Leu Ala Thr Leu Arg Pro Arg Pro Phe Val Gly Ala Gln  
       930                  935                  940

Leu Asp Ser Val Lys Lys Thr Ala Gln Lys Ala Glu Lys Thr Glu Val  
   945                  950                  955                  960

Gly Arg Val Lys Thr Lys Ile Tyr Leu Ala Tyr Ile Lys Ala Cys Gly  
                   965                  970                  975

Val Leu Gly Val Val Leu Phe Phe Leu Phe Met Ile Leu Thr Arg Val  
           980                  985                  990

Phe Asp Leu Ala Glu Asn Phe Trp Leu Lys Tyr Trp Ser Glu Ser Asn  
           995                  1000                  1005

Glu Lys Asn Gly Ser Asn Glu Arg Val Trp Met Phe Val Gly Val  
       1010                  1015                  1020

Tyr Ser Leu Ile Gly Val Ala Ser Ala Ala Phe Asn Asn Leu Arg  
       1025                  1030                  1035

Ser Ile Met Met Leu Leu Tyr Cys Ser Ile Arg Gly Ser Lys Lys  
       1040                  1045                  1050

Leu His Glu Ser Met Ala Lys Ser Val Ile Arg Ser Pro Met Thr  
       1055                  1060                  1065

Phe Phe Glu Thr Thr Pro Val Gly Arg Ile Ile Asn Arg Phe Ser  
       1070                  1075                  1080

Ser Asp Met Asp Ala Val Asp Ser Asn Leu Gln Tyr Ile Phe Ser  
 1085 1090 1095

Phe Phe Phe Lys Ser Ile Leu Thr Tyr Leu Val Thr Val Ile Leu  
 1100 1105 1110

Val Gly Tyr Asn Met Pro Trp Phe Leu Val Phe Asn Met Phe Leu  
 1115 1120 1125

Val Val Ile Tyr Ile Tyr Tyr Gln Thr Phe Tyr Ile Val Leu Ser  
 1130 1135 1140

Arg Glu Leu Lys Arg Leu Ile Ser Ile Ser Tyr Ser Pro Ile Met  
 1145 1150 1155

Ser Leu Met Ser Glu Ser Leu Asn Gly Tyr Ser Ile Ile Asp Ala  
 1160 1165 1170

Tyr Asp His Phe Glu Arg Phe Ile Tyr Leu Asn Tyr Glu Lys Ile  
 1175 1180 1185

Gln Tyr Asn Val Asp Phe Val Phe Asn Phe Arg Ser Thr Asn Arg  
 1190 1195 1200

Trp Leu Ser Val Arg Leu Gln Thr Ile Gly Ala Thr Ile Val Leu  
 1205 1210 1215

Ala Thr Ala Ile Leu Ala Leu Ala Thr Met Asn Thr Lys Arg Gln  
 1220 1225 1230

Leu Ser Ser Gly Met Val Gly Leu Leu Met Ser Tyr Ser Leu Glu  
 1235 1240 1245

Val Thr Gly Ser Leu Thr Trp Ile Val Arg Thr Thr Val Thr Ile  
 1250 1255 1260

Glu Thr Asn Ile Val Ser Val Glu Arg Ile Val Glu Tyr Cys Glu

|                                                             |  |      |  |      |
|-------------------------------------------------------------|--|------|--|------|
| 1265                                                        |  | 1270 |  | 1275 |
| Leu Pro Pro Glu Ala Gln Ser Ile Asn Pro Glu Lys Arg Pro Asp |  |      |  |      |
| 1280                                                        |  | 1285 |  | 1290 |
| Glu Asn Trp Pro Ser Lys Gly Gly Ile Glu Phe Lys Asn Tyr Ser |  |      |  |      |
| 1295                                                        |  | 1300 |  | 1305 |
| Thr Lys Tyr Arg Glu Asn Leu Asp Pro Val Leu Asn Asn Ile Asn |  |      |  |      |
| 1310                                                        |  | 1315 |  | 1320 |
| Val Lys Ile Glu Pro Cys Glu Lys Val Gly Ile Val Gly Arg Thr |  |      |  |      |
| 1325                                                        |  | 1330 |  | 1335 |
| Gly Ala Gly Lys Ser Thr Leu Ser Leu Ala Leu Phe Arg Ile Leu |  |      |  |      |
| 1340                                                        |  | 1345 |  | 1350 |
| Glu Pro Thr Glu Gly Lys Ile Ile Ile Asp Gly Ile Asp Ile Ser |  |      |  |      |
| 1355                                                        |  | 1360 |  | 1365 |
| Asp Ile Gly Leu Phe Asp Leu Arg Ser His Leu Ala Ile Ile Pro |  |      |  |      |
| 1370                                                        |  | 1375 |  | 1380 |
| Gln Asp Ala Gln Ala Phe Glu Gly Thr Val Lys Thr Asn Leu Asp |  |      |  |      |
| 1385                                                        |  | 1390 |  | 1395 |
| Pro Phe Asn Arg Tyr Ser Glu Asp Glu Leu Lys Arg Ala Val Glu |  |      |  |      |
| 1400                                                        |  | 1405 |  | 1410 |
| Gln Ala His Leu Lys Pro His Leu Glu Lys Met Leu His Ser Lys |  |      |  |      |
| 1415                                                        |  | 1420 |  | 1425 |
| Pro Arg Gly Asp Asp Ser Asn Glu Glu Asp Gly Asn Val Asn Asp |  |      |  |      |
| 1430                                                        |  | 1435 |  | 1440 |
| Ile Leu Asp Val Lys Ile Asn Glu Asn Gly Ser Asn Leu Ser Val |  |      |  |      |
| 1445                                                        |  | 1450 |  | 1455 |

Gly Gln Arg Gln Leu Leu Cys Leu Ala Arg Ala Leu Leu Asn Arg  
 1460 1465 1470

Ser Lys Ile Leu Val Leu Asp Glu Ala Thr Ala Ser Val Asp Met  
 1475 1480 1485

Glu Thr Asp Lys Ile Ile Gln Asp Thr Ile Arg Arg Glu Phe Lys  
 1490 1495 1500

Asp Arg Thr Ile Leu Thr Ile Ala His Arg Ile Asp Thr Val Leu  
 1505 1510 1515

Asp Ser Asp Lys Ile Ile Val Leu Asp Gln Gly Ser Val Arg Glu  
 1520 1525 1530

Phe Asp Ser Pro Ser Lys Leu Leu Ser Asp Lys Thr Ser Ile Phe  
 1535 1540 1545

Tyr Ser Leu Cys Glu Lys Gly Gly Tyr Leu Lys  
 1550 1555

<210> 2

<211> 1620

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: T4\_Fungal\_1 ABC-transporter

<400> 2

Met Ser Leu Glu Leu Ser Asn Ser Thr Leu Cys Asp Ser Tyr Trp Ala  
 1 5 10 15

Val Asp Asp Phe Thr Ala Cys Gly Arg Gln Leu Val Glu Ser Trp Val  
 20 25 30

Ser Val Pro Leu Val Leu Ser Ala Leu Val Val Ala Phe Asn Leu Leu  
 35 40 45

Arg Asn Ser Leu Ala Ser Glu Lys Thr Asp Pro Tyr Ser Lys Leu Asp  
 50 55 60

Ala Glu Gln Gln Pro Leu Leu Gln Asn Gly His Ala Leu Tyr Thr Ser  
 65 70 75 80

Ser Ile Glu Ser Asp Asn Thr Asp Ile Phe Gln Arg His Phe Asp Ile  
 85 90 95

Ala Leu Leu Lys Pro Val Lys Asp Asp Gly Lys Pro Ile Gly Val Val  
 100 105 110

Arg Ile Val Tyr Arg Asp Thr Ala Glu Lys Leu Lys Val Ala Leu Glu  
 115 120 125

Glu Ile Leu Leu Ile Ser Gln Thr Val Leu Ala Phe Leu Ala Leu Ser  
 130 135 140

Arg Leu Glu Asp Ile Ser Glu Ser Arg Phe Leu Leu Val Lys Tyr Ile  
 145 150 155 160

Asn Phe Ser Leu Trp Leu Tyr Leu Thr Val Ile Thr Ser Ala Arg Leu  
 165 170 175

Leu Asn Val Thr Lys Gly Phe Ser Ala Asn Arg Val Asp Leu Trp Tyr  
 180 185 190

His Cys Ala Ile Leu Tyr Asn Leu Gln Trp Phe Asn Ser Val Met Leu  
 195 200 205

Phe Arg Ser Ala Leu Leu His His Val Ser Gly Thr Tyr Gly Tyr Trp  
 210 215 220

Phe Tyr Val Thr Gln Phe Val Ile Asn Thr Leu Leu Cys Leu Thr Asn  
 225 230 235 240

Gly Leu Glu Lys Leu Ser Asp Lys Pro Ala Ile Val Tyr Glu Glu Glu

245

250

255

Gly Val Ile Pro Ser Pro Glu Thr Thr Ser Ser Leu Ile Asp Ile Met  
 260 265 270

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

Ile Thr Met Glu Glu Val Trp Gly Leu Arg Tyr Asp Asp Tyr Ser His  
 290 295 300

Asp Val Leu Ile Arg Phe His Lys Leu Lys Ser Ser Ile Arg Phe Thr  
 305 310 315 320

Leu Arg Leu Phe Leu Gln Phe Lys Lys Glu Leu Ala Leu Gln Thr Leu  
 325 330 335

Cys Thr Cys Ile Glu Ala Leu Leu Ile Phe Val Pro Pro Leu Cys Leu  
 340 345 350

Lys Lys Ile Leu Glu Tyr Ile Glu Ser Pro His Thr Lys Ser Arg Ser  
 355 360 365

Met Ala Trp Phe Tyr Val Leu Ile Met Phe Gly Ser Gly Val Ile Ala  
 370 375 380

Cys Ser Phe Ser Gly Arg Gly Leu Phe Leu Gly Arg Arg Ile Cys Thr  
 385 390 395 400

Arg Met Arg Ser Ile Leu Ile Gly Glu Ile Tyr Ser Lys Ala Leu Arg  
 405 410 415

Arg Arg Leu Gly Ser Thr Asp Lys Glu Lys Thr Thr Glu Glu Glu Asp  
 420 425 430

Asp Lys Ser Ala Lys Ser Lys Lys Glu Asp Glu Pro Ser Asn Lys Glu  
 435 440 445

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

Glu Ile Gly Gly Tyr Leu His Tyr Phe Pro Asn Ser Phe Val Met Ala  
 465 470 475 480

Ala Val Ala Ile Tyr Met Leu Tyr Lys Leu Leu Gly Trp Ser Ser Leu  
 485 490 495

Ile Gly Thr Ala Thr Leu Ile Ala Ile Leu Pro Ile Asn Tyr Met Leu  
 500 505 510

Val Glu Lys Leu Ser Lys Tyr Gln Lys Gln Met Leu Leu Val Thr Asp  
 515 520 525

Lys Arg Ile Gln Lys Thr Asn Glu Ala Phe Gln Asn Ile Arg Ile Ile  
 530 535 540

Lys Tyr Phe Ala Trp Glu Asp Lys Phe Ala Asp Thr Ile Met Lys Ile  
 545 550 555 560

Arg Glu Glu Glu Leu Gly Tyr Leu Val Gly Arg Cys Val Val Trp Ala  
 565 570 575

Leu Leu Ile Phe Leu Trp Leu Val Val Pro Thr Ile Val Thr Leu Ile  
 580 585 590

Thr Phe Tyr Ala Tyr Thr Val Ile Gln Gly Asn Pro Leu Thr Ser Pro  
 595 600 605

Ile Ala Phe Thr Ala Leu Ser Leu Phe Thr Leu Leu Arg Gly Pro Leu  
 610 615 620

Asp Ala Leu Ala Asp Met Leu Ser Met Val Met Gln Cys Lys Val Ser  
 625 630 635 640

Leu Asp Arg Val Glu Asp Phe Leu Asn Glu Pro Glu Thr Thr Lys Tyr

645

650

655

Gln Gln Leu Ser Ala Pro Arg Gly Pro Asn Ser Pro Leu Ile Gly Phe  
 660 665 670

Glu Asn Ala Thr Phe Tyr Trp Ser Lys Asn Ser Lys Ala Glu Phe Ala  
 675 680 685

Leu Lys Asp Leu Asn Ile Asp Phe Lys Val Gly Lys Leu Asn Val Val  
 690 695 700

Ile Gly Pro Thr Gly Ser Gly Lys Ser Ser Leu Leu Leu Ala Leu Leu  
 705 710 715 720

Gly Glu Met Asp Leu Asp Lys Gly Asn Val Phe Leu Pro Gly Ala Ile  
 725 730 735

Pro Arg Asp Asp Leu Thr Pro Asn Pro Val Thr Gly Leu Met Glu Ser  
 740 745 750

Val Ala Tyr Cys Ser Gln Thr Ala Trp Leu Leu Asn Ala Thr Val Lys  
 755 760 765

Asp Asn Ile Ile Phe Ala Ser Pro Phe Asn Gln Glu Arg Tyr Asp Ala  
 770 775 780

Val Ile His Ala Cys Gly Leu Thr Arg Asp Leu Ser Ile Leu Glu Ala  
 785 790 795 800

Gly Asp Glu Thr Glu Ile Gly Glu Lys Gly Ile Thr Leu Ser Gly Gly  
 805 810 815

Gln Lys Gln Arg Val Ser Leu Ala Arg Ala Leu Tyr Ser Ser Ala Ser  
 820 825 830

Tyr Leu Leu Leu Asp Asp Cys Leu Ser Ala Val Asp Ser His Thr Ala  
 835 840 845

Val His Ile Tyr Asp Tyr Cys Ile Asn Gly Glu Leu Met Lys Gly Arg  
 850 855 860

Thr Cys Ile Leu Val Ser His Asn Val Ser Leu Thr Val Lys Glu Ala  
 865 870 875 880

Asp Phe Val Val Met Met Asp Asn Gly Arg Ile Lys Ala Gln Gly Ser  
 885 890 895

Val Asp Glu Leu Met Gln Glu Gly Leu Leu Asn Glu Glu Val Val Lys  
 900 905 910

Ser Val Met Gln Ser Arg Ser Ala Ser Thr Ala Asn Leu Ala Ala Leu  
 915 920 925

Asp Asp Asn Ser Pro Ile Ser Ser Glu Ala Ile Ala Glu Gly Leu Ala  
 930 935 940

Lys Lys Thr Gln Lys Pro Glu Gln Ser Lys Lys Ser Lys Leu Ile Glu  
 945 950 955 960

Asp Glu Thr Lys Ser Asp Gly Ser Val Lys Pro Glu Ile Tyr Tyr Ala  
 965 970 975

Tyr Phe Arg Tyr Phe Gly Asn Pro Ala Leu Trp Ile Met Ile Ala Phe  
 980 985 990

Leu Phe Ile Gly Ser Gln Ser Val Asn Val Tyr Gln Ser Tyr Trp Leu  
 995 1000 1005

Arg Arg Trp Ser Ala Ile Glu Asp Lys Arg Asp Leu Ser Ala Phe  
 1010 1015 1020

Ser Asn Ser Asn Asp Met Thr Leu Phe Leu Phe Pro Thr Phe His  
 1025 1030 1035

Ser Ile Asn Trp His Arg Pro Leu Val Asn Tyr Ala Leu Gln Pro

|                                                             |  |      |  |      |
|-------------------------------------------------------------|--|------|--|------|
| 1040                                                        |  | 1045 |  | 1050 |
| Phe Gly Leu Ala Val Glu Glu Arg Ser Thr Met Tyr Tyr Ile Thr |  |      |  |      |
| 1055                                                        |  | 1060 |  | 1065 |
| Ile Tyr Thr Leu Ile Gly Leu Ala Phe Ala Thr Leu Gly Ser Ser |  |      |  |      |
| 1070                                                        |  | 1075 |  | 1080 |
| Arg Val Ile Leu Thr Phe Ile Gly Gly Leu Asn Val Ser Arg Lys |  |      |  |      |
| 1085                                                        |  | 1090 |  | 1095 |
| Ile Phe Lys Asp Leu Leu Asp Lys Leu Leu His Ala Lys Leu Arg |  |      |  |      |
| 1100                                                        |  | 1105 |  | 1110 |
| Phe Phe Asp Gln Thr Pro Ile Gly Arg Ile Met Asn Arg Phe Ser |  |      |  |      |
| 1115                                                        |  | 1120 |  | 1125 |
| Lys Asp Ile Glu Ala Ile Asp Gln Glu Leu Ala Leu Tyr Ala Glu |  |      |  |      |
| 1130                                                        |  | 1135 |  | 1140 |
| Glu Phe Val Thr Tyr Leu Ile Ser Cys Leu Ser Thr Leu Val Val |  |      |  |      |
| 1145                                                        |  | 1150 |  | 1155 |
| Val Cys Ala Val Thr Pro Ala Phe Leu Val Ala Gly Val Leu Ile |  |      |  |      |
| 1160                                                        |  | 1165 |  | 1170 |
| Leu Leu Val Tyr Tyr Gly Val Gly Val Leu Tyr Leu Glu Leu Ser |  |      |  |      |
| 1175                                                        |  | 1180 |  | 1185 |
| Arg Asp Leu Lys Arg Phe Glu Ser Ile Thr Lys Ser Pro Ile His |  |      |  |      |
| 1190                                                        |  | 1195 |  | 1200 |
| Gln His Phe Ser Glu Thr Leu Val Gly Met Thr Thr Ile Arg Ala |  |      |  |      |
| 1205                                                        |  | 1210 |  | 1215 |
| Tyr Gly Asp Glu Arg Arg Phe Leu Lys Gln Asn Phe Glu Lys Ile |  |      |  |      |
| 1220                                                        |  | 1225 |  | 1230 |

Asp Val Asn Asn Arg Pro Phe Trp Tyr Val Trp Val Asn Asn Arg  
 1235 1240 1245

Trp Leu Ala Tyr Arg Ser Asp Met Ile Gly Ala Phe Ile Ile Phe  
 1250 1255 1260

Phe Ala Ala Ala Phe Ala Val Ala Tyr Ser Asp Lys Ile Asp Ala  
 1265 1270 1275

Gly Leu Ala Gly Ile Ser Leu Ser Phe Ser Val Ser Phe Arg Tyr  
 1280 1285 1290

Thr Ala Val Trp Val Val Arg Met Tyr Ala Tyr Val Glu Met Ser  
 1295 1300 1305

Met Asn Ser Val Glu Arg Val Gln Glu Tyr Ile Glu Gln Thr Pro  
 1310 1315 1320

Gln Glu Pro Pro Lys Tyr Leu Pro Gln Asp Pro Val Asn Ser Trp  
 1325 1330 1335

Pro Ser Asn Gly Val Ile Asp Val Gln Asn Ile Cys Ile Arg Tyr  
 1340 1345 1350

Ser Pro Glu Leu Pro Arg Val Ile Asp Asn Val Ser Phe His Val  
 1355 1360 1365

Asn Ala Gly Glu Lys Ile Gly Val Val Gly Arg Thr Gly Ala Gly  
 1370 1375 1380

Lys Ser Thr Ile Ile Thr Ser Phe Phe Arg Phe Val Asp Leu Glu  
 1385 1390 1395

Ser Gly Ser Ile Lys Ile Asp Gly Leu Asp Ile Ser Lys Ile Gly  
 1400 1405 1410

Leu Lys Pro Leu Arg Lys Gly Leu Thr Ile Ile Pro Gln Asp Pro

|                                                             |  |      |  |      |
|-------------------------------------------------------------|--|------|--|------|
| 1415                                                        |  | 1420 |  | 1425 |
| Thr Leu Phe Ser Gly Thr Ile Arg Ser Asn Leu Asp Ile Phe Gly |  |      |  |      |
| 1430                                                        |  | 1435 |  | 1440 |
| Glu Tyr Gly Asp Leu Gln Met Phe Glu Ala Leu Arg Arg Val Asn |  |      |  |      |
| 1445                                                        |  | 1450 |  | 1455 |
| Leu Ile Ser Val Asp Asp Tyr Gln Arg Ile Val Asp Gly Asn Gly |  |      |  |      |
| 1460                                                        |  | 1465 |  | 1470 |
| Ala Ala Val Ala Asp Glu Thr Ala Gln Ala Arg Gly Asp Asn Val |  |      |  |      |
| 1475                                                        |  | 1480 |  | 1485 |
| Asn Lys Phe Leu Asp Leu Asp Ser Thr Val Ser Glu Gly Gly Gly |  |      |  |      |
| 1490                                                        |  | 1495 |  | 1500 |
| Asn Leu Ser Gln Gly Glu Arg Gln Leu Leu Cys Leu Ala Arg Ser |  |      |  |      |
| 1505                                                        |  | 1510 |  | 1515 |
| Ile Leu Lys Met Pro Lys Ile Leu Met Leu Asp Glu Ala Thr Ala |  |      |  |      |
| 1520                                                        |  | 1525 |  | 1530 |
| Ser Ile Asp Tyr Glu Ser Asp Ala Lys Ile Gln Ala Thr Ile Arg |  |      |  |      |
| 1535                                                        |  | 1540 |  | 1545 |
| Glu Glu Phe Ser Ser Ser Thr Val Leu Thr Ile Ala His Arg Leu |  |      |  |      |
| 1550                                                        |  | 1555 |  | 1560 |
| Lys Thr Ile Ile Asp Tyr Asp Lys Ile Leu Leu Leu Asp His Gly |  |      |  |      |
| 1565                                                        |  | 1570 |  | 1575 |
| Lys Val Lys Glu Tyr Asp His Pro Tyr Lys Leu Ile Thr Asn Lys |  |      |  |      |
| 1580                                                        |  | 1585 |  | 1590 |
| Lys Ser Asp Phe Arg Lys Met Cys Gln Asp Thr Gly Glu Phe Asp |  |      |  |      |
| 1595                                                        |  | 1600 |  | 1605 |

Asp Leu Val Asn Leu Ala Lys Gln Ala Tyr Arg Lys  
 1610 1615 1620

<210> 3  
 <211> 1515  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic: T4\_Fungal\_10 ABC-transporter

<400> 3

Met Gly Gln Ser Glu Arg Ala Ala Leu Ile Ala Phe Ala Ser Arg Asn  
 1 5 10 15

Thr Thr Glu Cys Trp Leu Cys Arg Asp Lys Glu Gly Phe Gly Pro Ile  
 20 25 30

Ser Tyr Tyr Gly Asp Phe Thr Val Cys Phe Ile Asp Gly Val Leu Leu  
 35 40 45

Asn Phe Ala Ala Leu Phe Met Leu Ile Phe Gly Thr Tyr Gln Val Val  
 50 55 60

Lys Leu Ser Lys Lys Glu His Pro Gly Ile Lys Tyr Arg Arg Asp Trp  
 65 70 75 80

Leu Leu Phe Ser Arg Ile Thr Leu Val Gly Cys Phe Leu Leu Phe Thr  
 85 90 95

Ser Met Ala Ala Tyr Tyr Ser Ser Glu Lys His Glu Ser Ile Ala Leu  
 100 105 110

Thr Ser Gln Tyr Thr Leu Thr Leu Met Ser Ile Phe Val Ala Leu Met  
 115 120 125

Leu His Trp Val Glu Tyr His Arg Ser Arg Ile Ser Asn Gly Ile Val  
 130 135 140

Leu Phe Tyr Trp Leu Phe Glu Thr Leu Phe Gln Gly Ser Lys Trp Val  
 145 150 155 160

Asn Phe Ser Ile Arg His Ala Tyr Asn Leu Asn His Glu Trp Pro Val  
 165 170 175

Ser Tyr Ser Val Tyr Ile Leu Thr Ile Phe Gln Thr Ile Ser Ala Phe  
 180 185 190

Met Ile Leu Ile Leu Glu Ala Gly Phe Glu Lys Pro Leu Pro Ser Tyr  
 195 200 205

Gln Arg Val Ile Glu Ser Tyr Ser Lys Gln Lys Arg Asn Pro Val Asp  
 210 215 220

Asn Ser His Ile Phe Gln Arg Leu Ser Phe Ser Trp Met Thr Glu Leu  
 225 230 235 240

Met Lys Thr Gly Tyr Lys Lys Tyr Leu Thr Glu Gln Asp Leu Tyr Lys  
 245 250 255

Leu Pro Lys Ser Phe Gly Ala Lys Glu Ile Ser His Lys Phe Ser Glu  
 260 265 270

Arg Trp Gln Tyr Gln Leu Lys His Lys Ala Asn Pro Ser Leu Ala Trp  
 275 280 285

Ala Leu Leu Ser Thr Phe Gly Gly Lys Ile Leu Leu Gly Gly Ile Phe  
 290 295 300

Lys Val Ala Tyr Asp Ile Leu Gln Phe Thr Gln Pro Gln Leu Leu Arg  
 305 310 315 320

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

Leu Pro Leu Val Arg Gly Val Met Leu Ser Ile Ala Met Phe Val Val

340

345

350

Ser Val Val Gln Thr Ser Ile Leu His Gln Tyr Phe Leu Asn Ala Phe  
 355 360 365

Asp Thr Gly Met His Ile Lys Ser Gly Met Thr Ser Val Ile Tyr Gln  
 370 375 380

Lys Ala Leu Val Leu Ser Ser Glu Ala Ser Ala Ser Ser Ser Thr Gly  
 385 390 395 400

Asp Ile Val Asn Leu Met Ser Val Asp Val Gln Arg Leu Gln Asp Leu  
 405 410 415

Thr Gln Trp Gly Gln Ile Ile Trp Ser Gly Pro Phe Gln Ile Ile Leu  
 420 425 430

Cys Leu Val Ser Leu Tyr Lys Leu Leu Gly Pro Cys Met Trp Val Gly  
 435 440 445

Val Ile Ile Met Ile Ile Met Ile Pro Ile Asn Ser Val Ile Val Arg  
 450 455 460

Ile Gln Lys Lys Leu Gln Lys Ile Gln Met Lys Asn Lys Asp Glu Arg  
 465 470 475 480

Thr Arg Val Thr Ser Glu Ile Leu Asn Asn Ile Lys Ser Leu Lys Val  
 485 490 495

Tyr Gly Trp Glu Ile Pro Tyr Lys Ala Lys Leu Asp His Val Arg Asn  
 500 505 510

Asp Lys Glu Leu Lys Asn Leu Lys Lys Met Gly Cys Thr Leu Ala Leu  
 515 520 525

Ala Ser Phe Gln Phe Asn Ile Val Pro Phe Leu Val Ser Cys Ser Thr  
 530 535 540

Phe Ala Val Phe Val Phe Thr Glu Asp Arg Pro Leu Ser Thr Asp Leu  
 545 550 555 560

Val Phe Pro Ala Leu Thr Leu Phe Asn Leu Leu Ser Phe Pro Leu Ala  
 565 570 575

Val Val Pro Asn Ala Ile Ser Ser Phe Ile Glu Ala Ser Val Ser Val  
 580 585 590

Asn Arg Leu Tyr Ala Phe Leu Thr Asn Glu Glu Leu Gln Thr Asp Ala  
 595 600 605

Val His Arg Glu Pro Lys Val Asn Asn Ile Gly Asp Glu Gly Val Lys  
 610 615 620

Val Ser Asp Ala Thr Phe Leu Trp Gln Arg Lys Pro Glu Tyr Lys Val  
 625 630 635 640

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

Ile Val Gly Lys Val Gly Ser Gly Lys Ser Ala Leu Ile Gln Ser Leu  
 660 665 670

Leu Gly Asp Leu Ile Arg Val Lys Gly Tyr Ala Ala Val His Gly Ser  
 675 680 685

Val Ala Tyr Val Ser Gln Val Ala Trp Ile Met Asn Gly Thr Val Lys  
 690 695 700

Asp Asn Ile Ile Phe Gly His Lys Tyr Asp Pro Glu Phe Tyr Glu Leu  
 705 710 715 720

Thr Ile Lys Ala Cys Ala Leu Ala Ile Asp Leu Ser Met Leu Pro Asp  
 725 730 735

Gly Asp Gln Thr Leu Val Gly Glu Lys Gly Ile Ser Leu Ser Gly Gly

740

745

750

Gln Lys Ala Arg Leu Ser Leu Ala Arg Ala Val Tyr Ala Arg Ala Asp  
 755 760 765

Thr Tyr Leu Leu Asp Asp Pro Leu Ala Ala Val Asp Glu His Val Ala  
 770 775 780

Lys His Leu Ile Glu His Val Leu Gly Pro His Gly Leu Leu His Ser  
 785 790 795 800

Lys Thr Lys Val Leu Ala Thr Asn Lys Ile Ser Val Leu Ser Ile Ala  
 805 810 815

Asp Ser Ile Thr Leu Met Glu Asn Gly Glu Ile Ile Gln Gln Gly Thr  
 820 825 830

Tyr Glu Glu Thr Asn Asn Thr Thr Asp Ser Pro Leu Ser Lys Leu Ile  
 835 840 845

Ser Glu Phe Gly Lys Lys Gly Lys Ala Thr Pro Ser Gln Ser Thr Thr  
 850 855 860

Ser Leu Thr Lys Leu Ala Thr Ser Asp Leu Gly Ser Ser Ser Asp Ser  
 865 870 875 880

Lys Val Ser Asp Val Ser Ile Asp Val Ser Gln Leu Asp Thr Glu Asn  
 885 890 895

Leu Thr Glu Ala Glu Glu Leu Lys Ser Leu Arg Arg Ala Ser Met Ala  
 900 905 910

Thr Leu Gly Ser Ile Gly Phe Asp Asp Asp Glu Asn Ile Ala Arg Arg  
 915 920 925

Glu His Arg Glu Gln Gly Lys Val Lys Trp Asp Ile Tyr Met Glu Tyr  
 930 935 940

Ala Arg Ala Cys Asn Pro Arg Ser Val Cys Val Phe Leu Phe Phe Ile  
 945 950 955 960

Val Leu Ser Met Leu Leu Ser Val Leu Gly Asn Phe Trp Leu Lys His  
 965 970 975

Trp Ser Glu Val Asn Thr Gly Glu Gly Tyr Asn Pro His Ala Ala Arg  
 980 985 990

Tyr Leu Leu Ile Tyr Phe Ala Leu Gly Val Gly Ser Ala Leu Ala Thr  
 995 1000 1005

Leu Ile Gln Thr Ile Val Leu Trp Val Phe Cys Thr Ile His Gly  
 1010 1015 1020

Ser Arg Tyr Leu His Asp Ala Met Ala Thr Ser Val Leu Lys Ala  
 1025 1030 1035

Pro Met Ser Phe Phe Glu Thr Thr Pro Ile Gly Arg Ile Leu Asn  
 1040 1045 1050

Arg Phe Ser Asn Asp Ile Tyr Lys Val Asp Glu Val Leu Gly Arg  
 1055 1060 1065

Thr Phe Ser Gln Phe Phe Ala Asn Val Val Lys Val Ser Phe Thr  
 1070 1075 1080

Ile Ile Val Ile Cys Met Ala Thr Trp Gln Phe Ile Phe Ile Ile  
 1085 1090 1095

Leu Pro Leu Ser Val Leu Tyr Ile Tyr Tyr Gln Gln Tyr Tyr Leu  
 1100 1105 1110

Arg Thr Ser Arg Glu Leu Arg Arg Leu Asp Ser Val Thr Arg Ser  
 1115 1120 1125

Pro Ile Tyr Ala His Phe Gln Glu Thr Leu Gly Gly Leu Thr Thr

|                                                             |  |      |  |      |
|-------------------------------------------------------------|--|------|--|------|
| 1130                                                        |  | 1135 |  | 1140 |
| Ile Arg Gly Tyr Ser Gln Gln Thr Arg Phe Val His Ile Asn Gln |  |      |  |      |
| 1145                                                        |  | 1150 |  | 1155 |
| Thr Arg Val Asp Asn Asn Met Ser Ala Phe Tyr Pro Ser Val Asn |  |      |  |      |
| 1160                                                        |  | 1165 |  | 1170 |
| Ala Asn Arg Trp Leu Ala Phe Arg Leu Glu Phe Ile Gly Ser Ile |  |      |  |      |
| 1175                                                        |  | 1180 |  | 1185 |
| Ile Ile Leu Gly Ser Ser Met Leu Ala Val Ile Arg Leu Gly Asn |  |      |  |      |
| 1190                                                        |  | 1195 |  | 1200 |
| Gly Thr Leu Thr Ala Gly Met Ile Gly Leu Ser Leu Ser Phe Ala |  |      |  |      |
| 1205                                                        |  | 1210 |  | 1215 |
| Leu Gln Ile Thr Gln Ser Leu Asn Trp Ile Val Arg Met Thr Val |  |      |  |      |
| 1220                                                        |  | 1225 |  | 1230 |
| Glu Val Glu Thr Asn Ile Val Ser Val Glu Arg Ile Lys Glu Tyr |  |      |  |      |
| 1235                                                        |  | 1240 |  | 1245 |
| Ala Glu Leu Lys Ser Glu Ala Pro Tyr Ile Ile Glu Asp His Arg |  |      |  |      |
| 1250                                                        |  | 1255 |  | 1260 |
| Pro Pro Ala Ser Trp Pro Glu Lys Gly Asp Val Lys Phe Val Asn |  |      |  |      |
| 1265                                                        |  | 1270 |  | 1275 |
| Tyr Ser Thr Arg Tyr Arg Pro Glu Leu Glu Leu Ile Leu Lys Asp |  |      |  |      |
| 1280                                                        |  | 1285 |  | 1290 |
| Ile Asn Leu His Ile Leu Pro Lys Glu Lys Ile Gly Ile Val Gly |  |      |  |      |
| 1295                                                        |  | 1300 |  | 1305 |
| Arg Thr Gly Ala Gly Lys Ser Ser Leu Thr Leu Ala Leu Phe Arg |  |      |  |      |
| 1310                                                        |  | 1315 |  | 1320 |

Ile Ile Glu Ala Ala Ser Gly His Ile Ile Ile Asp Gly Ile Pro  
 1325 1330 1335

Ile Asp Ser Ile Gly Leu Ala Asp Leu Arg His Arg Leu Ser Ile  
 1340 1345 1350

Ile Pro Gln Asp Ser Gln Ile Phe Glu Gly Thr Ile Arg Glu Asn  
 1355 1360 1365

Ile Asp Pro Ser Lys Gln Tyr Thr Asp Glu Gln Ile Trp Asp Ala  
 1370 1375 1380

Leu Glu Leu Ser His Leu Lys Asn His Val Lys Asn Met Gly Pro  
 1385 1390 1395

Asp Gly Leu Glu Thr Met Leu Ser Glu Gly Gly Gly Asn Leu Ser  
 1400 1405 1410

Val Gly Gln Arg Gln Leu Met Cys Leu Ala Arg Ala Leu Leu Ile  
 1415 1420 1425

Ser Ser Lys Ile Leu Val Leu Asp Glu Ala Thr Ala Ala Val Asp  
 1430 1435 1440

Val Glu Thr Asp Gln Leu Ile Gln Lys Thr Ile Arg Glu Ala Phe  
 1445 1450 1455

Lys Glu Arg Thr Ile Leu Thr Ile Ala His Arg Ile Asn Thr Ile  
 1460 1465 1470

Met Asp Ser Asp Arg Ile Ile Val Leu Asp Lys Gly Arg Val Thr  
 1475 1480 1485

Glu Phe Asp Thr Pro Ala Asn Leu Leu Asn Lys Lys Asp Ser Ile  
 1490 1495 1500

Phe Tyr Ser Leu Cys Val Glu Ala Gly Leu Ala Glu

1505

1510

1515

&lt;210&gt; 4

&lt;211&gt; 1559

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Synthetic: T4\_Fungal\_2 ABC-transporter

&lt;400&gt; 4

Met Ser Ser Leu Glu Val Val Asp Gly Cys Pro Tyr Gly Tyr Arg Pro  
 1 5 10 15

Tyr Pro Asp Ser Gly Thr Asn Ala Leu Asn Pro Cys Phe Ile Ser Val  
 20 25 30

Ile Ser Ala Trp Gln Ala Val Phe Phe Leu Leu Ile Gly Ser Tyr Gln  
 35 40 45

Leu Trp Lys Leu Tyr Lys Asn Asn Lys Val Pro Pro Arg Phe Lys Asn  
 50 55 60

Phe Pro Thr Leu Pro Ser Lys Ile Asn Ser Arg His Leu Thr His Leu  
 65 70 75 80

Thr Asn Val Cys Phe Gln Ser Thr Leu Ile Ile Cys Glu Leu Ala Leu  
 85 90 95

Val Ser Gln Ser Ser Asp Arg Val Tyr Pro Phe Ile Leu Lys Lys Ala  
 100 105 110

Leu Tyr Leu Asn Leu Leu Phe Asn Leu Gly Ile Ser Leu Pro Thr Gln  
 115 120 125

Tyr Leu Ala Tyr Phe Lys Ser Thr Phe Ser Met Gly Asn Gln Leu Phe  
 130 135 140

Tyr Tyr Met Phe Gln Ile Leu Leu Gln Leu Phe Leu Ile Leu Gln Arg

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

Gln Phe Tyr Ile Gly Ile Phe Glu Ala Gly Leu Gly Ile Arg Gly Ser  
 355 360 365

Leu Ala Ser Leu Val Tyr Gln Lys Ser Leu Arg Leu Thr Leu Ala Glu  
 370 375 380

Arg Asn Glu Lys Ser Thr Gly Asp Ile Leu Asn Leu Met Ser Val Asp  
 385 390 395 400

Val Leu Arg Ile Gln Arg Phe Phe Glu Asn Ala Gln Thr Ile Ile Gly  
 405 410 415

Ala Pro Ile Gln Ile Ile Val Val Leu Thr Ser Leu Tyr Trp Leu Leu  
 420 425 430

Gly Lys Ala Val Val Gly Gly Leu Val Thr Met Ala Ile Met Met Pro  
 435 440 445

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

Met Lys Tyr Lys Asp Met Arg Ile Lys Thr Ile Thr Glu Leu Leu Asn  
 465 470 475 480

Ala Ile Lys Ser Ile Lys Leu Tyr Ala Trp Glu Glu Pro Met Met Ala  
 485 490 495

Arg Leu Asn His Val Arg Asn Asp Met Glu Leu Lys Asn Phe Arg Lys  
 500 505 510

Ile Gly Ile Val Ser Asn Leu Ile Tyr Phe Ala Trp Asn Cys Val Pro  
 515 520 525

Leu Met Val Thr Cys Ser Thr Phe Gly Leu Phe Ser Leu Phe Ser Asp  
 530 535 540

Ser Pro Leu Ser Pro Ala Ile Val Phe Pro Ser Leu Ser Leu Phe Asn

|                 |                         |                 |             |     |  |     |
|-----------------|-------------------------|-----------------|-------------|-----|--|-----|
| 545             |                         | 550             |             | 555 |  | 560 |
| Ile Leu Asn Ser | Ala Ile Tyr Ser Val     | Pro Ser Met Ile | Asn Thr Ile |     |  |     |
|                 | 565                     | 570             | 575         |     |  |     |
| Ile Glu Thr Ser | Val Ser Met Glu Arg     | Leu Lys Ser Phe | Leu Leu Ser |     |  |     |
|                 | 580                     | 585             | 590         |     |  |     |
| Asp Glu Ile Asp | Asp Ser Phe Ile Glu Arg | Ile Asp Pro Ser | Ala Asp     |     |  |     |
|                 | 595                     | 600             | 605         |     |  |     |
| Glu Arg Ala Leu | Pro Ala Ile Glu Met     | Asn Asn Ile Thr | Phe Leu Trp |     |  |     |
|                 | 610                     | 615             | 620         |     |  |     |
| Lys Ser Lys Glu | Val Leu Ala Ser Ser     | Gln Ser Gly Asp | Asn Leu Arg |     |  |     |
| 625             | 630                     | 635             | 640         |     |  |     |
| Thr Asp Glu Glu | Ser Ile Ile Gly Ser     | Ser Gln Ile Ala | Leu Lys Asn |     |  |     |
|                 | 645                     | 650             | 655         |     |  |     |
| Ile Asp His Phe | Glu Ala Lys Arg Gly Asp | Leu Val Cys Val | Val Gly     |     |  |     |
|                 | 660                     | 665             | 670         |     |  |     |
| Arg Val Gly Ala | Gly Lys Ser Thr Phe     | Leu Lys Ala Ile | Leu Gly Gln |     |  |     |
|                 | 675                     | 680             | 685         |     |  |     |
| Leu Pro Cys Met | Ser Gly Ser Arg Asp     | Ser Ile Pro Pro | Lys Leu Ile |     |  |     |
|                 | 690                     | 695             | 700         |     |  |     |
| Ile Arg Ser Ser | Ser Val Ala Tyr Cys Ser | Gln Glu Ser Trp | Ile Met     |     |  |     |
| 705             | 710                     | 715             | 720         |     |  |     |
| Asn Ala Ser Val | Arg Glu Asn Ile Leu     | Phe Gly His Lys | Phe Asp Gln |     |  |     |
|                 | 725                     | 730             | 735         |     |  |     |
| Asn Tyr Tyr Asp | Leu Thr Ile Lys Ala Cys | Gln Leu Leu Pro | Asp Leu     |     |  |     |
|                 | 740                     | 745             | 750         |     |  |     |

Lys Ile Leu Pro Asp Gly Asp Glu Thr Leu Val Gly Glu Lys Gly Ile  
 755 760 765

Ser Leu Ser Gly Gly Gln Lys Ala Arg Leu Ser Leu Ala Arg Ala Val  
 770 775 780

Tyr Ser Arg Ala Asp Ile Tyr Leu Leu Asp Asp Ile Leu Ser Ala Val  
 785 790 795 800

Asp Ala Glu Val Ser Lys Asn Ile Ile Glu Tyr Val Leu Ile Gly Lys  
 805 810 815

Thr Ala Leu Leu Lys Asn Lys Thr Ile Ile Leu Thr Thr Asn Thr Val  
 820 825 830

Ser Ile Leu Lys His Ser Gln Met Ile Tyr Ala Leu Glu Asn Gly Glu  
 835 840 845

Ile Val Glu Gln Gly Asn Tyr Glu Asp Val Met Asn Arg Lys Asn Asn  
 850 855 860

Thr Ser Lys Leu Lys Lys Leu Leu Glu Glu Phe Asp Ser Pro Ile Asp  
 865 870 875 880

Asn Gly Asn Glu Ser Asp Val Gln Thr Glu His Arg Ser Glu Ser Glu  
 885 890 895

Val Asp Glu Pro Leu Gln Leu Lys Val Thr Glu Ser Glu Thr Glu Asp  
 900 905 910

Glu Val Val Thr Glu Ser Glu Leu Glu Leu Ile Lys Ala Asn Ser Arg  
 915 920 925

Arg Ala Ser Leu Ala Thr Leu Arg Pro Arg Pro Phe Val Gly Ala Gln  
 930 935 940

Leu Asp Ser Val Lys Lys Thr Ala Gln Glu Ala Glu Lys Thr Glu Val

|                                                                 |  |      |  |      |  |      |
|-----------------------------------------------------------------|--|------|--|------|--|------|
| 945                                                             |  | 950  |  | 955  |  | 960  |
| Gly Arg Val Lys Thr Lys Val Tyr Leu Ala Tyr Ile Lys Ala Cys Gly |  |      |  |      |  |      |
|                                                                 |  | 965  |  | 970  |  | 975  |
| Val Leu Gly Val Val Leu Phe Phe Leu Phe Met Ile Leu Thr Arg Val |  |      |  |      |  |      |
|                                                                 |  | 980  |  | 985  |  | 990  |
| Phe Asp Leu Ala Glu Asn Phe Trp Leu Lys Tyr Trp Ser Glu Ser Asn |  |      |  |      |  |      |
|                                                                 |  | 995  |  | 1000 |  | 1005 |
| Glu Lys Asn Gly Ser Asn Glu Arg Val Trp Met Phe Val Gly Val     |  |      |  |      |  |      |
|                                                                 |  | 1010 |  | 1015 |  | 1020 |
| Tyr Ser Leu Ile Gly Val Ala Ser Ala Ala Phe Asn Asn Leu Arg     |  |      |  |      |  |      |
|                                                                 |  | 1025 |  | 1030 |  | 1035 |
| Ser Ile Met Met Leu Leu Tyr Cys Ser Ile Arg Gly Ser Lys Lys     |  |      |  |      |  |      |
|                                                                 |  | 1040 |  | 1045 |  | 1050 |
| Leu His Glu Ser Met Ala Lys Ser Val Ile Arg Ser Pro Met Thr     |  |      |  |      |  |      |
|                                                                 |  | 1055 |  | 1060 |  | 1065 |
| Phe Phe Glu Thr Thr Pro Val Gly Arg Ile Ile Asn Arg Phe Ser     |  |      |  |      |  |      |
|                                                                 |  | 1070 |  | 1075 |  | 1080 |
| Ser Asp Met Asp Ala Val Asp Ser Asn Leu Gln Tyr Ile Phe Ser     |  |      |  |      |  |      |
|                                                                 |  | 1085 |  | 1090 |  | 1095 |
| Phe Phe Phe Lys Ser Ile Leu Thr Tyr Leu Val Thr Val Ile Leu     |  |      |  |      |  |      |
|                                                                 |  | 1100 |  | 1105 |  | 1110 |
| Val Gly Tyr Asn Met Pro Trp Phe Leu Val Phe Asn Met Phe Leu     |  |      |  |      |  |      |
|                                                                 |  | 1115 |  | 1120 |  | 1125 |
| Val Val Ile Tyr Ile Tyr Tyr Gln Thr Phe Tyr Ile Val Leu Ser     |  |      |  |      |  |      |
|                                                                 |  | 1130 |  | 1135 |  | 1140 |

Arg Glu Leu Lys Arg Leu Ile Ser Ile Ser Tyr Ser Pro Ile Met  
 1145 1150 1155

Ser Leu Met Ser Glu Ser Leu Asn Gly Tyr Ser Ile Ile Asp Ala  
 1160 1165 1170

Tyr Asp His Phe Glu Arg Phe Ile Tyr Leu Asn Tyr Glu Lys Ile  
 1175 1180 1185

Gln Tyr Asn Val Asp Phe Val Phe Asn Phe Arg Ser Thr Asn Arg  
 1190 1195 1200

Trp Leu Ser Val Arg Leu Gln Thr Ile Gly Ala Thr Ile Val Leu  
 1205 1210 1215

Ala Thr Ala Ile Leu Ala Leu Ala Thr Met Asn Thr Lys Arg Gln  
 1220 1225 1230

Leu Ser Ser Gly Met Val Gly Leu Leu Met Ser Tyr Ser Leu Glu  
 1235 1240 1245

Val Thr Gly Ser Leu Thr Trp Ile Val Arg Thr Thr Val Met Ile  
 1250 1255 1260

Glu Thr Asn Ile Val Ser Val Glu Arg Ile Val Glu Tyr Cys Glu  
 1265 1270 1275

Leu Pro Pro Glu Ala Gln Ser Ile Asn Pro Glu Lys Arg Pro Asp  
 1280 1285 1290

Glu Asn Trp Pro Ser Lys Gly Gly Ile Glu Phe Lys Asn Tyr Ser  
 1295 1300 1305

Thr Lys Tyr Arg Glu Asn Leu Asp Pro Val Leu Asn Asn Ile Asn  
 1310 1315 1320

Val Lys Ile Glu Pro Cys Glu Lys Val Gly Ile Val Gly Arg Thr

1325

1330

1335

Gly Ala Gly Lys Ser Thr Leu Ser Leu Ala Leu Phe Arg Ile Leu  
 1340 1345 1350

Glu Pro Thr Glu Gly Lys Ile Ile Ile Asp Gly Ile Gly Ile Ser  
 1355 1360 1365

Asp Ile Gly Leu Phe Asp Leu Arg Ser His Leu Ala Ile Ile Pro  
 1370 1375 1380

Gln Asp Ala Gln Ala Phe Glu Gly Thr Val Lys Thr Asn Leu Asp  
 1385 1390 1395

Pro Phe Asn Arg Tyr Ser Glu Asp Glu Leu Lys Arg Ala Val Glu  
 1400 1405 1410

Gln Ala His Leu Lys Pro His Leu Glu Lys Met Leu His Ser Lys  
 1415 1420 1425

Pro Arg Gly Asp Asp Ser Asn Glu Glu Asp Gly Asn Val Asn Asp  
 1430 1435 1440

Ile Leu Asp Val Lys Ile Asn Glu Asn Gly Ser Asn Leu Ser Val  
 1445 1450 1455

Gly Gln Arg Gln Leu Leu Cys Leu Ala Arg Ala Leu Leu Asn Arg  
 1460 1465 1470

Ser Lys Ile Leu Val Leu Asp Glu Ala Thr Ala Ser Val Asp Met  
 1475 1480 1485

Glu Thr Asp Lys Ile Ile Gln Asp Thr Ile Arg Arg Glu Phe Lys  
 1490 1495 1500

Asp Arg Thr Ile Leu Thr Ile Ala His Arg Ile Asp Thr Val Leu  
 1505 1510 1515

Asp Ser Asp Lys Ile Ile Val Leu Asp Gln Gly Ser Val Arg Glu  
 1520 1525 1530

Phe Asp Ser Pro Ser Lys Leu Leu Ser Asp Lys Thr Ser Ile Phe  
 1535 1540 1545

Tyr Ser Leu Cys Glu Lys Gly Gly Tyr Leu Lys  
 1550 1555

<210> 5

<211> 1638

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: T4\_Fungal\_3 ABC-transporter

<400> 5

Met Asn Ser Tyr Asn Glu Ser Ala Pro Thr Gly Cys Ser Phe Trp Asp  
 1 5 10 15

Asn Asp Asp Ile Ser Pro Cys Ile Arg Lys Ser Leu Leu Asp Ser Tyr  
 20 25 30

Leu Pro Ala Ala Ile Val Val Gly Ser Leu Leu Tyr Leu Leu Leu Ile  
 35 40 45

Gly Ala Gln Gln Ile Lys Thr His Arg Lys Leu Tyr Ala Lys Asp Glu  
 50 55 60

Thr Gln Pro Leu Leu Glu Pro Ala Asn Gly Ser Pro Thr Asp Tyr Ser  
 65 70 75 80

Asn Thr Tyr Gly Thr Ile Asp Tyr Glu Glu Glu Gln Ser Thr Ala Glu  
 85 90 95

Leu Thr Thr Ser Gln Lys His Phe Asp Ile Ser Arg Leu Glu Pro Leu  
 100 105 110

Lys Asp Asp Gly Thr Pro Leu Gly Leu Val Lys Tyr Val Gln Arg Asp  
 115 120 125

Gly Trp Glu Lys Val Lys Leu Ile Leu Glu Phe Val Ile Leu Ile Phe  
 130 135 140

Gln Leu Val Ile Ala Val Val Ala Leu Phe Val Pro Ser Leu Asn Gln  
 145 150 155 160

Glu Trp Glu Gly Tyr Lys Leu Thr Pro Ile Val Arg Val Phe Val Trp  
 165 170 175

Ile Phe Leu Phe Ala Leu Gly Ser Ile Arg Ala Leu Asn Lys Ser Gly  
 180 185 190

Pro Phe Pro Leu Ala Asn Ile Ser Leu Leu Tyr Tyr Ile Val Asn Ile  
 195 200 205

Val Pro Ser Ala Leu Ser Phe Arg Ser Val Leu Ile His Pro Gln Asn  
 210 215 220

Ser Gln Leu Val Asn Tyr Tyr Tyr Ser Phe Gln Phe Ile Asn Asn Thr  
 225 230 235 240

Leu Leu Phe Leu Leu Leu Gly Ser Ala Arg Val Phe Asp His Pro Ser  
 245 250 255

Val Leu Phe Asp Thr Asp Asp Gly Val Lys Pro Ser Pro Glu Asn Asn  
 260 265 270

Ser Asn Phe Phe Glu Ile Val Thr Tyr Ser Trp Ile Asp Pro Leu Ile  
 275 280 285

Phe Lys Ala Tyr Lys Thr Pro Leu Gln Phe Asn Asp Ile Trp Gly Leu  
 290 295 300

Arg Ile Asp Asp Tyr Ala Tyr Phe Leu Leu Arg Arg Phe Lys Asp Leu

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 305 |     | 310 |     | 315 |     | 320 |     |     |     |     |     |     |     |     |     |
| Gly | Phe | Thr | Arg | Thr | Phe | Thr | Tyr | Lys | Ile | Phe | Tyr | Phe | Ser | Lys | Gly |
|     |     |     |     | 325 |     |     |     |     | 330 |     |     |     |     | 335 |     |
| Asp | Leu | Ala | Ala | Gln | Ala | Leu | Trp | Ala | Ser | Ile | Asp | Ser | Met | Leu | Ile |
|     |     |     | 340 |     |     |     |     | 345 |     |     |     |     | 350 |     |     |
| Phe | Gly | Pro | Ser | Leu | Leu | Leu | Lys | Arg | Ile | Leu | Glu | Tyr | Val | Asp | Asn |
|     |     | 355 |     |     |     |     | 360 |     |     |     |     | 365 |     |     |     |
| Pro | Gly | Met | Thr | Ser | Arg | Asn | Met | Ala | Trp | Leu | Tyr | Val | Leu | Thr | Met |
|     | 370 |     |     |     |     | 375 |     |     |     |     | 380 |     |     |     |     |
| Phe | Phe | Ile | Gln | Ile | Ser | Asp | Ser | Leu | Val | Ser | Gly | Arg | Ser | Leu | Tyr |
| 385 |     |     |     |     | 390 |     |     |     |     | 395 |     |     |     |     | 400 |
| Leu | Gly | Arg | Arg | Val | Cys | Ile | Arg | Met | Lys | Ala | Leu | Ile | Ile | Gly | Glu |
|     |     |     |     | 405 |     |     |     |     | 410 |     |     |     |     | 415 |     |
| Val | Tyr | Ala | Lys | Ala | Leu | Arg | Arg | Arg | Met | Thr | Ser | Pro | Glu | Glu | Leu |
|     |     |     | 420 |     |     |     |     | 425 |     |     |     |     | 430 |     |     |
| Ile | Glu | Glu | Val | Asp | Pro | Lys | Asp | Gly | Lys | Ala | Pro | Ile | Ala | Asp | Gln |
|     |     | 435 |     |     |     |     | 440 |     |     |     |     | 445 |     |     |     |
| Thr | Ser | Lys | Glu | Glu | Ser | Lys | Ser | Thr | Glu | Leu | Gly | Gly | Ile | Ile | Asn |
|     | 450 |     |     |     |     | 455 |     |     |     |     | 460 |     |     |     |     |
| Leu | Met | Ala | Val | Asp | Ala | Ser | Lys | Val | Ser | Glu | Leu | Cys | Ser | Tyr | Leu |
| 465 |     |     |     |     | 470 |     |     |     |     | 475 |     |     |     |     | 480 |
| His | Phe | Phe | Val | Asn | Ser | Phe | Phe | Met | Ile | Ile | Val | Ala | Val | Thr | Leu |
|     |     |     |     | 485 |     |     |     |     | 490 |     |     |     |     | 495 |     |
| Leu | Tyr | Arg | Leu | Leu | Gly | Trp | Ser | Ala | Leu | Ala | Gly | Ser | Ser | Ser | Ile |
|     |     |     | 500 |     |     |     |     | 505 |     |     |     |     | 510 |     |     |

Leu Ile Leu Leu Pro Leu Asn Tyr Lys Leu Ala Ser Lys Ile Gly Glu  
 515 520 525

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

Asn Glu Ala Phe Gln Ser Ile Arg Ile Ile Lys Phe Phe Ala Trp Glu  
 545 550 555 560

Glu Asn Phe Ala Lys Glu Ile Met Lys Val Arg Asn Glu Glu Ile Arg  
 565 570 575

Tyr Leu Arg Tyr Arg Val Ile Val Trp Thr Cys Ser Ala Phe Val Trp  
 580 585 590

Phe Ile Thr Pro Thr Leu Val Thr Leu Ile Ser Phe Tyr Phe Tyr Val  
 595 600 605

Val Phe Gln Gly Lys Ile Leu Thr Thr Pro Val Ala Phe Thr Ala Leu  
 610 615 620

Ser Leu Phe Asn Leu Leu Arg Ser Pro Leu Asp Gln Leu Ser Asp Met  
 625 630 635 640

Leu Ser Phe Met Val Gln Ser Lys Val Ser Leu Asp Arg Val Gln Lys  
 645 650 655

Phe Leu Glu Glu Gln Glu Ser Asp Lys Tyr Glu Gln Leu Thr His Thr  
 660 665 670

Arg Gly Ala Asn Ser Pro Glu Val Gly Phe Glu Asn Ala Thr Leu Ser  
 675 680 685

Trp Asn Lys Gly Ser Lys Asn Asp Phe Gln Leu Lys Asp Ile Asp Ile  
 690 695 700

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

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 705 |     | 710 |     | 715 |     | 720 |     |     |     |     |     |     |     |     |     |
| Gly | Lys | Thr | Ser | Leu | Leu | Leu | Gly | Leu | Leu | Gly | Glu | Met | Gln | Leu | Thr |
|     |     |     |     | 725 |     |     |     |     | 730 |     |     |     |     | 735 |     |
| Asn | Gly | Lys | Ile | Phe | Leu | Pro | Gly | Ser | Thr | Pro | Arg | Asp | Glu | Leu | Ile |
|     |     |     | 740 |     |     |     |     | 745 |     |     |     |     | 750 |     |     |
| Pro | Asn | Pro | Glu | Thr | Gly | Met | Thr | Glu | Ala | Val | Ala | Tyr | Cys | Ser | Gln |
|     |     | 755 |     |     |     |     | 760 |     |     |     |     | 765 |     |     |     |
| Ile | Ala | Trp | Leu | Leu | Asn | Asp | Thr | Val | Lys | Asn | Asn | Ile | Val | Phe | Ala |
|     | 770 |     |     |     |     | 775 |     |     |     |     | 780 |     |     |     |     |
| Ala | Pro | Phe | Asn | Gln | Gln | Arg | Tyr | Asp | Ala | Val | Ile | Asp | Ala | Cys | Gly |
| 785 |     |     |     |     | 790 |     |     |     |     | 795 |     |     |     |     | 800 |
| Leu | Thr | Arg | Asp | Leu | Lys | Val | Leu | Asp | Ala | Gly | Asp | Ala | Thr | Glu | Ile |
|     |     |     |     | 805 |     |     |     |     | 810 |     |     |     |     | 815 |     |
| Gly | Glu | Lys | Gly | Ile | Thr | Leu | Ser | Gly | Gly | Gln | Lys | Gln | Arg | Val | Ser |
|     |     |     | 820 |     |     |     |     | 825 |     |     |     |     | 830 |     |     |
| Leu | Ala | Arg | Ala | Leu | Tyr | Ser | Asn | Ala | Arg | His | Val | Leu | Leu | Asp | Asp |
|     |     | 835 |     |     |     |     | 840 |     |     |     |     | 845 |     |     |     |
| Cys | Leu | Ser | Ala | Val | Asp | Ser | His | Thr | Ala | Ala | Trp | Ile | Tyr | Glu | Asn |
|     | 850 |     |     |     |     | 855 |     |     |     |     | 860 |     |     |     |     |
| Cys | Ile | Thr | Gly | Pro | Leu | Met | Lys | Asp | Arg | Thr | Cys | Ile | Leu | Val | Ser |
| 865 |     |     |     |     | 870 |     |     |     |     | 875 |     |     |     |     | 880 |
| His | Asn | Val | Ala | Leu | Thr | Val | Arg | Asp | Ala | Ala | Trp | Ile | Val | Ala | Met |
|     |     |     | 885 |     |     |     |     |     | 890 |     |     |     |     | 895 |     |
| Asp | Asn | Gly | Arg | Val | Leu | Glu | Gln | Gly | Thr | Cys | Glu | Asp | Leu | Leu | Ser |
|     |     | 900 |     |     |     |     |     | 905 |     |     |     |     | 910 |     |     |

Ser Gly Ser Leu Gly His Asp Asp Leu Val Ser Thr Val Ile Ser Ser  
 915 920 925

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

Ser Glu Ile His Gln Lys Leu Lys Lys Ile Ala Glu Ser Asp Lys Ala  
 945 950 955 960

Asp Gln Leu Asp Glu Glu Arg Leu Ser Pro Arg Gly Lys Leu Ile Glu  
 965 970 975

Asp Glu Thr Lys Ser Ser Gly Ala Val Ser Trp Glu Val Tyr Lys Phe  
 980 985 990

Tyr Gly Arg Ala Phe Gly Gly Val Phe Ile Trp Phe Val Phe Val Ala  
 995 1000 1005

Ala Phe Ala Ala Ser Gln Gly Ser Asn Ile Met Gln Ser Val Trp  
 1010 1015 1020

Leu Lys Ile Trp Ala Ala Ala Asn Asp Lys Leu Val Ser Pro Ala  
 1025 1030 1035

Phe Thr Met Ser Ile Asp Arg Ser Leu Asn Ala Leu Lys Glu Gly  
 1040 1045 1050

Phe Arg Ala Ser Val Ala Ser Val Glu Trp Ser Arg Pro Leu Gly  
 1055 1060 1065

Gly Glu Met Phe Arg Val Tyr Gly Glu Glu Ser Ser His Ser Ser  
 1070 1075 1080

Gly Tyr Tyr Ile Thr Ile Tyr Ala Leu Ile Gly Leu Ser Tyr Ala  
 1085 1090 1095

Leu Ile Ser Ala Phe Arg Val Tyr Val Val Phe Met Gly Gly Ile

|      |     |      |     |      |     |      |     |     |     |     |      |     |     |     |
|------|-----|------|-----|------|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| 1100 |     | 1105 |     | 1110 |     |      |     |     |     |     |      |     |     |     |
| Val  | Ala | Ser  | Asn | Lys  | Ile | Phe  | Glu | Asp | Met | Leu | Thr  | Lys | Ile | Phe |
| 1115 |     |      |     |      |     | 1120 |     |     |     |     | 1125 |     |     |     |
| Asn  | Ala | Lys  | Leu | Arg  | Phe | Phe  | Asp | Ser | Thr | Pro | Ile  | Gly | Arg | Ile |
| 1130 |     |      |     |      |     | 1135 |     |     |     |     | 1140 |     |     |     |
| Met  | Asn | Arg  | Phe | Ser  | Lys | Asp  | Thr | Glu | Ser | Ile | Asp  | Gln | Glu | Leu |
| 1145 |     |      |     |      |     | 1150 |     |     |     |     | 1155 |     |     |     |
| Ala  | Pro | Tyr  | Ala | Glu  | Gly | Phe  | Ile | Val | Ser | Val | Leu  | Gln | Cys | Gly |
| 1160 |     |      |     |      |     | 1165 |     |     |     |     | 1170 |     |     |     |
| Ala  | Thr | Ile  | Leu | Leu  | Ile | Cys  | Ile | Ile | Thr | Pro | Gly  | Phe | Ile | Val |
| 1175 |     |      |     |      |     | 1180 |     |     |     |     | 1185 |     |     |     |
| Phe  | Ala | Ala  | Phe | Ile  | Val | Ile  | Ile | Tyr | Tyr | Tyr | Ile  | Gly | Ala | Leu |
| 1190 |     |      |     |      |     | 1195 |     |     |     |     | 1200 |     |     |     |
| Tyr  | Leu | Ala  | Ser | Ser  | Arg | Glu  | Leu | Lys | Arg | Tyr | Asp  | Ser | Ile | Thr |
| 1205 |     |      |     |      |     | 1210 |     |     |     |     | 1215 |     |     |     |
| Val  | Ser | Pro  | Ile | His  | Gln | His  | Phe | Ser | Glu | Thr | Leu  | Val | Gly | Val |
| 1220 |     |      |     |      |     | 1225 |     |     |     |     | 1230 |     |     |     |
| Thr  | Thr | Ile  | Arg | Ala  | Tyr | Gly  | Asp | Glu | Arg | Arg | Phe  | Met | Arg | Gln |
| 1235 |     |      |     |      |     | 1240 |     |     |     |     | 1245 |     |     |     |
| Asn  | Leu | Glu  | Lys | Ile  | Asp | Asn  | Asn | Asn | Arg | Ser | Phe  | Phe | Tyr | Leu |
| 1250 |     |      |     |      |     | 1255 |     |     |     |     | 1260 |     |     |     |
| Trp  | Val | Ala  | Asn | Arg  | Trp | Leu  | Ala | Leu | Arg | Val | Asp  | Phe | Val | Gly |
| 1265 |     |      |     |      |     | 1270 |     |     |     |     | 1275 |     |     |     |
| Ala  | Leu | Val  | Ser | Leu  | Leu | Ser  | Ala | Ala | Phe | Val | Met  | Leu | Ser | Ile |
| 1280 |     |      |     |      |     | 1285 |     |     |     |     | 1290 |     |     |     |

Gly His Ile Asp Ala Gly Met Ala Gly Leu Ser Leu Ser Tyr Ala  
 1295 1300 1305

Ile Ala Phe Thr Gln Ser Ala Leu Trp Val Val Arg Leu Tyr Ser  
 1310 1315 1320

Val Val Glu Met Asn Met Asn Ser Val Glu Arg Leu Glu Glu Tyr  
 1325 1330 1335

Leu Asn Ile Asp Gln Glu Pro Asp Arg Glu Ile Pro Asp Asn Lys  
 1340 1345 1350

Pro Pro Ser Ser Trp Pro Glu Thr Gly Glu Ile Glu Val Asp Asp  
 1355 1360 1365

Val Ser Leu Arg Tyr Ala Pro Ser Leu Pro Lys Val Ile Lys Asn  
 1370 1375 1380

Val Ser Phe Lys Val Glu Pro Arg Ser Lys Ile Gly Ile Val Gly  
 1385 1390 1395

Arg Thr Gly Ala Gly Lys Ser Thr Ile Ile Thr Ala Phe Phe Arg  
 1400 1405 1410

Phe Val Asp Pro Glu Ser Gly Ser Ile Lys Ile Asp Gly Ile Asp  
 1415 1420 1425

Ile Thr Ser Ile Gly Leu Lys Asp Leu Arg Asn Ala Val Thr Ile  
 1430 1435 1440

Ile Pro Gln Asp Pro Thr Leu Phe Thr Gly Thr Ile Arg Ser Asn  
 1445 1450 1455

Leu Asp Pro Phe Asn Gln Tyr Ser Asp Ala Glu Ile Phe Glu Ser  
 1460 1465 1470

Leu Lys Arg Val Asn Leu Val Ser Thr Asp Glu Pro Thr Ser Gly

1475

1480

1485

Ser Ser Ser Asp Asn Ile Glu Asp Ser Asn Glu Asn Val Asn Lys  
 1490 1495 1500

Phe Leu Asn Leu Asn Asn Thr Val Ser Glu Gly Gly Ser Asn Leu  
 1505 1510 1515

Ser Gln Gly Gln Arg Gln Leu Thr Cys Leu Ala Arg Ser Leu Leu  
 1520 1525 1530

Lys Ser Pro Lys Ile Ile Leu Leu Asp Glu Ala Thr Ala Ser Ile  
 1535 1540 1545

Asp Tyr Asn Thr Asp Ser Lys Ile Gln Thr Thr Ile Arg Glu Glu  
 1550 1555 1560

Phe Ser Asp Ser Thr Ile Leu Thr Ile Ala His Arg Leu Arg Ser  
 1565 1570 1575

Ile Ile Asp Tyr Asp Lys Ile Leu Val Met Asp Ala Gly Arg Val  
 1580 1585 1590

Val Glu Tyr Asp Asp Pro Tyr Lys Leu Ile Ser Asp Gln Asn Ser  
 1595 1600 1605

Leu Phe Tyr Ser Met Cys Ser Asn Ser Gly Glu Leu Asp Thr Leu  
 1610 1615 1620

Val Lys Leu Ala Lys Glu Ala Phe Ile Ala Lys Arg Asn Lys Lys  
 1625 1630 1635

&lt;210&gt; 6

&lt;211&gt; 1559

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Synthetic: T4\_Fungal\_4 ABC-transporter

&lt;400&gt; 6

Met Ser Ser Leu Glu Val Val Asp Gly Cys Pro Tyr Gly Tyr Arg Pro  
 1 5 10 15

Tyr Pro Asp Ser Gly Thr Asn Ala Leu Asn Pro Cys Phe Ile Ser Val  
 20 25 30

Ile Ser Ala Trp Gln Ala Val Phe Phe Leu Leu Ile Gly Ser Tyr Gln  
 35 40 45

Leu Trp Lys Leu Tyr Lys Asn Asn Lys Val Pro Pro Arg Phe Lys Asn  
 50 55 60

Phe Pro Thr Leu Pro Ser Lys Ile Asn Ser Arg His Leu Thr His Leu  
 65 70 75 80

Thr Asn Val Cys Phe Gln Ser Thr Leu Ile Ile Cys Glu Leu Ala Leu  
 85 90 95

Val Ser Gln Ser Ser Asp Arg Val Tyr Pro Phe Ile Leu Lys Lys Ala  
 100 105 110

Leu Tyr Leu Asn Leu Leu Phe Asn Leu Gly Ile Ser Leu Pro Thr Gln  
 115 120 125

Tyr Leu Ala Tyr Phe Lys Ser Thr Phe Ser Met Gly Asn Gln Leu Phe  
 130 135 140

Tyr Tyr Met Phe Gln Ile Leu Leu Gln Leu Phe Leu Ile Leu Gln Arg  
 145 150 155 160

Tyr Tyr His Gly Ser Ser Asn Glu Arg Leu Thr Val Ile Ser Gly Gln  
 165 170 175

Thr Ala Met Ile Leu Glu Val Leu Leu Leu Phe Asn Ser Val Ala Ile  
 180 185 190

Phe Ile Tyr Asp Leu Cys Ile Phe Glu Pro Ile Asn Glu Leu Ser Glu  
 195 200 205

Tyr Tyr Lys Lys Asn Gly Trp Tyr Pro Pro Val His Val Leu Ser Tyr  
 210 215 220

Ile Thr Phe Ile Trp Met Asn Lys Leu Ile Val Glu Thr Tyr Arg Asn  
 225 230 235 240

Lys Lys Ile Lys Asp Pro Asn Gln Leu Pro Leu Pro Pro Val Asp Leu  
 245 250 255

Asn Ile Lys Ser Ile Ser Lys Glu Phe Lys Ala Asn Trp Glu Leu Glu  
 260 265 270

Lys Trp Leu Asn Arg Asn Ser Leu Trp Arg Ala Ile Trp Lys Ser Phe  
 275 280 285

Gly Arg Thr Ile Ser Val Ala Met Leu Tyr Glu Thr Thr Ser Asp Leu  
 290 295 300

Leu Ser Val Val Gln Pro Gln Phe Leu Arg Ile Phe Ile Asp Gly Phe  
 305 310 315 320

Asn Pro Glu Thr Ser Ser Lys Tyr Pro Pro Leu Asn Gly Val Phe Ile  
 325 330 335

Ala Leu Thr Leu Phe Val Ile Ser Val Val Ser Val Phe Leu Thr Asn  
 340 345 350

Gln Phe Tyr Ile Gly Ile Phe Glu Ala Gly Leu Gly Ile Arg Gly Ser  
 355 360 365

Leu Ala Ser Leu Val Tyr Gln Lys Ser Leu Arg Leu Thr Leu Ala Glu  
 370 375 380

Arg Asn Glu Lys Ser Thr Gly Asp Ile Leu Asn Leu Met Ser Val Asp

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 385 |     | 390 |     | 395 |     | 400 |     |     |     |     |     |     |     |     |     |
| Val | Leu | Arg | Ile | Gln | Arg | Phe | Phe | Glu | Asn | Ala | Gln | Thr | Ile | Ile | Gly |
|     |     |     | 405 |     |     |     |     |     | 410 |     |     |     |     | 415 |     |
| Ala | Pro | Ile | Gln | Ile | Ile | Val | Val | Leu | Thr | Ser | Leu | Tyr | Trp | Leu | Leu |
|     |     |     | 420 |     |     |     |     | 425 |     |     |     |     | 430 |     |     |
| Gly | Lys | Ala | Val | Ile | Gly | Gly | Leu | Val | Thr | Met | Ala | Ile | Met | Met | Pro |
|     |     | 435 |     |     |     |     | 440 |     |     |     |     | 445 |     |     |     |
| Ile | Asn | Ala | Phe | Leu | Ser | Arg | Lys | Val | Lys | Lys | Leu | Ser | Lys | Thr | Gln |
|     | 450 |     |     |     |     | 455 |     |     |     |     | 460 |     |     |     |     |
| Met | Lys | Tyr | Lys | Asp | Met | Arg | Ile | Lys | Thr | Ile | Thr | Glu | Leu | Leu | Asn |
| 465 |     |     |     |     | 470 |     |     |     |     | 475 |     |     |     |     | 480 |
| Ala | Ile | Lys | Ser | Ile | Lys | Leu | Tyr | Ala | Trp | Glu | Glu | Pro | Met | Met | Ala |
|     |     |     |     | 485 |     |     |     |     | 490 |     |     |     |     | 495 |     |
| Arg | Leu | Asn | His | Val | Arg | Asn | Asp | Met | Glu | Leu | Lys | Asn | Phe | Arg | Lys |
|     |     |     | 500 |     |     |     |     | 505 |     |     |     |     | 510 |     |     |
| Ile | Gly | Ile | Val | Ser | Asn | Leu | Ile | Tyr | Phe | Ala | Trp | Asn | Cys | Val | Pro |
|     |     | 515 |     |     |     |     | 520 |     |     |     |     | 525 |     |     |     |
| Leu | Met | Val | Thr | Cys | Ser | Thr | Phe | Gly | Leu | Phe | Ser | Leu | Phe | Ser | Asp |
|     | 530 |     |     |     |     | 535 |     |     |     |     | 540 |     |     |     |     |
| Ser | Pro | Leu | Ser | Pro | Ala | Ile | Val | Phe | Pro | Ser | Leu | Ser | Leu | Phe | Asn |
| 545 |     |     |     |     | 550 |     |     |     |     | 555 |     |     |     |     | 560 |
| Ile | Leu | Asn | Ser | Ala | Ile | Tyr | Ser | Val | Pro | Ser | Met | Ile | Asn | Thr | Ile |
|     |     |     |     | 565 |     |     |     |     | 570 |     |     |     |     | 575 |     |
| Ile | Glu | Thr | Ser | Val | Ser | Met | Glu | Arg | Leu | Lys | Ser | Phe | Leu | Leu | Ser |
|     |     |     | 580 |     |     |     |     | 585 |     |     |     |     | 590 |     |     |

Asp Glu Ile Asp Asp Ser Phe Ile Glu Arg Ile Asp Pro Ser Ala Asp  
 595 600 605

Glu Arg Ala Leu Pro Ala Ile Glu Met Asn Asn Ile Thr Phe Leu Trp  
 610 615 620

Lys Ser Lys Glu Val Leu Ala Ser Ser Gln Ser Arg Asp Asn Leu Arg  
 625 630 635 640

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

Ile Asp His Phe Glu Ala Lys Arg Gly Asp Leu Val Cys Val Val Gly  
 660 665 670

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

Leu Pro Cys Met Ser Gly Ser Arg Asp Ser Ile Pro Pro Lys Leu Ile  
 690 695 700

Ile Arg Ser Ser Ser Val Ala Tyr Cys Ser Gln Glu Ser Trp Ile Met  
 705 710 715 720

Asn Ala Ser Val Arg Glu Asn Ile Leu Phe Gly His Lys Phe Asp Gln  
 725 730 735

Asn Tyr Tyr Asp Leu Thr Ile Lys Ala Cys Gln Leu Leu Pro Asp Leu  
 740 745 750

Lys Ile Leu Pro Asp Gly Asp Glu Thr Leu Val Gly Glu Lys Gly Ile  
 755 760 765

Ser Leu Ser Gly Gly Gln Lys Ala Arg Leu Ser Leu Ala Arg Ala Val  
 770 775 780

Tyr Ser Arg Ala Asp Ile Tyr Leu Leu Asp Asp Ile Leu Ser Ala Val

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 785 |     | 790 |     | 795 |     | 800 |     |     |     |     |     |     |     |     |     |
| Asp | Ala | Glu | Val | Ser | Lys | Asn | Ile | Ile | Glu | Tyr | Val | Leu | Ile | Gly | Lys |
|     |     |     |     | 805 |     |     |     |     | 810 |     |     |     |     | 815 |     |
| Thr | Ala | Leu | Leu | Lys | Asn | Lys | Thr | Ile | Ile | Leu | Thr | Thr | Asn | Thr | Val |
|     |     |     | 820 |     |     |     |     | 825 |     |     |     |     | 830 |     |     |
| Ser | Ile | Leu | Lys | His | Ser | Gln | Met | Ile | Tyr | Ala | Leu | Glu | Asn | Gly | Glu |
|     |     | 835 |     |     |     |     | 840 |     |     |     |     | 845 |     |     |     |
| Ile | Val | Glu | Gln | Gly | Asn | Tyr | Glu | Asp | Val | Met | Asn | Arg | Lys | Asn | Asn |
|     | 850 |     |     |     |     | 855 |     |     |     |     | 860 |     |     |     |     |
| Thr | Ser | Lys | Leu | Lys | Lys | Leu | Leu | Glu | Glu | Phe | Asp | Ser | Pro | Ile | Asp |
| 865 |     |     |     |     | 870 |     |     |     |     | 875 |     |     |     |     | 880 |
| Asn | Gly | Asn | Glu | Ser | Asp | Val | Gln | Thr | Glu | His | Arg | Ser | Glu | Ser | Glu |
|     |     |     |     | 885 |     |     |     |     | 890 |     |     |     |     | 895 |     |
| Val | Asp | Glu | Pro | Leu | Gln | Leu | Lys | Val | Thr | Glu | Ser | Glu | Thr | Glu | Asp |
|     |     |     | 900 |     |     |     |     | 905 |     |     |     |     | 910 |     |     |
| Glu | Val | Val | Thr | Glu | Ser | Glu | Leu | Glu | Leu | Ile | Lys | Ala | Asn | Ser | Arg |
|     | 915 |     |     |     |     |     | 920 |     |     |     |     | 925 |     |     |     |
| Arg | Ala | Ser | Leu | Ala | Thr | Leu | Arg | Pro | Arg | Pro | Phe | Val | Gly | Ala | Gln |
|     | 930 |     |     |     |     | 935 |     |     |     |     | 940 |     |     |     |     |
| Leu | Asp | Ser | Val | Lys | Lys | Thr | Ala | Gln | Glu | Ala | Glu | Lys | Thr | Glu | Val |
| 945 |     |     |     |     | 950 |     |     |     |     | 955 |     |     |     |     | 960 |
| Gly | Arg | Val | Lys | Thr | Lys | Val | Tyr | Leu | Ala | Tyr | Ile | Lys | Ala | Cys | Gly |
|     |     |     | 965 |     |     |     |     | 970 |     |     |     |     |     | 975 |     |
| Val | Leu | Gly | Val | Val | Leu | Phe | Phe | Leu | Phe | Met | Ile | Leu | Thr | Arg | Val |
|     |     |     | 980 |     |     |     |     | 985 |     |     |     |     | 990 |     |     |

Phe Asp Leu Ala Glu Asn Phe Trp Leu Lys Tyr Trp Ser Glu Ser Asn  
 995 1000 1005

Glu Lys Asn Gly Ser Asn Glu Arg Val Trp Met Phe Val Gly Val  
 1010 1015 1020

Tyr Ser Leu Ile Gly Val Ala Ser Ala Ala Phe Asn Asn Leu Arg  
 1025 1030 1035

Ser Ile Met Met Leu Leu Tyr Cys Ser Ile Arg Gly Ser Lys Lys  
 1040 1045 1050

Leu His Glu Ser Met Ala Lys Ser Val Ile Arg Ser Pro Met Thr  
 1055 1060 1065

Phe Phe Glu Thr Thr Pro Val Gly Arg Ile Ile Asn Arg Phe Ser  
 1070 1075 1080

Ser Asp Met Asp Ala Val Asp Ser Asn Leu Gln Tyr Ile Phe Ser  
 1085 1090 1095

Phe Phe Phe Lys Ser Ile Leu Thr Tyr Leu Val Thr Val Ile Leu  
 1100 1105 1110

Val Gly Tyr Asn Met Pro Trp Phe Leu Val Phe Asn Met Phe Leu  
 1115 1120 1125

Val Val Ile Tyr Ile Tyr Tyr Gln Thr Phe Tyr Ile Val Leu Ser  
 1130 1135 1140

Arg Glu Leu Lys Arg Leu Ile Ser Ile Ser Tyr Ser Pro Ile Met  
 1145 1150 1155

Ser Leu Met Ser Glu Ser Leu Asn Gly Tyr Ser Ile Ile Asp Ala  
 1160 1165 1170

Tyr Asp His Phe Glu Arg Phe Ile Tyr Leu Asn Tyr Glu Lys Ile

|                                                             |  |      |  |      |
|-------------------------------------------------------------|--|------|--|------|
| 1175                                                        |  | 1180 |  | 1185 |
| Gln Tyr Asn Val Asp Phe Val Phe Asn Phe Arg Ser Thr Asn Arg |  |      |  |      |
| 1190                                                        |  | 1195 |  | 1200 |
| Trp Leu Ser Val Arg Leu Gln Thr Ile Gly Ala Thr Ile Val Leu |  |      |  |      |
| 1205                                                        |  | 1210 |  | 1215 |
| Ala Thr Ala Ile Leu Ala Leu Ala Thr Met Asn Thr Lys Arg Gln |  |      |  |      |
| 1220                                                        |  | 1225 |  | 1230 |
| Leu Ser Ser Gly Met Val Gly Leu Leu Met Ser Tyr Ser Leu Glu |  |      |  |      |
| 1235                                                        |  | 1240 |  | 1245 |
| Val Thr Gly Ser Leu Thr Trp Ile Val Arg Thr Thr Val Met Ile |  |      |  |      |
| 1250                                                        |  | 1255 |  | 1260 |
| Glu Thr Asn Ile Val Ser Val Glu Arg Ile Val Glu Tyr Cys Glu |  |      |  |      |
| 1265                                                        |  | 1270 |  | 1275 |
| Leu Pro Pro Glu Ala Gln Ser Ile Asn Pro Glu Lys Arg Pro Asp |  |      |  |      |
| 1280                                                        |  | 1285 |  | 1290 |
| Glu Asn Trp Pro Ser Lys Gly Gly Ile Glu Phe Lys Asn Tyr Ser |  |      |  |      |
| 1295                                                        |  | 1300 |  | 1305 |
| Thr Lys Tyr Arg Glu Asn Leu Asp Pro Val Leu Asn Asn Ile Asn |  |      |  |      |
| 1310                                                        |  | 1315 |  | 1320 |
| Val Lys Ile Glu Pro Cys Glu Lys Val Gly Ile Val Gly Arg Thr |  |      |  |      |
| 1325                                                        |  | 1330 |  | 1335 |
| Gly Ala Gly Lys Ser Thr Leu Ser Leu Ala Leu Phe Arg Ile Leu |  |      |  |      |
| 1340                                                        |  | 1345 |  | 1350 |
| Glu Pro Thr Glu Gly Lys Ile Ile Ile Asp Gly Ile Asp Ile Ser |  |      |  |      |
| 1355                                                        |  | 1360 |  | 1365 |

Asp Ile Gly Leu Phe Asp Leu Arg Ser His Leu Ala Ile Ile Pro  
 1370 1375 1380

Gln Asp Ala Gln Ala Phe Glu Gly Thr Val Lys Thr Asn Leu Asp  
 1385 1390 1395

Pro Phe Asn Arg Tyr Ser Glu Asp Glu Leu Lys Arg Ala Val Glu  
 1400 1405 1410

Gln Ala His Leu Lys Pro His Leu Glu Lys Met Leu His Ser Lys  
 1415 1420 1425

Pro Arg Gly Asp Asp Ser Asn Glu Glu Asp Gly Asn Val Asn Asp  
 1430 1435 1440

Ile Leu Asp Val Lys Ile Asn Glu Asn Gly Ser Asn Leu Ser Val  
 1445 1450 1455

Gly Gln Arg Gln Leu Leu Cys Leu Ala Arg Ala Leu Leu Asn Arg  
 1460 1465 1470

Ser Lys Ile Leu Val Leu Asp Glu Ala Thr Ala Ser Val Asp Met  
 1475 1480 1485

Glu Thr Asp Lys Ile Ile Gln Asp Thr Ile Arg Arg Glu Phe Lys  
 1490 1495 1500

Asp Arg Thr Ile Leu Thr Ile Ala His Arg Ile Asp Thr Val Leu  
 1505 1510 1515

Asp Ser Asp Lys Ile Ile Val Leu Asp Gln Gly Ser Val Arg Glu  
 1520 1525 1530

Phe Asp Ser Pro Ser Lys Leu Leu Ser Asp Lys Thr Ser Ile Phe  
 1535 1540 1545

Tyr Ser Leu Cys Glu Lys Gly Gly Tyr Leu Lys

1550

1555

&lt;210&gt; 7

&lt;211&gt; 1381

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Synthetic: T4\_Fungal\_5 ABC-transporter

&lt;400&gt; 7

Met Thr Ser Pro Gly Ser Glu Lys Cys Thr Pro Arg Ser Asp Glu Asp  
 1 5 10 15

Leu Glu Arg Ser Glu Pro Gln Leu Gln Arg Arg Leu Leu Thr Pro Phe  
 20 25 30

Leu Leu Ser Lys Lys Val Pro Pro Ile Pro Lys Glu Asp Glu Arg Lys  
 35 40 45

Pro Tyr Pro Tyr Leu Lys Thr Asn Pro Leu Ser Gln Ile Leu Phe Trp  
 50 55 60

Trp Leu Asn Pro Leu Leu Arg Val Gly Tyr Lys Arg Thr Leu Asp Pro  
 65 70 75 80

Asn Asp Phe Tyr Tyr Leu Glu His Ser Gln Asp Ile Glu Thr Thr Tyr  
 85 90 95

Ser Asn Tyr Glu Met His Leu Ala Arg Ile Leu Glu Lys Asp Arg Ala  
 100 105 110

Lys Ala Arg Ala Lys Asp Pro Thr Leu Thr Asp Glu Asp Leu Lys Asn  
 115 120 125

Arg Glu Tyr Pro Lys Asn Ala Val Ile Lys Ala Leu Phe Leu Thr Phe  
 130 135 140

Lys Trp Lys Tyr Leu Trp Ser Ile Phe Leu Lys Leu Leu Ser Asp Ile



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

Met Gln Ser Ile Arg Asn Phe Leu Leu Ala Leu Ser Leu Ser Leu Pro  
 370 375 380

Ala Ile Ile Ser Met Val Ala Phe Leu Val Leu Tyr Gly Val Ser Asn  
 385 390 395 400

Asp Lys Asn Pro Gly Asn Ile Phe Ser Ser Ile Ser Leu Phe Ser Val  
 405 410 415

Leu Ala Gln Gln Thr Met Met Leu Pro Met Ala Leu Ala Thr Gly Ala  
 420 425 430

Asp Ala Lys Ile Gly Leu Glu Arg Leu Arg Gln Tyr Leu Gln Ser Gly  
 435 440 445

Asp Ile Glu Lys Glu Tyr Glu Asp His Glu Lys Pro Gly Asp Arg Asp  
 450 455 460

Val Val Leu Pro Asp Asn Val Ala Val Glu Leu Asn Asn Ala Ser Phe  
 465 470 475 480

Ile Trp Glu Lys Phe Asp Asp Ala Asp Asp Asn Asp Gly Asn Ser Glu  
 485 490 495

Lys Thr Lys Glu Val Val Val Thr Ser Lys Ser Ser Leu Thr Asp Ser  
 500 505 510

Ser His Ile Asp Lys Ser Thr Asp Ser Ala Asp Gly Glu Tyr Ile Lys  
 515 520 525

Ser Val Phe Glu Gly Phe Asn Asn Ile Asn Leu Thr Ile Lys Lys Gly  
 530 535 540

Glu Phe Val Ile Ile Thr Gly Pro Ile Gly Ser Gly Lys Ser Ser Leu

|             |                         |                     |                     |     |  |     |
|-------------|-------------------------|---------------------|---------------------|-----|--|-----|
| 545         |                         | 550                 |                     | 555 |  | 560 |
| Leu Val Ala | Leu Ala Gly Phe Met Lys | Lys Thr Ser Gly Thr | Leu Gly             |     |  |     |
|             | 565                     | 570                 | 575                 |     |  |     |
| Val Asn Gly | Thr Met Leu Leu Cys     | Gly Gln Pro Trp     | Val Gln Asn Cys     |     |  |     |
|             | 580                     | 585                 | 590                 |     |  |     |
| Thr Val Arg | Asp Asn Ile Leu Phe     | Gly Leu Glu Tyr     | Asp Glu Ala Arg     |     |  |     |
|             | 595                     | 600                 | 605                 |     |  |     |
| Tyr Asp Arg | Val Val Glu Val Cys     | Ala Leu Gly         | Asp Asp Leu Lys Met |     |  |     |
|             | 610                     | 615                 | 620                 |     |  |     |
| Phe Thr Ala | Gly Asp Gln Thr Glu Ile | Gly Glu Arg Gly     | Ile Thr Leu         |     |  |     |
| 625         | 630                     | 635                 | 640                 |     |  |     |
| Ser Gly Gly | Gln Lys Ala Arg Ile     | Asn Leu Ala Arg     | Ala Val Tyr Ala     |     |  |     |
|             | 645                     | 650                 | 655                 |     |  |     |
| Asn Lys Asp | Ile Ile Leu Leu Asp     | Asp Val Leu Ser     | Ala Val Asp Ala     |     |  |     |
|             | 660                     | 665                 | 670                 |     |  |     |
| Arg Val Gly | Lys Leu Ile Val Asp     | Asp Cys Leu Thr     | Ser Phe Leu Gly     |     |  |     |
|             | 675                     | 680                 | 685                 |     |  |     |
| Asp Lys Thr | Arg Ile Leu Ala Thr     | His Gln Leu Ser     | Leu Ile Glu Ala     |     |  |     |
|             | 690                     | 695                 | 700                 |     |  |     |
| Ala Asp Arg | Val Ile Tyr Leu Asn     | Gly Asp Gly Thr     | Ile His Ile Gly     |     |  |     |
| 705         | 710                     | 715                 | 720                 |     |  |     |
| Thr Val Gln | Glu Leu Leu Glu Ser     | Asn Glu Gly Phe     | Leu Lys Leu Met     |     |  |     |
|             | 725                     | 730                 | 735                 |     |  |     |
| Glu Phe Ser | Arg Lys Ser Glu Ser     | Glu Asp Glu Glu     | Asp Val Glu Ala     |     |  |     |
|             | 740                     | 745                 | 750                 |     |  |     |

Ala Asn Glu Lys Asp Val Ser Leu Gln Lys Ala Val Ser Val Val Gln  
 755 760 765

Glu Gln Asp Ala His Ala Gly Val Leu Ile Gly Gln Glu Glu Arg Ala  
 770 775 780

Val Asn Gly Ile Glu Trp Asp Ile Tyr Lys Glu Tyr Leu His Glu Gly  
 785 790 795 800

Arg Gly Lys Leu Gly Ile Phe Ala Ile Pro Thr Ile Ile Met Leu Leu  
 805 810 815

Val Leu Asp Val Phe Thr Ser Ile Phe Val Asn Val Trp Leu Ser Phe  
 820 825 830

Trp Ile Ser His Lys Phe Lys Ala Arg Ser Asp Gly Phe Tyr Ile Gly  
 835 840 845

Leu Tyr Val Met Phe Val Ile Leu Ser Val Ile Trp Ile Thr Ala Glu  
 850 855 860

Phe Val Val Met Gly Tyr Phe Ser Ser Thr Ala Ala Arg Arg Leu Asn  
 865 870 875 880

Leu Lys Ala Met Lys Arg Val Leu His Thr Pro Met His Phe Leu Asp  
 885 890 895

Val Thr Pro Met Gly Arg Ile Leu Asn Arg Phe Thr Lys Asp Thr Asp  
 900 905 910

Val Leu Asp Asn Glu Ile Gly Glu Gln Ala Arg Met Phe Leu His Pro  
 915 920 925

Ala Ala Tyr Val Ile Gly Val Leu Ile Leu Cys Ile Ile Tyr Ile Pro  
 930 935 940

Trp Phe Ala Ile Ala Ile Pro Pro Leu Ala Ile Leu Phe Thr Phe Ile

|                 |                         |                     |                 |     |  |      |
|-----------------|-------------------------|---------------------|-----------------|-----|--|------|
| 945             |                         | 950                 |                 | 955 |  | 960  |
| Thr Asn Phe Tyr | Ile Ala Ser Ser Arg     | Glu Val Lys Arg     | Ile Glu Ala     |     |  |      |
|                 | 965                     |                     | 970             |     |  | 975  |
| Ile Gln Arg Ser | Leu Val Tyr Asn Asn Phe | Asn Glu Val         | Leu Asn Gly     |     |  |      |
|                 | 980                     |                     | 985             |     |  | 990  |
| Leu Gln Thr     | Leu Lys Ala Tyr Asn     | Ala Thr Ser Arg     | Phe Met Glu Lys |     |  |      |
|                 | 995                     |                     | 1000            |     |  | 1005 |
| Asn Lys         | Arg Leu Leu Asn Arg     | Met Asn Glu Ala Tyr | Leu Leu Val     |     |  |      |
|                 | 1010                    |                     | 1015            |     |  | 1020 |
| Ile Ala         | Asn Gln Arg Trp Ile     | Ser Val Asn Leu Asp | Leu Val Ser     |     |  |      |
|                 | 1025                    |                     | 1030            |     |  | 1035 |
| Cys Cys         | Phe Val Phe Leu Ile     | Ser Met Leu Ser     | Val Phe Arg Val |     |  |      |
|                 | 1040                    |                     | 1045            |     |  | 1050 |
| Phe Asp         | Ile Asn Ala Ser Ser     | Val Gly Leu Val     | Val Thr Ser Val |     |  |      |
|                 | 1055                    |                     | 1060            |     |  | 1065 |
| Leu Gln         | Ile Gly Gly Leu Met     | Ser Leu Ile Met     | Arg Ala Tyr Thr |     |  |      |
|                 | 1070                    |                     | 1075            |     |  | 1080 |
| Thr Val         | Glu Asn Glu Met Asn     | Ser Val Glu Arg     | Leu Cys His Tyr |     |  |      |
|                 | 1085                    |                     | 1090            |     |  | 1095 |
| Ala Asn         | Lys Leu Glu Gln Glu     | Ala Pro Tyr Ile     | Met Asn Glu Thr |     |  |      |
|                 | 1100                    |                     | 1105            |     |  | 1110 |
| Lys Pro         | Arg Pro Thr Trp Pro     | Glu His Gly Ala     | Ile Glu Phe Lys |     |  |      |
|                 | 1115                    |                     | 1120            |     |  | 1125 |
| His Ala         | Ser Met Arg Tyr Arg     | Glu Gly Leu Pro     | Leu Val Leu Lys |     |  |      |
|                 | 1130                    |                     | 1135            |     |  | 1140 |

Asp Leu Thr Ile Ser Val Lys Gly Gly Glu Lys Ile Gly Ile Cys  
 1145 1150 1155

Gly Arg Thr Gly Ala Gly Lys Ser Thr Ile Met Asn Ala Leu Tyr  
 1160 1165 1170

Arg Leu Thr Glu Leu Ala Glu Gly Ser Ile Thr Ile Asp Gly Val  
 1175 1180 1185

Glu Ile Ser Gln Leu Gly Leu Tyr Asp Leu Arg Ser Lys Leu Ala  
 1190 1195 1200

Ile Ile Pro Gln Asp Pro Val Leu Phe Arg Gly Thr Ile Arg Lys  
 1205 1210 1215

Asn Leu Asp Pro Phe Gly Gln Asn Asp Asp Glu Thr Leu Trp Asp  
 1220 1225 1230

Ala Leu Arg Arg Ser Gly Leu Val Glu Gly Ser Ile Leu Asn Thr  
 1235 1240 1245

Ile Lys Ser Gln Ser Lys Asp Asp Pro Asn Phe His Lys Phe His  
 1250 1255 1260

Leu Asp Gln Thr Val Glu Asp Glu Gly Ala Asn Phe Ser Leu Gly  
 1265 1270 1275

Glu Arg Gln Leu Ile Ala Leu Ala Arg Ala Leu Val Arg Asn Ser  
 1280 1285 1290

Lys Ile Leu Ile Leu Asp Glu Ala Thr Ser Ser Val Asp Tyr Glu  
 1295 1300 1305

Thr Asp Ser Lys Ile Gln Lys Thr Ile Ser Thr Glu Phe Ser His  
 1310 1315 1320

Cys Thr Ile Leu Cys Ile Ala His Arg Leu Lys Thr Ile Leu Thr

1325

1330

1335

Tyr Asp Arg Ile Leu Val Leu Glu Lys Gly Glu Val Glu Glu Phe  
 1340 1345 1350

Asp Thr Pro Arg Val Leu Tyr Ser Lys Asn Gly Val Phe Arg Gln  
 1355 1360 1365

Met Cys Glu Arg Ser Glu Ile Thr Ser Ala Asp Phe Val  
 1370 1375 1380

&lt;210&gt; 8

&lt;211&gt; 1650

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Synthetic: T4\_Fungal\_8 ABC-transporter

&lt;400&gt; 8

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

Cys Pro Phe Trp Arg Tyr Asp Asp Ile Thr Glu Cys Gly Arg Val Gln  
 20 25 30

Tyr Ile Asn Tyr Tyr Leu Pro Ile Thr Leu Val Gly Val Ser Leu Leu  
 35 40 45

Tyr Leu Phe Lys Asn Ala Ile Gln His Tyr Tyr Arg Lys Pro Gln Glu  
 50 55 60

Ile Lys Pro Ser Val Ala Ser Glu Leu Leu Gly Ser Asn Leu Thr Asp  
 65 70 75 80

Leu Pro Asn Glu Asn Lys Pro Leu Leu Ser Glu Ser Thr Gln Ala Leu  
 85 90 95

Tyr Thr Asn Pro Asp Ser Asn Lys Thr Gly Phe Ser Leu Lys Glu Glu

100

105

110

His Phe Ser Ile Asn Lys Val Thr Leu Thr Glu Ile His Ser Asn Lys  
 115 120 125

His Asp Ala Val Lys Ile Val Arg Arg Asn Trp Leu Glu Lys Leu Arg  
 130 135 140

Val Phe Leu Glu Trp Val Leu Cys Ala Leu Gln Leu Cys Ile Tyr Ile  
 145 150 155 160

Ser Val Trp Ser Lys Tyr Thr Asn Thr Gln Glu Asp Phe Pro Met His  
 165 170 175

Ala Ser Ile Ser Gly Leu Met Leu Trp Ser Leu Leu Leu Leu Val Val  
 180 185 190

Ser Leu Arg Leu Ala Asn Ile Asn Gln Asn Ile Ser Trp Ile Asn Ser  
 195 200 205

Gly Pro Gly Asn Leu Trp Ala Leu Ser Phe Ala Cys Tyr Leu Ser Leu  
 210 215 220

Phe Cys Gly Ser Val Leu Pro Leu Arg Ser Ile Tyr Ile Gly His Ile  
 225 230 235 240

Thr Asp Glu Ile Ala Ser Thr Phe Tyr Lys Leu Gln Phe Tyr Leu Ser  
 245 250 255

Leu Thr Leu Phe Leu Leu Leu Phe Thr Ser Gln Ala Gly Asn Arg Phe  
 260 265 270

Ala Ile Ile Tyr Lys Ser Thr Pro Asp Ile Thr Pro Ser Pro Glu Pro  
 275 280 285

Ile Val Ser Ile Ala Ser Tyr Ile Thr Trp Ala Trp Val Asp Lys Phe  
 290 295 300

Leu Trp Lys Ala His Gln Asn Tyr Ile Glu Met Lys Asp Val Trp Gly  
 305 310 315 320

Leu Met Val Glu Asp Tyr Ser Ile Leu Val Ile Lys Arg Phe Asn His  
 325 330 335

Phe Val Gln Asn Lys Thr Lys Ser Arg Thr Phe Ser Phe Asn Leu Ile  
 340 345 350

His Phe Phe Met Lys Phe Ile Ala Ile Gln Gly Ala Trp Ala Thr Ile  
 355 360 365

Ser Ser Val Ile Ser Phe Val Pro Thr Met Leu Leu Arg Arg Ile Leu  
 370 375 380

Glu Tyr Val Glu Asp Gln Ser Thr Ala Pro Leu Asn Leu Ala Trp Met  
 385 390 395 400

Tyr Ile Phe Leu Met Phe Leu Ala Arg Ile Leu Thr Ala Ile Cys Ala  
 405 410 415

Ala Gln Ala Leu Phe Leu Gly Arg Arg Val Cys Ile Arg Met Lys Ala  
 420 425 430

Ile Ile Ile Ser Glu Ile Tyr Ser Lys Ala Leu Arg Arg Lys Ile Ser  
 435 440 445

Pro Asn Ser Thr Lys Glu Pro Thr Asp Val Val Asp Pro Gln Glu Leu  
 450 455 460

Asn Asp Lys Gln His Val Asp Gly Asp Glu Glu Ser Ala Thr Thr Ala  
 465 470 475 480

Asn Leu Gly Ala Ile Ile Asn Leu Met Ala Val Asp Ala Phe Lys Val  
 485 490 495

Ser Glu Ile Cys Ala Tyr Leu His Ser Phe Ile Glu Ala Ile Ile Met

500

505

510

Thr Ile Val Ala Leu Phe Leu Leu Tyr Arg Leu Ile Gly Trp Ser Ala  
 515 520 525

Leu Val Gly Ser Ala Met Ile Ile Cys Phe Leu Pro Leu Asn Phe Lys  
 530 535 540

Leu Ala Ser Leu Leu Gly Thr Leu Gln Lys Lys Ser Leu Ala Ile Thr  
 545 550 555 560

Asp Lys Arg Ile Gln Lys Leu Asn Glu Ala Phe Gln Ala Ile Arg Ile  
 565 570 575

Ile Lys Phe Phe Ser Trp Glu Glu Asn Phe Glu Lys Asp Ile Gln Asn  
 580 585 590

Thr Arg Asp Glu Glu Leu Asn Met Leu Leu Lys Arg Ser Ile Val Trp  
 595 600 605

Ala Leu Ser Ser Leu Val Trp Phe Ile Thr Pro Ser Ile Val Thr Ser  
 610 615 620

Ala Ser Phe Ala Val Tyr Ile Tyr Val Gln Gly Gln Thr Leu Thr Thr  
 625 630 635 640

Pro Val Ala Phe Thr Ala Leu Ser Leu Phe Ala Leu Leu Arg Asn Pro  
 645 650 655

Leu Asp Met Leu Ser Asp Met Leu Ser Phe Val Ile Gln Ser Lys Val  
 660 665 670

Ser Leu Asp Arg Val Gln Glu Phe Leu Asn Glu Glu Glu Thr Lys Lys  
 675 680 685

Tyr Glu Gln Leu Thr Val Ser Arg Asn Lys Leu Gly Leu Gln Asn Ala  
 690 695 700

Thr Phe Thr Trp Asp Lys Asn Asn Gln Asp Phe Lys Leu Lys Asn Leu  
705 710 715 720

Thr Ile Asp Phe Lys Ile Gly Lys Leu Asn Val Ile Val Gly Pro Thr  
725 730 735

Gly Ser Gly Lys Thr Ser Leu Leu Met Gly Leu Leu Gly Glu Met Glu  
740 745 750

Leu Leu Asn Gly Lys Val Phe Val Pro Ser Leu Asn Pro Arg Glu Glu  
755 760 765

Leu Val Val Glu Ala Asp Gly Met Thr Asn Ser Ile Ala Tyr Cys Ser  
770 775 780

Gln Ala Ala Trp Leu Leu Asn Asp Thr Val Arg Asn Asn Ile Leu Phe  
785 790 795 800

Asn Ala Pro Tyr Asn Glu Asn Arg Tyr Asn Ala Val Ile Ser Ala Cys  
805 810 815

Gly Leu Lys Arg Asp Phe Glu Ile Leu Ser Ala Gly Asp Gln Thr Glu  
820 825 830

Ile Gly Glu Lys Gly Ile Thr Leu Ser Gly Gly Gln Lys Gln Arg Val  
835 840 845

Ser Leu Ala Arg Ser Leu Tyr Ser Ser Ser Arg His Leu Leu Leu Asp  
850 855 860

Asp Cys Leu Ser Ala Val Asp Ser His Thr Ala Leu Trp Ile Tyr Glu  
865 870 875 880

Asn Cys Ile Thr Gly Pro Leu Met Glu Gly Arg Thr Cys Val Leu Val  
885 890 895

Ser His Asn Val Ala Leu Thr Leu Lys Asn Ala Asp Trp Val Ile Ile

900

905

910

Met Glu Asn Gly Arg Val Lys Glu Gln Gly Glu Pro Val Glu Leu Leu  
 915 920 925

Gln Lys Gly Ser Leu Gly Asp Asp Ser Met Val Lys Ser Ser Ile Leu  
 930 935 940

Ser Arg Thr Ala Ser Ser Val Asn Ile Ser Glu Thr Asn Ser Lys Ile  
 945 950 955 960

Ser Ser Gly Pro Lys Ala Pro Ala Glu Ser Asp Asn Ala Asn Glu Glu  
 965 970 975

Ser Thr Thr Cys Gly Asp Arg Ser Lys Ser Ser Gly Lys Leu Ile Ala  
 980 985 990

Glu Glu Thr Lys Ser Asn Gly Val Val Ser Leu Asp Val Tyr Lys Trp  
 995 1000 1005

Tyr Ala Val Phe Phe Gly Gly Trp Lys Met Ile Ser Phe Leu Cys  
 1010 1015 1020

Phe Ile Phe Leu Phe Ala Gln Met Ile Ser Ile Ser Gln Ala Trp  
 1025 1030 1035

Trp Leu Arg Ala Trp Ala Ser Asn Asn Thr Leu Lys Val Phe Ser  
 1040 1045 1050

Asn Leu Gly Leu Gln Thr Met Arg Pro Phe Ala Leu Ser Leu Gln  
 1055 1060 1065

Gly Lys Glu Ala Ser Pro Val Thr Leu Ser Ala Val Phe Pro Asn  
 1070 1075 1080

Gly Ser Leu Thr Thr Ala Thr Glu Pro Asn His Ser Asn Ala Tyr  
 1085 1090 1095

Tyr Leu Ser Ile Tyr Leu Gly Ile Gly Val Phe Gln Ala Leu Cys  
 1100 1105 1110

Ser Ser Ser Lys Ala Ile Ile Asn Phe Val Ala Gly Ile Arg Ala  
 1115 1120 1125

Ser Arg Lys Ile Phe Asn Leu Leu Leu Lys Asn Val Leu Tyr Ala  
 1130 1135 1140

Lys Leu Arg Phe Phe Asp Ser Thr Pro Ile Gly Arg Ile Met Asn  
 1145 1150 1155

Arg Phe Ser Lys Asp Ile Glu Ser Ile Asp Gln Glu Leu Thr Pro  
 1160 1165 1170

Tyr Met Glu Gly Ala Phe Gly Ser Leu Ile Gln Cys Val Ser Thr  
 1175 1180 1185

Ile Ile Val Ile Ala Tyr Ile Thr Pro Gln Phe Leu Ile Val Ala  
 1190 1195 1200

Ala Ile Val Met Leu Leu Phe Tyr Phe Val Ala Tyr Phe Tyr Met  
 1205 1210 1215

Ser Gly Ala Arg Glu Leu Lys Arg Leu Glu Ser Met Ser Arg Ser  
 1220 1225 1230

Pro Ile His Gln His Phe Ser Glu Thr Leu Val Gly Ile Thr Thr  
 1235 1240 1245

Ile Arg Ala Phe Ser Asp Glu Arg Arg Phe Leu Val Asp Asn Met  
 1250 1255 1260

Lys Lys Ile Asp Asp Asn Asn Arg Pro Phe Phe Tyr Leu Trp Val  
 1265 1270 1275

Cys Asn Arg Trp Leu Ser Tyr Arg Ile Glu Leu Ile Gly Ala Leu

|                                                             |      |      |      |      |
|-------------------------------------------------------------|------|------|------|------|
| 1280                                                        |      | 1285 |      | 1290 |
| Ile Val Leu Ala Ala Gly Ser Phe Ile Leu Leu Asn Ile Lys Ser | 1295 | 1300 | 1305 |      |
| Ile Asp Ser Gly Leu Ala Gly Ile Ser Leu Gly Phe Ala Ile Gln | 1310 | 1315 | 1320 |      |
| Phe Thr Asp Gly Ala Leu Trp Val Val Arg Leu Tyr Ser Asn Val | 1325 | 1330 | 1335 |      |
| Glu Met Asn Met Asn Ser Val Glu Arg Leu Lys Glu Tyr Thr Thr | 1340 | 1345 | 1350 |      |
| Ile Glu Gln Glu Pro Ser Asn Val Gly Ala Leu Val Pro Pro Cys | 1355 | 1360 | 1365 |      |
| Glu Trp Pro Gln Asn Gly Lys Ile Glu Val Lys Asp Leu Ser Leu | 1370 | 1375 | 1380 |      |
| Arg Tyr Ala Ala Gly Leu Pro Lys Val Ile Lys Asn Val Thr Phe | 1385 | 1390 | 1395 |      |
| Thr Val Asp Ser Lys Cys Lys Val Gly Ile Val Gly Arg Thr Gly | 1400 | 1405 | 1410 |      |
| Ala Gly Lys Ser Thr Ile Ile Thr Ala Leu Phe Arg Phe Leu Asp | 1415 | 1420 | 1425 |      |
| Pro Glu Thr Gly Tyr Ile Lys Ile Asp Asp Val Asp Ile Thr Thr | 1430 | 1435 | 1440 |      |
| Ile Gly Leu Lys Arg Leu Arg Gln Ser Ile Thr Ile Ile Pro Gln | 1445 | 1450 | 1455 |      |
| Asp Pro Thr Leu Phe Thr Gly Thr Leu Lys Thr Asn Leu Asp Pro | 1460 | 1465 | 1470 |      |

Tyr Asn Glu Tyr Ser Glu Ala Glu Ile Phe Glu Ala Leu Lys Arg  
 1475 1480 1485

Val Asn Leu Val Ser Ser Glu Glu Leu Gly Asn Pro Ser Thr Ser  
 1490 1495 1500

Asp Ser Thr Ser Val His Ser Ala Asn Met Asn Lys Phe Leu Asp  
 1505 1510 1515

Leu Glu Asn Glu Val Ser Glu Gly Gly Ser Asn Leu Ser Gln Gly  
 1520 1525 1530

Gln Arg Gln Leu Ile Cys Leu Ala Arg Ser Leu Leu Arg Cys Pro  
 1535 1540 1545

Lys Val Ile Leu Leu Asp Glu Ala Thr Ala Ser Ile Asp Tyr Asn  
 1550 1555 1560

Ser Asp Ser Lys Ile Gln Ala Thr Ile Arg Glu Glu Phe Ser Asn  
 1565 1570 1575

Ser Thr Ile Leu Thr Ile Ala His Arg Leu Arg Ser Ile Ile Asp  
 1580 1585 1590

Tyr Asp Lys Ile Leu Val Met Asp Ala Gly Glu Val Lys Glu Tyr  
 1595 1600 1605

Asp His Pro Tyr Ser Leu Leu Leu Asn Arg Asp Ser Ile Phe Tyr  
 1610 1615 1620

His Met Cys Glu Asp Ser Gly Glu Leu Glu Val Leu Ile Gln Leu  
 1625 1630 1635

Ala Lys Glu Ser Phe Val Lys Lys Leu Asn Ala Asn  
 1640 1645 1650

<211> 320  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic: Bt.GGPPS

<400> 9

Met Leu Thr Ser Ser Lys Ser Ile Glu Ser Phe Pro Lys Asn Val Gln  
 1 5 10 15

Pro Tyr Gly Lys His Tyr Gln Asn Gly Leu Glu Pro Val Gly Lys Ser  
 20 25 30

Gln Glu Asp Ile Leu Leu Glu Pro Phe His Tyr Leu Cys Ser Asn Pro  
 35 40 45

Gly Lys Asp Val Arg Thr Lys Met Ile Glu Ala Phe Asn Ala Trp Leu  
 50 55 60

Lys Val Pro Lys Asp Asp Leu Ile Val Ile Thr Arg Val Ile Glu Met  
 65 70 75 80

Leu His Ser Ala Ser Leu Leu Ile Asp Asp Val Glu Asp Asp Ser Val  
 85 90 95

Leu Arg Arg Gly Val Pro Ala Ala His His Ile Tyr Gly Thr Pro Gln  
 100 105 110

Thr Ile Asn Cys Ala Asn Tyr Val Tyr Phe Leu Ala Leu Lys Glu Ile  
 115 120 125

Ala Lys Leu Asn Lys Pro Asn Met Ile Thr Ile Tyr Thr Asp Glu Leu  
 130 135 140

Ile Asn Leu His Arg Gly Gln Gly Met Glu Leu Phe Trp Arg Asp Thr  
 145 150 155 160

Leu Thr Cys Pro Thr Glu Lys Glu Phe Leu Asp Met Val Asn Asp Lys

165

170

175

Thr Gly Gly Leu Leu Arg Leu Ala Val Lys Leu Met Gln Glu Ala Ser  
 180 185 190

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

Phe Gln Val Arg Asp Asp Tyr Met Asn Leu Gln Ser Lys Asn Tyr Ala  
 210 215 220

Asp Asn Lys Gly Phe Cys Glu Asp Leu Thr Glu Gly Lys Phe Ser Phe  
 225 230 235 240

Pro Ile Ile His Ser Ile Arg Ser Asp Pro Ser Asn Arg Gln Leu Leu  
 245 250 255

Asn Ile Leu Lys Gln Arg Ser Ser Ser Ile Glu Leu Lys Gln Phe Ala  
 260 265 270

Leu Gln Leu Leu Glu Asn Thr Asn Thr Phe Gln Tyr Cys Arg Asp Phe  
 275 280 285

Leu Arg Val Leu Glu Lys Glu Ala Arg Glu Glu Ile Lys Leu Leu Gly  
 290 295 300

Gly Asn Ile Met Leu Glu Lys Ile Met Asp Val Leu Ser Val Asn Glu  
 305 310 315 320

<210> 10

<211> 736

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: Ent-0s.CDPS

<400> 10

Met Glu His Ala Arg Pro Pro Gln Gly Gly Asp Asp Asp Val Ala Ala

|                                                                 |     |     |     |
|-----------------------------------------------------------------|-----|-----|-----|
| 1                                                               | 5   | 10  | 15  |
| Ser Thr Ser Glu Leu Pro Tyr Met Ile Glu Ser Ile Lys Ser Lys Leu | 20  | 25  | 30  |
| Arg Ala Ala Arg Asn Ser Leu Gly Glu Thr Thr Val Ser Ala Tyr Asp | 35  | 40  | 45  |
| Thr Ala Trp Ile Ala Leu Val Asn Arg Leu Asp Gly Gly Gly Glu Arg | 50  | 55  | 60  |
| Ser Pro Gln Phe Pro Glu Ala Ile Asp Trp Ile Ala Arg Asn Gln Leu | 65  | 70  | 75  |
| Pro Asp Gly Ser Trp Gly Asp Ala Gly Met Phe Ile Val Gln Asp Arg | 85  | 90  | 95  |
| Leu Ile Asn Thr Leu Gly Cys Val Val Ala Leu Ala Thr Trp Gly Val | 100 | 105 | 110 |
| His Glu Glu Gln Arg Ala Arg Gly Leu Ala Tyr Ile Gln Asp Asn Leu | 115 | 120 | 125 |
| Trp Arg Leu Gly Glu Asp Asp Glu Glu Trp Met Met Val Gly Phe Glu | 130 | 135 | 140 |
| Ile Thr Phe Pro Val Leu Leu Glu Lys Ala Lys Asn Leu Gly Leu Asp | 145 | 150 | 155 |
| Ile Asn Tyr Asp Asp Pro Ala Leu Gln Asp Ile Tyr Ala Lys Arg Gln | 165 | 170 | 175 |
| Leu Lys Leu Ala Lys Ile Pro Arg Glu Ala Leu His Ala Arg Pro Thr | 180 | 185 | 190 |
| Thr Leu Leu His Ser Leu Glu Gly Met Glu Asn Leu Asp Trp Glu Arg | 195 | 200 | 205 |

Leu Leu Gln Phe Lys Cys Pro Ala Gly Ser Leu His Ser Ser Pro Ala  
 210 215 220

Ala Ser Ala Tyr Ala Leu Ser Glu Thr Gly Asp Lys Glu Leu Leu Glu  
 225 230 235 240

Tyr Leu Glu Thr Ala Ile Asn Asn Phe Asp Gly Gly Ala Pro Cys Thr  
 245 250 255

Tyr Pro Val Asp Asn Phe Asp Arg Leu Trp Ser Val Asp Arg Leu Arg  
 260 265 270

Arg Leu Gly Ile Ser Arg Tyr Phe Thr Ser Glu Ile Glu Glu Tyr Leu  
 275 280 285

Glu Tyr Ala Tyr Arg His Leu Ser Pro Asp Gly Met Ser Tyr Gly Gly  
 290 295 300

Leu Cys Pro Val Lys Asp Ile Asp Asp Thr Ala Met Ala Phe Arg Leu  
 305 310 315 320

Leu Arg Leu His Gly Tyr Asn Val Ser Ser Ser Val Phe Asn His Phe  
 325 330 335

Glu Lys Asp Gly Glu Tyr Phe Cys Phe Ala Gly Gln Ser Ser Gln Ser  
 340 345 350

Leu Thr Ala Met Tyr Asn Ser Tyr Arg Ala Ser Gln Ile Val Phe Pro  
 355 360 365

Gly Asp Asp Asp Gly Leu Glu Gln Leu Arg Ala Tyr Cys Arg Ala Phe  
 370 375 380

Leu Glu Glu Arg Arg Ala Thr Gly Asn Leu Arg Asp Lys Trp Val Ile  
 385 390 395 400

Ala Asn Gly Leu Pro Ser Glu Val Glu Tyr Ala Leu Asp Phe Pro Trp

405

410

415

Lys Ala Ser Leu Pro Arg Val Glu Thr Arg Val Tyr Leu Glu Gln Tyr  
 420 425 430

Gly Ala Ser Glu Asp Ala Trp Ile Gly Lys Gly Leu Tyr Arg Met Thr  
 435 440 445

Leu Val Asn Asn Asp Leu Tyr Leu Glu Ala Ala Lys Ala Asp Phe Thr  
 450 455 460

Asn Phe Gln Arg Leu Ser Arg Leu Glu Trp Leu Ser Leu Lys Arg Trp  
 465 470 475 480

Tyr Ile Arg Asn Asn Leu Gln Ala His Gly Val Thr Glu Gln Ser Val  
 485 490 495

Leu Arg Ala Tyr Phe Leu Ala Ala Ala Asn Ile Phe Glu Pro Asn Arg  
 500 505 510

Ala Ala Glu Arg Leu Gly Trp Ala Arg Thr Ala Ile Leu Ala Glu Ala  
 515 520 525

Ile Ala Ser His Leu Arg Gln Tyr Ser Ala Asn Gly Ala Ala Asp Gly  
 530 535 540

Met Thr Glu Arg Leu Ile Ser Gly Leu Ala Ser His Asp Trp Asp Trp  
 545 550 555 560

Arg Glu Ser Asn Asp Ser Ala Ala Arg Ser Leu Leu Tyr Ala Leu Asp  
 565 570 575

Glu Leu Ile Asp Leu His Ala Phe Gly Asn Ala Ser Asp Ser Leu Arg  
 580 585 590

Glu Ala Trp Lys Gln Trp Leu Met Ser Trp Thr Asn Glu Ser Gln Gly  
 595 600 605

Ser Thr Gly Gly Asp Thr Ala Leu Leu Leu Val Arg Thr Ile Glu Ile  
 610 615 620

Cys Ser Gly Arg His Gly Ser Ala Glu Gln Ser Leu Lys Asn Ser Glu  
 625 630 635 640

Asp Tyr Ala Arg Leu Glu Gln Ile Ala Ser Ser Met Cys Ser Lys Leu  
 645 650 655

Ala Thr Lys Ile Leu Ala Gln Asn Gly Gly Ser Met Asp Asn Val Glu  
 660 665 670

Gly Ile Asp Gln Glu Val Asp Val Glu Met Lys Glu Leu Ile Gln Arg  
 675 680 685

Val Tyr Gly Ser Ser Ser Asn Asp Val Ser Ser Val Thr Arg Gln Thr  
 690 695 700

Phe Leu Asp Val Val Lys Ser Phe Cys Tyr Val Ala His Cys Ser Pro  
 705 710 715 720

Glu Thr Ile Asp Gly His Ile Ser Lys Val Leu Phe Glu Asp Val Asn  
 725 730 735

<210> 11

<211> 757

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: Ent-Pg.KS

<400> 11

Met Lys Arg Glu Gln Tyr Thr Ile Leu Asn Glu Lys Glu Ser Met Ala  
 1 5 10 15

Glu Glu Leu Ile Leu Arg Ile Lys Arg Met Phe Ser Glu Ile Glu Asn  
 20 25 30

Thr Gln Thr Ser Ala Ser Ala Tyr Asp Thr Ala Trp Val Ala Met Val  
 35 40 45

Pro Ser Leu Asp Ser Ser Gln Gln Pro Gln Phe Pro Gln Cys Leu Ser  
 50 55 60

Trp Ile Ile Asp Asn Gln Leu Leu Asp Gly Ser Trp Gly Ile Pro Tyr  
 65 70 75 80

Leu Ile Ile Lys Asp Arg Leu Cys His Thr Leu Ala Cys Val Ile Ala  
 85 90 95

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

Phe Leu Arg Glu Asn Ile Glu Gly Ile Val His Glu Asp Glu Tyr Thr  
 115 120 125

Pro Ile Gly Phe Gln Ile Ile Phe Pro Ala Met Leu Glu Glu Ala Arg  
 130 135 140

Gly Leu Gly Leu Glu Leu Pro Tyr Asp Leu Thr Pro Ile Lys Leu Met  
 145 150 155 160

Leu Thr His Arg Glu Lys Ile Met Lys Gly Lys Ala Ile Asp His Met  
 165 170 175

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

Ile Val Asp Trp Asn Lys Val Leu Lys His Gln Asn Lys Asp Gly Ser  
 195 200 205

Leu Phe Asn Ser Pro Ser Ala Thr Ala Cys Ala Leu Met His Thr Arg  
 210 215 220

Lys Ser Asn Cys Leu Glu Tyr Leu Ser Ser Met Leu Gln Lys Leu Gly

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

Ile Ser Asn Asp Leu Phe Leu Ala Leu Ala Lys Gln Asp Tyr Asn Ile  
 435 440 445

Cys Gln Ala Ile Gln Gln Lys Glu Leu Arg Glu Leu Glu Arg Trp Phe  
 450 455 460

Ala Asp Asn Lys Phe Ser His Leu Asn Phe Ala Arg Gln Lys Leu Ile  
 465 470 475 480

Tyr Cys Tyr Phe Ser Ala Ala Ala Thr Leu Phe Ser Pro Glu Leu Ser  
 485 490 495

Ala Ala Arg Val Val Trp Ala Lys Asn Gly Val Ile Thr Thr Val Val  
 500 505 510

Asp Asp Phe Phe Asp Val Gly Gly Ser Ser Glu Glu Ile His Ser Phe  
 515 520 525

Val Glu Ala Val Arg Val Trp Asp Glu Ala Ala Thr Asp Gly Leu Ser  
 530 535 540

Glu Asn Val Gln Ile Leu Phe Ser Ala Leu Tyr Asn Thr Val Asp Glu  
 545 550 555 560

Ile Val Gln Gln Ala Phe Val Phe Gln Gly Arg Asp Ile Ser Ile His  
 565 570 575

Leu Arg Glu Ile Trp Tyr Arg Leu Val Asn Ser Met Met Thr Glu Ala  
 580 585 590

Gln Trp Ala Arg Thr His Cys Leu Pro Ser Met His Glu Tyr Met Glu  
 595 600 605

Asn Ala Glu Pro Ser Ile Ala Leu Glu Pro Ile Val Leu Ser Ser Leu  
 610 615 620

Tyr Phe Val Gly Pro Lys Leu Ser Glu Glu Ile Ile Cys His Pro Glu

625                                  630                                  635                                  640

Tyr Tyr Asn Leu Met His Leu Leu Asn Ile Cys Gly Arg Leu Leu Asn  
                                 645                                  650                                  655

Asp Ile Gln Gly Cys Lys Arg Glu Ala His Gln Gly Lys Leu Asn Ser  
                                 660                                  665                                  670

Val Thr Leu Tyr Met Glu Glu Asn Ser Gly Thr Thr Met Glu Asp Ala  
                                 675                                  680                                  685

Ile Val Tyr Leu Arg Lys Thr Ile Asp Glu Ser Arg Gln Leu Leu Leu  
                                 690                                  695                                  700

Lys Glu Val Leu Arg Pro Ser Ile Val Pro Arg Glu Cys Lys Gln Leu  
                                 705                                  710                                  715                                  720

His Trp Asn Met Met Arg Ile Leu Gln Leu Phe Tyr Leu Lys Asn Asp  
                                 725                                  730                                  735

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

Val Asp Pro Ile Leu  
                                 755

<210> 12  
 <211> 499  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic: Ps.K0

<400> 12

Met Asp Thr Leu Thr Leu Ser Leu Gly Phe Leu Ser Leu Phe Leu Phe  
 1                                  5                                  10                                  15

Leu Phe Leu Leu Lys Arg Ser Thr His Lys His Ser Lys Leu Ser His

20

25

30

Val Pro Val Val Pro Gly Leu Pro Val Ile Gly Asn Leu Leu Gln Leu  
 35 40 45

Lys Glu Lys Lys Pro His Lys Thr Phe Thr Lys Met Ala Gln Lys Tyr  
 50 55 60

Gly Pro Ile Phe Ser Ile Lys Ala Gly Ser Ser Lys Ile Ile Val Leu  
 65 70 75 80

Asn Thr Ala His Leu Ala Lys Glu Ala Met Val Thr Arg Tyr Ser Ser  
 85 90 95

Ile Ser Lys Arg Lys Leu Ser Thr Ala Leu Thr Ile Leu Thr Ser Asp  
 100 105 110

Lys Cys Met Val Ala Met Ser Asp Tyr Asn Asp Phe His Lys Met Val  
 115 120 125

Lys Lys His Ile Leu Ala Ser Val Leu Gly Ala Asn Ala Gln Lys Arg  
 130 135 140

Leu Arg Phe His Arg Glu Val Met Met Glu Asn Met Ser Ser Lys Phe  
 145 150 155 160

Asn Glu His Val Lys Thr Leu Ser Asp Ser Ala Val Asp Phe Arg Lys  
 165 170 175

Ile Phe Val Ser Glu Leu Phe Gly Leu Ala Leu Lys Gln Ala Leu Gly  
 180 185 190

Ser Asp Ile Glu Ser Ile Tyr Val Glu Gly Leu Thr Ala Thr Leu Ser  
 195 200 205

Arg Glu Asp Leu Tyr Asn Thr Leu Val Val Asp Phe Met Glu Gly Ala  
 210 215 220

Ile Glu Val Asp Trp Arg Asp Phe Phe Pro Tyr Leu Lys Trp Ile Pro  
 225 230 235 240

Asn Lys Ser Phe Glu Lys Lys Ile Arg Arg Val Asp Arg Gln Arg Lys  
 245 250 255

Ile Ile Met Lys Ala Leu Ile Asn Glu Gln Lys Lys Arg Leu Thr Ser  
 260 265 270

Gly Lys Glu Leu Asp Cys Tyr Tyr Asp Tyr Leu Val Ser Glu Ala Lys  
 275 280 285

Glu Val Thr Glu Glu Gln Met Ile Met Leu Leu Trp Glu Pro Ile Ile  
 290 295 300

Glu Thr Ser Asp Thr Thr Leu Val Thr Thr Glu Trp Ala Met Tyr Glu  
 305 310 315 320

Leu Ala Lys Asp Lys Asn Arg Gln Asp Arg Leu Tyr Glu Glu Leu Leu  
 325 330 335

Asn Val Cys Gly His Glu Lys Val Thr Asp Glu Glu Leu Ser Lys Leu  
 340 345 350

Pro Tyr Leu Gly Ala Val Phe His Glu Thr Leu Arg Lys His Ser Pro  
 355 360 365

Val Pro Ile Val Pro Leu Arg Tyr Val Asp Glu Asp Thr Glu Leu Gly  
 370 375 380

Gly Tyr His Ile Pro Ala Gly Ser Glu Ile Ala Ile Asn Ile Tyr Gly  
 385 390 395 400

Cys Asn Met Asp Ser Asn Leu Trp Glu Asn Pro Asp Gln Trp Ile Pro  
 405 410 415

Glu Arg Phe Leu Asp Glu Lys Tyr Ala Gln Ala Asp Leu Tyr Lys Thr

420

425

430

Met Ala Phe Gly Gly Gly Lys Arg Val Cys Ala Gly Ser Leu Gln Ala  
 435 440 445

Met Leu Ile Ala Cys Thr Ala Ile Gly Arg Leu Val Gln Glu Phe Glu  
 450 455 460

Trp Glu Leu Gly His Gly Glu Glu Glu Asn Val Asp Thr Met Gly Leu  
 465 470 475 480

Thr Thr His Arg Leu His Pro Leu Gln Val Lys Leu Lys Pro Arg Asn  
 485 490 495

Arg Ile Tyr

<210> 13  
 <211> 500  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic: Sr.KAH

<400> 13

Met Glu Ala Ser Tyr Leu Tyr Ile Ser Ile Leu Leu Leu Leu Ala Ser  
 1 5 10 15

Tyr Leu Phe Thr Thr Gln Leu Arg Arg Lys Ser Ala Asn Leu Pro Pro  
 20 25 30

Thr Val Phe Pro Ser Ile Pro Ile Ile Gly His Leu Tyr Leu Leu Lys  
 35 40 45

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

Ile Leu Gln Leu Gln Leu Gly Tyr Arg Arg Val Leu Val Ile Ser Ser

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

Leu Leu Ser Leu Gln Glu Ser Glu Pro Glu Tyr Tyr Thr Asp Ala Met  
 275 280 285

Ile Arg Ser Phe Val Leu Gly Leu Leu Ala Ala Gly Ser Asp Thr Ser  
 290 295 300

Ala Gly Thr Met Glu Trp Ala Met Ser Leu Leu Val Asn His Pro His  
 305 310 315 320

Val Leu Lys Lys Ala Gln Ala Glu Ile Asp Arg Val Ile Gly Asn Asn  
 325 330 335

Arg Leu Ile Asp Glu Ser Asp Ile Gly Asn Ile Pro Tyr Ile Gly Cys  
 340 345 350

Ile Ile Asn Glu Thr Leu Arg Leu Tyr Pro Ala Gly Pro Leu Leu Phe  
 355 360 365

Pro His Glu Ser Ser Ala Asp Cys Val Ile Ser Gly Tyr Asn Ile Pro  
 370 375 380

Arg Gly Thr Met Leu Ile Val Asn Gln Trp Ala Ile His His Asp Pro  
 385 390 395 400

Lys Val Trp Asp Asp Pro Glu Thr Phe Lys Pro Glu Arg Phe Gln Gly  
 405 410 415

Leu Glu Gly Thr Arg Asp Gly Phe Lys Leu Met Pro Phe Gly Ser Gly  
 420 425 430

Arg Arg Gly Cys Pro Gly Glu Gly Leu Ala Ile Arg Leu Leu Gly Met  
 435 440 445

Thr Leu Gly Ser Val Ile Gln Cys Phe Asp Trp Glu Arg Val Gly Asp  
 450 455 460

Glu Met Val Asp Met Thr Glu Gly Leu Gly Val Thr Leu Pro Lys Ala

Val Pro Leu Val Ala Lys Cys Lys Pro Arg Ser Glu Met Thr Asn Leu  
485 490 495

Val Pro Leu Val Ala Lys Cys Lys Pro Arg Ser Glu Met Thr Asn Leu  
485 490 495

485

490

495

Leu Ser Glu Leu  
500

500

<210> 14

<211> 711

<212> PRT

### <213> Artificial Sequence

 $\langle 220 \rangle$ 

<223> Synthetic: At.CPR

<400> 14

Met Ser Ser Ser Ser Ser Ser Ser Thr Ser Met Ile Asp Leu Met Ala  
1 5 10 15

1

5

10

15

Ala Ile Ile Lys Gly Glu Pro Val Ile Val Ser Asp Pro Ala Asn Ala  
20 25 30

20

25

30

Ser Ala Tyr Glu Ser Val Ala Ala Glu Leu Ser Ser Met Leu Ile Glu  
35 40 45

35

40

45

Asn Arg Gln Phe Ala Met Ile Val Thr Thr Ser Ile Ala Val Leu Ile  
50 55 60

50

55

60

Gly Cys Ile Val Met Leu Val Trp Arg Arg Ser Gly Ser Gly Asn Ser  
65 70 75 80

65

70

75

80

Lys Arg Val Glu Pro Leu Lys Pro Leu Val Ile Lys Pro Arg Glu Glu  
85 90 95

85

90

95

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

100

105

110

Thr Gly Thr Ala Glu Gly Phe Ala Lys Ala Leu Gly Glu Glu Ala Lys

115

120

125

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

Ala Ala Asp Asp Asp Glu Tyr Glu Glu Lys Leu Lys Lys Glu Asp Val  
 145 150 155 160

Ala Phe Phe Phe Leu Ala Thr Tyr Gly Asp Gly Glu Pro Thr Asp Asn  
 165 170 175

Ala Ala Arg Phe Tyr Lys Trp Phe Thr Glu Gly Asn Asp Arg Gly Glu  
 180 185 190

Trp Leu Lys Asn Leu Lys Tyr Gly Val Phe Gly Leu Gly Asn Arg Gln  
 195 200 205

Tyr Glu His Phe Asn Lys Val Ala Lys Val Val Asp Asp Ile Leu Val  
 210 215 220

Glu Gln Gly Ala Gln Arg Leu Val Gln Val Gly Leu Gly Asp Asp Asp  
 225 230 235 240

Gln Cys Ile Glu Asp Asp Phe Thr Ala Trp Arg Glu Ala Leu Trp Pro  
 245 250 255

Glu Leu Asp Thr Ile Leu Arg Glu Glu Gly Asp Thr Ala Val Ala Thr  
 260 265 270

Pro Tyr Thr Ala Ala Val Leu Glu Tyr Arg Val Ser Ile His Asp Ser  
 275 280 285

Glu Asp Ala Lys Phe Asn Asp Ile Asn Met Ala Asn Gly Asn Gly Tyr  
 290 295 300

Thr Val Phe Asp Ala Gln His Pro Tyr Lys Ala Asn Val Ala Val Lys  
 305 310 315 320

Arg Glu Leu His Thr Pro Glu Ser Asp Arg Ser Cys Ile His Leu Glu  
 325 330 335

Phe Asp Ile Ala Gly Ser Gly Leu Thr Tyr Glu Thr Gly Asp His Val  
 340 345 350

Gly Val Leu Cys Asp Asn Leu Ser Glu Thr Val Asp Glu Ala Leu Arg  
 355 360 365

Leu Leu Asp Met Ser Pro Asp Thr Tyr Phe Ser Leu His Ala Glu Lys  
 370 375 380

Glu Asp Gly Thr Pro Ile Ser Ser Ser Leu Pro Pro Pro Phe Pro Pro  
 385 390 395 400

Cys Asn Leu Arg Thr Ala Leu Thr Arg Tyr Ala Cys Leu Leu Ser Ser  
 405 410 415

Pro Lys Lys Ser Ala Leu Val Ala Leu Ala Ala His Ala Ser Asp Pro  
 420 425 430

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

Glu Tyr Ser Lys Trp Val Val Glu Ser Gln Arg Ser Leu Leu Glu Val  
 450 455 460

Met Ala Glu Phe Pro Ser Ala Lys Pro Pro Leu Gly Val Phe Phe Ala  
 465 470 475 480

Gly Val Ala Pro Arg Leu Gln Pro Arg Phe Tyr Ser Ile Ser Ser Ser  
 485 490 495

Pro Lys Ile Ala Glu Thr Arg Ile His Val Thr Cys Ala Leu Val Tyr  
 500 505 510

Glu Lys Met Pro Thr Gly Arg Ile His Lys Gly Val Cys Ser Thr Trp

515

520

525

Met Lys Asn Ala Val Pro Tyr Glu Lys Ser Glu Asn Cys Ser Ser Ala  
 530 535 540

Pro Ile Phe Val Arg Gln Ser Asn Phe Lys Leu Pro Ser Asp Ser Lys  
 545 550 555 560

Val Pro Ile Ile Met Ile Gly Pro Gly Thr Gly Leu Ala Pro Phe Arg  
 565 570 575

Gly Phe Leu Gln Glu Arg Leu Ala Leu Val Glu Ser Gly Val Glu Leu  
 580 585 590

Gly Pro Ser Val Leu Phe Phe Gly Cys Arg Asn Arg Arg Met Asp Phe  
 595 600 605

Ile Tyr Glu Glu Glu Leu Gln Arg Phe Val Glu Ser Gly Ala Leu Ala  
 610 615 620

Glu Leu Ser Val Ala Phe Ser Arg Glu Gly Pro Thr Lys Glu Tyr Val  
 625 630 635 640

Gln His Lys Met Met Asp Lys Ala Ser Asp Ile Trp Asn Met Ile Ser  
 645 650 655

Gln Gly Ala Tyr Leu Tyr Val Cys Gly Asp Ala Lys Gly Met Ala Arg  
 660 665 670

Asp Val His Arg Ser Leu His Thr Ile Ala Gln Glu Gln Gly Ser Met  
 675 680 685

Asp Ser Thr Lys Ala Glu Gly Phe Val Lys Asn Leu Gln Thr Ser Gly  
 690 695 700

Arg Tyr Leu Arg Asp Val Trp  
 705 710

<210> 15  
 <211> 481  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic: UGT85C2

<400> 15

Met Asp Ala Met Ala Thr Thr Glu Lys Lys Pro His Val Ile Phe Ile  
 1 5 10 15

Pro Phe Pro Ala Gln Ser His Ile Lys Ala Met Leu Lys Leu Ala Gln  
 20 25 30

Leu Leu His His Lys Gly Leu Gln Ile Thr Phe Val Asn Thr Asp Phe  
 35 40 45

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

Ala Pro Gly Phe Arg Phe Glu Thr Ile Pro Asp Gly Val Ser His Ser  
 65 70 75 80

Pro Glu Ala Ser Ile Pro Ile Arg Glu Ser Leu Leu Arg Ser Ile Glu  
 85 90 95

Thr Asn Phe Leu Asp Arg Phe Ile Asp Leu Val Thr Lys Leu Pro Asp  
 100 105 110

Pro Pro Thr Cys Ile Ile Ser Asp Gly Phe Leu Ser Val Phe Thr Ile  
 115 120 125

Asp Ala Ala Lys Lys Leu Gly Ile Pro Val Met Met Tyr Trp Thr Leu  
 130 135 140

Ala Ala Cys Gly Phe Met Gly Phe Tyr His Ile His Ser Leu Ile Glu  
 145 150 155 160

Lys Gly Phe Ala Pro Leu Lys Asp Ala Ser Tyr Leu Thr Asn Gly Tyr  
 165 170 175

Leu Asp Thr Val Ile Asp Trp Val Pro Gly Met Glu Gly Ile Arg Leu  
 180 185 190

Lys Asp Phe Pro Leu Asp Trp Ser Thr Asp Leu Asn Asp Lys Val Leu  
 195 200 205

Met Phe Thr Thr Glu Ala Pro Gln Arg Ser His Lys Val Ser His His  
 210 215 220

Ile Phe His Thr Phe Asp Glu Leu Glu Pro Ser Ile Ile Lys Thr Leu  
 225 230 235 240

Ser Leu Arg Tyr Asn His Ile Tyr Thr Ile Gly Pro Leu Gln Leu Leu  
 245 250 255

Leu Asp Gln Ile Pro Glu Glu Lys Lys Gln Thr Gly Ile Thr Ser Leu  
 260 265 270

His Gly Tyr Ser Leu Val Lys Glu Glu Pro Glu Cys Phe Gln Trp Leu  
 275 280 285

Gln Ser Lys Glu Pro Asn Ser Val Val Tyr Val Asn Phe Gly Ser Thr  
 290 295 300

Thr Val Met Ser Leu Glu Asp Met Thr Glu Phe Gly Trp Gly Leu Ala  
 305 310 315 320

Asn Ser Asn His Tyr Phe Leu Trp Ile Ile Arg Ser Asn Leu Val Ile  
 325 330 335

Gly Glu Asn Ala Val Leu Pro Pro Glu Leu Glu Glu His Ile Lys Lys  
 340 345 350

Arg Gly Phe Ile Ala Ser Trp Cys Ser Gln Glu Lys Val Leu Lys His

355

360

365

Pro Ser Val Gly Gly Phe Leu Thr His Cys Gly Trp Gly Ser Thr Ile  
 370 375 380

Glu Ser Leu Ser Ala Gly Val Pro Met Ile Cys Trp Pro Tyr Ser Trp  
 385 390 395 400

Asp Gln Leu Thr Asn Cys Arg Tyr Ile Cys Lys Glu Trp Glu Val Gly  
 405 410 415

Leu Glu Met Gly Thr Lys Val Lys Arg Asp Glu Val Lys Arg Leu Val  
 420 425 430

Gln Glu Leu Met Gly Glu Gly Gly His Lys Met Arg Asn Lys Ala Lys  
 435 440 445

Asp Trp Lys Glu Lys Ala Arg Ile Ala Ile Ala Pro Asn Gly Ser Ser  
 450 455 460

Ser Leu Asn Ile Asp Lys Met Val Lys Glu Ile Thr Val Leu Ala Arg  
 465 470 475 480

Asn

<210> 16  
 <211> 460  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic: UGT74G1

<400> 16

Met Ala Glu Gln Gln Lys Ile Lys Lys Ser Pro His Val Leu Leu Ile  
 1 5 10 15

Pro Phe Pro Leu Gln Gly His Ile Asn Pro Phe Ile Gln Phe Gly Lys

20

25

30

Arg Leu Ile Ser Lys Gly Val Lys Thr Thr Leu Val Thr Thr Ile His  
 35 40 45

Thr Leu Asn Ser Thr Leu Asn His Ser Asn Thr Thr Thr Ser Ile  
 50 55 60

Glu Ile Gln Ala Ile Ser Asp Gly Cys Asp Glu Gly Gly Phe Met Ser  
 65 70 75 80

Ala Gly Glu Ser Tyr Leu Glu Thr Phe Lys Gln Val Gly Ser Lys Ser  
 85 90 95

Leu Ala Asp Leu Ile Lys Lys Leu Gln Ser Glu Gly Thr Thr Ile Asp  
 100 105 110

Ala Ile Ile Tyr Asp Ser Met Thr Glu Trp Val Leu Asp Val Ala Ile  
 115 120 125

Glu Phe Gly Ile Asp Gly Gly Ser Phe Phe Thr Gln Ala Cys Val Val  
 130 135 140

Asn Ser Leu Tyr Tyr His Val His Lys Gly Leu Ile Ser Leu Pro Leu  
 145 150 155 160

Gly Glu Thr Val Ser Val Pro Gly Phe Pro Val Leu Gln Arg Trp Glu  
 165 170 175

Thr Pro Leu Ile Leu Gln Asn His Glu Gln Ile Gln Ser Pro Trp Ser  
 180 185 190

Gln Met Leu Phe Gly Gln Phe Ala Asn Ile Asp Gln Ala Arg Trp Val  
 195 200 205

Phe Thr Asn Ser Phe Tyr Lys Leu Glu Glu Glu Val Ile Glu Trp Thr  
 210 215 220

Arg Lys Ile Trp Asn Leu Lys Val Ile Gly Pro Thr Leu Pro Ser Met  
 225 230 235 240

Tyr Leu Asp Lys Arg Leu Asp Asp Asp Lys Asp Asn Gly Phe Asn Leu  
 245 250 255

Tyr Lys Ala Asn His His Glu Cys Met Asn Trp Leu Asp Asp Lys Pro  
 260 265 270

Lys Glu Ser Val Val Tyr Val Ala Phe Gly Ser Leu Val Lys His Gly  
 275 280 285

Pro Glu Gln Val Glu Glu Ile Thr Arg Ala Leu Ile Asp Ser Asp Val  
 290 295 300

Asn Phe Leu Trp Val Ile Lys His Lys Glu Glu Gly Lys Leu Pro Glu  
 305 310 315 320

Asn Leu Ser Glu Val Ile Lys Thr Gly Lys Gly Leu Ile Val Ala Trp  
 325 330 335

Cys Lys Gln Leu Asp Val Leu Ala His Glu Ser Val Gly Cys Phe Val  
 340 345 350

Thr His Cys Gly Phe Asn Ser Thr Leu Glu Ala Ile Ser Leu Gly Val  
 355 360 365

Pro Val Val Ala Met Pro Gln Phe Ser Asp Gln Thr Thr Asn Ala Lys  
 370 375 380

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

Asn Gly Ile Val Arg Arg Gly Asn Leu Ala Ser Cys Ile Lys Met Ile  
 405 410 415

Met Glu Glu Glu Arg Gly Val Ile Ile Arg Lys Asn Ala Val Lys Trp

420

425

430

Lys Asp Leu Ala Lys Val Ala Val His Glu Gly Gly Ser Ser Asp Asn  
 435 440 445

Asp Ile Val Glu Phe Val Ser Glu Leu Ile Lys Ala  
 450 455 460

&lt;210&gt; 17

&lt;211&gt; 485

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Synthetic: UGT91D\_like3

&lt;400&gt; 17

Met Tyr Asn Val Thr Tyr His Gln Asn Ser Lys Ala Met Ala Thr Ser  
 1 5 10 15

Asp Ser Ile Val Asp Asp Arg Lys Gln Leu His Val Ala Thr Phe Pro  
 20 25 30

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

Ile Ala Glu Lys Gly His Lys Val Ser Phe Leu Ser Thr Thr Arg Asn  
 50 55 60

Ile Gln Arg Leu Ser Ser His Ile Ser Pro Leu Ile Asn Val Val Gln  
 65 70 75 80

Leu Thr Leu Pro Arg Val Gln Glu Leu Pro Glu Asp Ala Glu Ala Thr  
 85 90 95

Thr Asp Val His Pro Glu Asp Ile Pro Tyr Leu Lys Lys Ala Ser Asp  
 100 105 110

Gly Leu Gln Pro Glu Val Thr Arg Phe Leu Glu Gln His Ser Pro Asp

115

120

125

Trp Ile Ile Tyr Asp Tyr Thr His Tyr Trp Leu Pro Ser Ile Ala Ala  
 130 135 140

Ser Leu Gly Ile Ser Arg Ala His Phe Ser Val Thr Thr Pro Trp Ala  
 145 150 155 160

Ile Ala Tyr Met Gly Pro Ser Ala Asp Ala Met Ile Asn Gly Ser Asp  
 165 170 175

Gly Arg Thr Thr Val Glu Asp Leu Thr Thr Pro Pro Lys Trp Phe Pro  
 180 185 190

Phe Pro Thr Lys Val Cys Trp Arg Lys His Asp Leu Ala Arg Leu Val  
 195 200 205

Pro Tyr Lys Ala Pro Gly Ile Ser Asp Gly Tyr Arg Met Gly Leu Val  
 210 215 220

Leu Lys Gly Ser Asp Cys Leu Leu Ser Lys Cys Tyr His Glu Phe Gly  
 225 230 235 240

Thr Gln Trp Leu Pro Leu Leu Glu Thr Leu His Gln Val Pro Val Val  
 245 250 255

Pro Val Gly Leu Leu Pro Pro Glu Ile Pro Gly Asp Glu Lys Asp Glu  
 260 265 270

Thr Trp Val Ser Ile Lys Lys Trp Leu Asp Gly Lys Gln Lys Gly Ser  
 275 280 285

Val Val Tyr Val Ala Leu Gly Ser Glu Val Leu Val Ser Gln Thr Glu  
 290 295 300

Val Val Glu Leu Ala Leu Gly Leu Glu Leu Ser Gly Leu Pro Phe Val  
 305 310 315 320

Trp Ala Tyr Arg Lys Pro Lys Gly Pro Ala Lys Ser Asp Ser Val Glu  
                   325                                  330                                  335

Leu Pro Asp Gly Phe Val Glu Arg Thr Arg Asp Arg Gly Leu Val Trp  
                   340                                  345                                  350

Thr Ser Trp Ala Pro Gln Leu Arg Ile Leu Ser His Glu Ser Val Cys  
                   355                                  360                                  365

Gly Phe Leu Thr His Cys Gly Ser Gly Ser Ile Val Glu Gly Leu Met  
                   370                                  375                                  380

Phe Gly His Pro Leu Ile Met Leu Pro Ile Phe Gly Asp Gln Pro Leu  
                   385                                  390                                  395                                  400

Asn Ala Arg Leu Leu Glu Asp Lys Gln Val Gly Ile Glu Ile Pro Arg  
                   405                                  410                                  415

Asn Glu Glu Asp Gly Cys Leu Thr Lys Glu Ser Val Ala Arg Ser Leu  
                   420                                  425                                  430

Arg Ser Val Val Val Glu Lys Glu Gly Glu Ile Tyr Lys Ala Asn Ala  
                   435                                  440                                  445

Arg Glu Leu Ser Lys Ile Tyr Asn Asp Thr Lys Val Glu Lys Glu Tyr  
                   450                                  455                                  460

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

Ile Asp His Glu Ser  
                   485

<210> 18

<211> 458

<212> PRT

<213> Artificial Sequence

&lt;220&gt;

&lt;223&gt; Synthetic: UGT76G1

&lt;400&gt; 18

Met Glu Asn Lys Thr Glu Thr Thr Val Arg Arg Arg Arg Arg Ile Ile  
 1 5 10 15

Leu Phe Pro Val Pro Phe Gln Gly His Ile Asn Pro Ile Leu Gln Leu  
 20 25 30

Ala Asn Val Leu Tyr Ser Lys Gly Phe Ser Ile Thr Ile Phe His Thr  
 35 40 45

Asn Phe Asn Lys Pro Lys Thr Ser Asn Tyr Pro His Phe Thr Phe Arg  
 50 55 60

Phe Ile Leu Asp Asn Asp Pro Gln Asp Glu Arg Ile Ser Asn Leu Pro  
 65 70 75 80

Thr His Gly Pro Leu Ala Gly Met Arg Ile Pro Ile Ile Asn Glu His  
 85 90 95

Gly Ala Asp Glu Leu Arg Arg Glu Leu Glu Leu Leu Met Leu Ala Ser  
 100 105 110

Glu Glu Asp Glu Glu Val Ser Cys Leu Ile Thr Asp Ala Leu Trp Tyr  
 115 120 125

Phe Ala Gln Ser Val Ala Asp Ser Leu Asn Leu Arg Arg Leu Val Leu  
 130 135 140

Met Thr Ser Ser Leu Phe Asn Phe His Ala His Val Ser Leu Pro Gln  
 145 150 155 160

Phe Asp Glu Leu Gly Tyr Leu Asp Pro Asp Asp Lys Thr Arg Leu Glu  
 165 170 175

Glu Gln Ala Ser Gly Phe Pro Met Leu Lys Val Lys Asp Ile Lys Ser

180

185

190

Ala Tyr Ser Asn Trp Gln Ile Leu Lys Glu Ile Leu Gly Lys Met Ile  
 195 200 205

Lys Gln Thr Lys Ala Ser Ser Gly Val Ile Trp Asn Ser Phe Lys Glu  
 210 215 220

Leu Glu Glu Ser Glu Leu Glu Thr Val Ile Arg Glu Ile Pro Ala Pro  
 225 230 235 240

Ser Phe Leu Ile Pro Leu Pro Lys His Leu Thr Ala Ser Ser Ser Ser  
 245 250 255

Leu Leu Asp His Asp Arg Thr Val Phe Gln Trp Leu Asp Gln Gln Pro  
 260 265 270

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

Glu Lys Asp Phe Leu Glu Ile Ala Arg Gly Leu Val Asp Ser Lys Gln  
 290 295 300

Ser Phe Leu Trp Val Val Arg Pro Gly Phe Val Lys Gly Ser Thr Trp  
 305 310 315 320

Val Glu Pro Leu Pro Asp Gly Phe Leu Gly Glu Arg Gly Arg Ile Val  
 325 330 335

Lys Trp Val Pro Gln Gln Glu Val Leu Ala His Gly Ala Ile Gly Ala  
 340 345 350

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

Gly Val Pro Met Ile Phe Ser Asp Phe Gly Leu Asp Gln Pro Leu Asn  
 370 375 380

Ala Arg Tyr Met Ser Asp Val Leu Lys Val Gly Val Tyr Leu Glu Asn  
 385 390 395 400

Gly Trp Glu Arg Gly Glu Ile Ala Asn Ala Ile Arg Arg Val Met Val  
 405 410 415

Asp Glu Glu Gly Glu Tyr Ile Arg Gln Asn Ala Arg Val Leu Lys Gln  
 420 425 430

Lys Ala Asp Val Ser Leu Met Lys Gly Gly Ser Ser Tyr Glu Ser Leu  
 435 440 445

Glu Ser Leu Val Ser Tyr Ile Ser Ser Leu  
 450 455

<210> 19  
 <211> 436  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic: UGT40087

<400> 19

Met Asp Ala Ser Asp Ser Ser Pro Leu His Ile Val Ile Phe Pro Trp  
 1 5 10 15

Leu Ala Phe Gly His Met Leu Ala Ser Leu Glu Leu Ala Glu Arg Leu  
 20 25 30

Ala Ala Arg Gly His Arg Val Ser Phe Val Ser Thr Pro Arg Asn Ile  
 35 40 45

Ser Arg Leu Arg Pro Val Pro Pro Ala Leu Ala Pro Leu Ile Asp Phe  
 50 55 60

Val Ala Leu Pro Leu Pro Arg Val Asp Gly Leu Pro Asp Gly Ala Glu  
 65 70 75 80

Ala Thr Ser Asp Ile Pro Pro Gly Lys Thr Glu Leu His Leu Lys Ala  
                   85                                  90                                  95

Leu Asp Gly Leu Ala Ala Pro Phe Ala Ala Phe Leu Asp Ala Ala Cys  
                   100                                  105                                  110

Ala Asp Gly Ser Thr Asn Lys Val Asp Trp Leu Phe Leu Asp Asn Phe  
                   115                                  120                                  125

Gln Tyr Trp Ala Ala Ala Ala Ala Ala Asp His Lys Ile Pro Cys Ala  
                   130                                  135                                  140

Leu Asn Leu Thr Phe Ala Ala Ser Thr Ser Ala Glu Tyr Gly Val Pro  
   145                                  150                                  155                                  160

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

Phe Val Leu Thr Leu Glu Lys Cys Gln Phe Val Ile Gln Arg Ala Cys  
                   180                                  185                                  190

Phe Glu Leu Glu Pro Glu Pro Leu Pro Leu Leu Ser Asp Ile Phe Gly  
                   195                                  200                                  205

Lys Pro Val Ile Pro Tyr Gly Leu Val Pro Pro Cys Pro Pro Ala Glu  
                   210                                  215                                  220

Gly His Lys Arg Glu His Gly Asn Ala Ala Leu Ser Trp Leu Asp Lys  
   225                                  230                                  235                                  240

Gln Gln Pro Glu Ser Val Leu Phe Ile Ala Leu Gly Ser Glu Pro Pro  
                   245                                  250                                  255

Val Thr Val Glu Gln Leu His Glu Ile Ala Leu Gly Leu Glu Leu Ala  
                   260                                  265                                  270

Gly Thr Thr Phe Leu Trp Ala Leu Lys Lys Pro Asn Gly Leu Leu Leu

275

280

285

Glu Ala Asp Gly Asp Ile Leu Pro Pro Gly Phe Glu Glu Arg Thr Arg  
 290 295 300

Asp Arg Gly Leu Val Ala Met Gly Trp Val Pro Gln Pro Ile Ile Leu  
 305 310 315 320

Ala His Ser Ser Val Gly Ala Phe Leu Thr His Gly Gly Trp Ala Ser  
 325 330 335

Thr Ile Glu Gly Val Met Ser Gly His Pro Met Leu Phe Leu Thr Phe  
 340 345 350

Leu Asp Glu Gln Arg Ile Asn Ala Gln Leu Ile Glu Arg Lys Lys Ala  
 355 360 365

Gly Leu Arg Val Pro Arg Arg Glu Lys Asp Gly Ser Tyr Asp Arg Gln  
 370 375 380

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

Ser Val Phe Ala Ala Asn Ala Lys Lys Met Gln Glu Ile Val Ser Asp  
 405 410 415

Arg Asn Cys Gln Glu Lys Tyr Ile Asp Glu Leu Ile Gln Arg Leu Gly  
 420 425 430

Ser Phe Glu Lys  
 435

<210> 20

<211> 4680

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic: nucleic acid sequence

&lt;400&gt; 20

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| atgtcttcac tagaagtggg agatgggtgc ccctatggat accgaccata tccagatagt   | 60   |
| ggcacaaatg cattaaatcc atgtttttata tcagtaatat ccgcctggca agccgtcttt  | 120  |
| ttcctattga ttggtagcta tcaattgtgg aaactttata agaacaataa agtaccaccc   | 180  |
| agatttaaga acttttcctac attaccaagt aaaatcaaca gtcgacatct aacgcatttg  | 240  |
| accaatgttt gctttcagtc cacgcttata atttgtgaac tggccttggg atcccaatct   | 300  |
| agcgataggg tttatccatt tatactaaag aaggctctgt acttgaatct ctttttcaat   | 360  |
| ttgggtattt ctctccctac tcaatactta gcttatttta aaagtacatt ttcaatgggc   | 420  |
| aaccagcttt tctattacat gtttcaaatt cttctacagc tcttcttgat attgcagagg   | 480  |
| tactatcatg gttctagtaa cgaaaggctt actgttatta gcggacaaac tgctatgatt   | 540  |
| ttagaagtgc tccttctttt caattctgtg gcaattttta tttatgatct atgcattttt   | 600  |
| gagccaatta acgaattatc tgaatactac aagaaaaatg ggtggtatcc ccccgttcat   | 660  |
| gtactatcct atattacatt tatctggatg aacaaactga ttgtggaaac ttaccgtaac   | 720  |
| aagaaaaatca aagatcctaa ccagttacca ttgccgccag tagatctgaa tattaagtcg  | 780  |
| ataagtaagg aatttaaggc taactgggaa ttggaaaaat ggttgaatag aaattctctt   | 840  |
| tggaggggcca tttggaagtc atttggtagg actatttctg tggctatgct gtatgaaacg  | 900  |
| acatctgatt tactttctgt agtacagccc cagtttctac ggatattcat agatggtttg   | 960  |
| aacccggaaa catcttctaa atatcctcct ttaaattggg tatttattgc tctaaccctt   | 1020 |
| ttcgtaatca gcgtggtttc tgtgttcctc accaatcaat tttatattgg aatttttgag   | 1080 |
| gctggtttgg ggataagagg ctcttttagct tcttttagtgt atcagaagtc cttaagattg | 1140 |
| acgctagcag agcgtaacga aaaatctact ggtgacatct taaatttgat gtctgtggat   | 1200 |
| gtgttaagga tccagcgggt tttcgaaaat gcccaaacca ttattggcgc tcctattcag   | 1260 |
| attattgttg tattaacttc cctgtactgg ttgctaggaa aggctgttat tggagggttg   | 1320 |
| gttactatgg ctattatgat gcctatcaat gccttcttat ctagaaagggt aaaaaagcta  | 1380 |
| tcaaaaactc aaatgaagta taaggacatg agaatcaaga ctattacaga gcttttgaat   | 1440 |

|                                                                    |      |
|--------------------------------------------------------------------|------|
| gctataaaat ctattaaatt atacgcctgg gaggaaccta tgatggcaag attgaatcat  | 1500 |
| gttcgtaatg atatggagtt gaaaaatttt cggaaaattg gtatagttag caatctgata  | 1560 |
| tattttgcgt ggaattgtgt acctttaatg gtgacatggt ccacatttgg cttattttct  | 1620 |
| ttatttagtg attctccgtt atctcctgcc attgtcttcc cttcattatc tttatttaat  | 1680 |
| attttgaaca gtgccatcta ttccgttcca tccatgataa ataccattat agagacaagc  | 1740 |
| gtttctatgg aaagattaaa gtcattccta cttagttagc aaattgatga ttcgttcac   | 1800 |
| gaacgtattg atccttcagc ggatgaaaga gcgttacctg ctatagagat gaataatatt  | 1860 |
| acatttttat ggaaatcaaa agaagtatta acatctagcc aatctggaga taatttgagg  | 1920 |
| acagatgaag agtctattat cggatcttct caaattgcgt tgaagaatat cgatcatttt  | 1980 |
| gaagcaaaaa ggggtgattt agtttgtgtt gttggtcggg taggagctgg taaatcaaca  | 2040 |
| tttttgaagg caattcttgg tcaacttcct tgcatgagtg gttctaggga ctcgatacca  | 2100 |
| cctaaactga tcattagatc atcgtctgta gcctactggt cacaagaatc ctggataatg  | 2160 |
| aacgcatctg taagagaaaa cattctattt ggtcacaagt tcgaccaaga ttattatgac  | 2220 |
| ctcactatta aagcatgtca attgctaccc gatttgaaaa tactaccaga tggatgatgaa | 2280 |
| actttgtag gtgaaaaggg catttcccta tcaggcggtc agaaggcccg tctttcatta   | 2340 |
| gccagagcgg tgactcgag agcagatatt tatttgttgg atgacatttt atctgctgtt   | 2400 |
| gatgcagaag ttagtaaaaa tattattgaa tatgttttga tcggaaaagac ggctttatta | 2460 |
| aaaaataaaa caattatttt aactaccaat actgtatcaa ttttaaaaca ttcgcagatg  | 2520 |
| atatatgcg tagaaaacgg tgaaattgtt gaacaaggga attatgagga tgtaatgaac   | 2580 |
| cgtaagaaca atacttcaaa actgaaaaaa ttactagagg aatttgattc tccgattgat  | 2640 |
| aatggaaatg aaagcgatgt ccaaactgaa caccgatccg aaagtgaagt ggatgaacct  | 2700 |
| ctgcagctta aagtaactga atcagaaact gaggatgagg ttgttactga gagtgaatta  | 2760 |
| gaactaatca aagccaattc tagaagagct tctctagcta cgctaagacc tagacccttt  | 2820 |
| gtgggagcac aattggattc cgtgaagaaa acggcgcaaa aggccgagaa gacagagggtg | 2880 |
| ggaagagtca aaacaaagat ttatcttgcg tatattaagg cttgtggagt tttaggtgtt  | 2940 |

|             |            |             |             |             |             |            |      |
|-------------|------------|-------------|-------------|-------------|-------------|------------|------|
| gttttat     | tttt       | tcttgtttat  | gatattaaca  | agggttttcg  | acttagcaga  | gaatttttgg | 3000 |
| ttaaagtact  | ggtcagaatc | taatgaaaaa  | aatgggtcaa  | atgaaagggt  | ttggatgttt  |            | 3060 |
| gttgggtgtgt | attccttaat | cggagtagca  | tcggccgcat  | tcaataat    | acggagtatt  |            | 3120 |
| atgatgctac  | tgtattgttc | tattaggggt  | tctaagaaac  | tgcatgaaag  | catggccaaa  |            | 3180 |
| tctgtaatta  | gaagtcctat | gactttcttt  | gagactacac  | cagttggaag  | gatcataaac  |            | 3240 |
| aggttctcat  | ctgatatgga | tgcatgggac  | agtaatctac  | agtacatttt  | ctcctttttt  |            | 3300 |
| ttcaaatcaa  | tactaaccta | tttggttact  | gttatattag  | tcgggtacaa  | tatgccatgg  |            | 3360 |
| tttttagtgt  | tcaatatgtt | tttggtggtt  | atctatat    | actatcaaac  | attttacatt  |            | 3420 |
| gtgctatcta  | gggagctaaa | aagattgatc  | agtatatctt  | actctccgat  | tatgtcctta  |            | 3480 |
| atgagtgaga  | gcttgaacgg | ttattctatt  | attgatgcat  | acgatcattt  | tgagagattc  |            | 3540 |
| atctatctaa  | attatgaaaa | aatccaatac  | aacgttgatt  | ttgtcttcaa  | ctttagatca  |            | 3600 |
| acgaatagat  | ggttatccgt | gagattgcaa  | actattgggtg | ctacaattgt  | tttggctact  |            | 3660 |
| gcaatcttag  | cactagcaac | aatgaatact  | aaaaggcaac  | taagttcggg  | tatggttgggt |            | 3720 |
| ctactaatga  | gctattcatt | agagggttaca | ggttcattga  | cttggattgt  | aaggacaact  |            | 3780 |
| gtgacgattg  | aaaccaacat | tgtatcagtg  | gagagaattg  | ttgagtactg  | cgaattacca  |            | 3840 |
| cctgaagcac  | agtccattaa | ccctgaaaag  | aggccagatg  | aaaattggcc  | atcaaagggt  |            | 3900 |
| ggtattgaat  | tcaaaaacta | ttccacaaaa  | tacagagaaa  | atttggatcc  | agtgctgaat  |            | 3960 |
| aatattaacg  | tgaagattga | gccatgtgaa  | aagggtggga  | ttgttggcag  | aacaggtgca  |            | 4020 |
| gggaagtcta  | cactgagcct | ggcattat    | agaatactag  | aacctaccga  | aggtaaaatt  |            | 4080 |
| attattgacg  | gcattgatat | atccgacata  | ggtctgttcg  | atttaagaag  | ccatttggca  |            | 4140 |
| attattcctc  | aggatgcaca | agcttttgaa  | ggtacagtaa  | agaccaattt  | ggaccctttc  |            | 4200 |
| aatcgttatt  | cagaagatga | acttaaaagg  | gctgttgagc  | aggcacattt  | aaagcctcat  |            | 4260 |
| ctggaaaaaa  | tgctgcacag | taaaccaaga  | ggtgatgatt  | ctaatagaaga | ggatggcaat  |            | 4320 |
| gttaatgata  | ttctggatgt | caagattaat  | gagaacggta  | gtaacttgtc  | agtggggcaa  |            | 4380 |
| agacaactac  | tatgtttggc | aagagcgctg  | ctaaaccggt  | ccaaaatatt  | ggtccttgat  |            | 4440 |

|                                                                    |      |
|--------------------------------------------------------------------|------|
| gaagcaacgg cttctgtgga tatggaaacc gataaaatta tccaagacac tataagaaga  | 4500 |
| gaatttaagg accgtaccat cttacaatt gcacatcgta tcgacactgt attggacagt   | 4560 |
| gataagataa ttgttcttga ccagggtagt gtgagggaat tcgattcacc ctcgaaattg  | 4620 |
| ttatccgata aaacgtctat tttttacagt ctttgtgaga aagggtgggta tttgaaataa | 4680 |

&lt;210&gt; 21

&lt;211&gt; 4680

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Synthetic: nucleic acid sequence

&lt;400&gt; 21

|                                                                    |     |
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| atgtcttcac tagaagtggg agatgggtgc ccctatggat accgaccata tccagatagt  | 60  |
| ggcacaaatg cattaaatcc atgtttttata tcagtaatat ccgcctggca agccgtcttt | 120 |
| ttcctattga ttggtagcta tcaattgtgg aaactttata agaacaataa agtaccaccc  | 180 |
| agatttaaga actttcctac attaccaagt aaaatcaaca gtcgacatct aacgcatttg  | 240 |
| accaatgttt gctttcagtc cacgcttata atttgtgaac tggccttggg atcccaatct  | 300 |
| agcgataggg tttatccatt tataactaaag aaggctctgt acttgaatct ctttttcaat | 360 |
| ttgggtattt ctctccctac tcaatactta gcttatttta aaagtacatt ttcaatgggc  | 420 |
| aaccagcttt tctattacat gtttcaaatt cttctacagc tcttcttgat attgcagagg  | 480 |
| tactatcatg gttctagtaa cgaaaggctt actgttatta gcggacaaac tgctatgatt  | 540 |
| ttagaagtgc tccttctttt caattctgtg gcaattttta tttatgatct atgcattttt  | 600 |
| gagccaatta acgaattatc tgaatactac aagaaaaatg ggtggatatcc ccccgttcat | 660 |
| gtactatcct atattacatt tatctggatg aacaaactga ttgtggaaac ttaccgtaac  | 720 |
| aagaaaaatca aagatcctaa ccagttacca ttgccgccag tagatctgaa tattaagtcg | 780 |
| ataagtaagg aatttaaggc taactgggaa ttggaaaaat ggttgaatag aaattctctt  | 840 |
| tggaggggcca tttggaagtc atttggtagg actatttctg tggctatgct gtatgaaacg | 900 |
| acatctgatt tactttctgt agtacagccc cagtttctac ggatattcat agatggtttg  | 960 |

|             |                |             |             |             |              |            |      |
|-------------|----------------|-------------|-------------|-------------|--------------|------------|------|
| aacccgga    | aaa catcttctaa | atatcctcct  | ttaa        | atgggtg     | tatttattgc   | tctaaccctt | 1020 |
| ttc         | gtaatca        | gcgtggtttc  | tgtgttcctc  | accaatcaat  | tttatattgg   | aatttttgag | 1080 |
| gctggtttgg  | ggataagagg     | ctcttttagct | tcttttagtgt | atcagaagtc  | cttaagattg   |            | 1140 |
| acgctagcag  | agcgtaacga     | aaaatctact  | ggtgacatct  | taaatttgat  | gtctgtggat   |            | 1200 |
| gtgttaagga  | tccagcggtt     | tttcgaaaat  | gccccaaacca | ttattggcgc  | tcctattcag   |            | 1260 |
| attattgttg  | tattaacttc     | cctgtactgg  | ttgctaggaa  | aggctgttat  | tggagggttg   |            | 1320 |
| gttactatgg  | ctattatgat     | gcctatcaat  | gccttcttat  | ctagaaagg   | t aaaaaagcta |            | 1380 |
| tcaaaaaactc | aaatgaagta     | taaggacatg  | agaatcaaga  | ctattacaga  | gcttttgaat   |            | 1440 |
| gctataaaaat | ctatttaaatt    | atacgccctgg | gaggaaccta  | tgatggcaag  | attgaatcat   |            | 1500 |
| gttcgtaatg  | atatggagtt     | gaaaaatttt  | cggaaaaattg | gtatagtgag  | caatctgata   |            | 1560 |
| tattttgcgt  | ggaattgtgt     | acctttaatg  | gtgacatggt  | ccacatttgg  | cttattttct   |            | 1620 |
| ttattttagtg | attctccgtt     | atctcctgcc  | attgtcttcc  | cttcattatc  | tttattttaat  |            | 1680 |
| attttgaaca  | gtgccatcta     | ttccgttcca  | tccatgataa  | ataccattat  | agagacaagc   |            | 1740 |
| gtttctatgg  | aaagattaaa     | gtcattccta  | cttagtgacg  | aaattgatga  | ttcgttcatc   |            | 1800 |
| gaacgtattg  | atccttcagc     | ggatgaaaga  | gcgttacctg  | ctatagagat  | gaataatatt   |            | 1860 |
| acatttttat  | ggaaatcaaa     | agaagtatta  | acatctagcc  | aatctggaga  | taatttgagg   |            | 1920 |
| acagatgaag  | agtctattat     | cggatcttct  | caaattgcgt  | tgaagaatat  | cgatcatttt   |            | 1980 |
| gaagcaaaaa  | gggggtgattt    | agtttgtgtt  | gttggtcggg  | taggagctgg  | taaatcaaca   |            | 2040 |
| tttttgaagg  | caattcttgg     | tcaacttcct  | tgcatgagtg  | gttctaggga  | ctcgatacca   |            | 2100 |
| cctaaaactga | tcattagatc     | atcgtctgta  | gcctactggt  | cacaagaatc  | ctggataatg   |            | 2160 |
| aacgcatctg  | taagagaaaa     | cattctattt  | ggtcacaagt  | tcgaccaaga  | ttattatgac   |            | 2220 |
| ctcactatta  | aagcatgtca     | attgctaccc  | gatttgaaaa  | tactaccaga  | tggatgatgaa  |            | 2280 |
| actttggtag  | gtgaaaaggg     | catttcccta  | tcaggcggtc  | agaaggccccg | tctttcatta   |            | 2340 |
| gccagagcgg  | tgtactcgag     | agcagatatt  | tatttgttgg  | atgacatttt  | atctgctggt   |            | 2400 |
| gatgcagaag  | ttagtaaaaa     | tattattgaa  | tatgttttga  | tcggaaagac  | ggctttatta   |            | 2460 |

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| aaaaataaaa caattatttt aactaccaat actgtatcaa ttttaaaaca ttcgcagatg  | 2520 |
| atatatgcgc tagaaaacgg tgaaattggt gaacaaggga attatgagga tgtaatgaac  | 2580 |
| cgtaagaaca atacttcaaa actgaaaaaa ttactagagg aatttgattc tccgattgat  | 2640 |
| aatggaaatg aaagcgatgt ccaaactgaa caccgatccg aaagtgaagt ggatgaacct  | 2700 |
| ctgcagctta aagtaactga atcagaaaact gaggatgagg ttgttactga gagtgaatta | 2760 |
| gaactaatca aagccaattc tagaagagct tctctagcta cgctaagacc tagacccttt  | 2820 |
| gtgggagcac aattggattc cgtgaagaaa acggcgcaaa aggccgagaa gacagagggtg | 2880 |
| ggaagagtca aaacaaagat ttatcttgcg tatattaagg cttgtggagt tttagggtgtt | 2940 |
| gttttatttt tcttgtttat gatattaaca agggttttcg acttagcaga gaatttttgg  | 3000 |
| ttaaagtact ggtcagaatc taatgaaaaa aatgggtcaa atgaaagggt ttggatgttt  | 3060 |
| gttgggtgtg attccttaat cggagtagca tcggccgcat tcaataattt acggagtatt  | 3120 |
| atgatgctac tgtattgttc tattaggggt tctaagaaac tgcataaaag catggccaaa  | 3180 |
| tctgtaatta gaagtcctat gactttcttt gagactacac cagttggaag gatcataaac  | 3240 |
| aggttctcat ctgatatgga tgcagtggac agtaatctac agtacatttt ctcctttttt  | 3300 |
| ttcaaatcaa tactaaccta tttggttact gttatattag tcgggtacaa tatgccatgg  | 3360 |
| tttttagtgt tcaatatgtt tttgggtgtt atctatatat actatcaaac attttacatt  | 3420 |
| gtgctatcta gggagctaaa aagattgatc agtatatctt actctccgat tatgtcctta  | 3480 |
| atgagtgaga gcttgaacgg ttattctatt attgatgcat acgatcattt tgagagattc  | 3540 |
| atctatctaa attatgaaaa aatccaatac aacgttgatt ttgtcttcaa ctttagatca  | 3600 |
| acgaatagat gggtatccgt gagattgcaa actattgggt ctacaattgt tttggctact  | 3660 |
| gcaatcttag cactagcaac aatgaatact aaaaggcaac taagttcggg tatggttggt  | 3720 |
| ctactaatga gctattcatt agaggttaca gggttcattga cttggattgt aaggacaact | 3780 |
| gtgacgattg aaaccaacat tgtatcagtg gagagaattg ttgagtactg cgaattacca  | 3840 |
| cctgaagcac agtccattaa ccctgaaaag aggccagatg aaaattggcc atcaaagggt  | 3900 |
| ggatttgaat tcaaaaacta ttccacaaaa tacagagaaa atttggatcc agtgctgaat  | 3960 |

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aatattaacg tgaagattga gccatgtgaa aaggttggga ttgttggcag aacaggtgca      4020
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gaatttaagg accgtaccat cttacaatt gcacatcgta tcgacactgt attggacagt      4560
gataagataa ttgttcttga ccagggtagt gtgagggaat tcgattcacc ctcgaaattg      4620
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<210> 22

<211> 4680

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic: nucleic acid sequence

<400> 22

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ttcctattga ttggtagcta tcaattgtgg aaactttata agaacaataa agtaccaccc      180
agatttaaga actttcctac attaccaagt aaaatcaaca gtcgacatct aacgcatttg      240
accaatgttt gctttcagtc cacgcttata atttgtgaac tggccttggT atcccaatct      300
agcgataggg tttatccatt tatactaaag aaggctctgt acttgaatct ctttttcaat      360
ttgggtatTTT ctctccctac tcaatactta gcttattTTT aaagtacatt ttcaatgggc      420
aaccagctTTT tctattacat gtttcaaatt cttctacagc tcttcttgat attgcagagg      480

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|                                                                     |      |
|---------------------------------------------------------------------|------|
| tactatcatg gttctagtaa cgaaaggctt actgttatta gcggacaaac tgctatgatt   | 540  |
| ttagaagtgc tccttctttt caattctgtg gcaattttta tttatgatct atgcattttt   | 600  |
| gagccaatta acgaattatc tgaatactac aagaaaaatg ggtgggtatcc ccccgttcat  | 660  |
| gtactatcct atattacatt tatctggatg aacaaactga ttgtggaaac ttaccgtaac   | 720  |
| aagaaaaatca aagatcctaa ccagttacca ttgccgccag tagatctgaa tattaagtcg  | 780  |
| ataagtaagg aatttaaggc taactgggaa ttggaaaaat ggttgaatag aaattctctt   | 840  |
| tggagggcca tttggaagtc atttggtagg actatttctg tggctatgct gtatgaaacg   | 900  |
| acatctgatt tactttctgt agtacagccc cagtttctac ggatattcat agatggtttg   | 960  |
| aacccggaaa catcttctaa atatcctcct ttaaattggtg tatttattgc tctaaccctt  | 1020 |
| ttcgtaatca gcgtggtttc tgtgttcctc accaatcaat tttatattgg aatttttgag   | 1080 |
| gctggtttgg ggataagagg ctcttttagct tcttttagtgt atcagaagtc cttagattg  | 1140 |
| acgctagcag agcgtaacga aaaatctact ggtgacatct taaatttgat gtctgtggat   | 1200 |
| gtgttaagga tccagcggtt tttcgaaaaat gccccaaacca ttattggcgc tcctattcag | 1260 |
| attattgttg tattaacttc cctgtactgg ttgctaggaa aggctgttat tggagggttg   | 1320 |
| gttactatgg ctattatgat gcctatcaat gccttcttat ctagaaagggt aaaaaagcta  | 1380 |
| tcaaaaaactc aaatgaagta taaggacatg agaatcaaga ctattacaga gcttttgaat  | 1440 |
| gctataaaat ctattaaatt atacgcctgg gaggaacctt tgatggcaag attgaatcat   | 1500 |
| gttcgtaatg atatggagtt gaaaaatttt cggaaaattg gtatagttag caatctgata   | 1560 |
| tattttgcgt ggaatttgtt acctttaatg gtgacatggt ccacatttgg cttattttct   | 1620 |
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| attttgaaca gtgccatcta ttccgttcca tccatgataa ataccattat agagacaagc   | 1740 |
| gtttctatgg aaagattaaa gtcattccta cttagtacg aaattgatga ttcgttcatc    | 1800 |
| gaacgtattg atccttcagc ggatgaaaga gcgttacctg ctatagagat gaataatatt   | 1860 |
| acatttttat ggaaatcaaa agaagtatta acatctagcc aatctggaga taatttgagg   | 1920 |
| acagatgaag agtctattat cggatcttct caaattgcgt tgaagaatat cgatcatttt   | 1980 |

|            |            |             |             |            |             |      |
|------------|------------|-------------|-------------|------------|-------------|------|
| gaagcaaaaa | ggggtgattt | agtttgtgtt  | gttggtcggg  | taggagctgg | taaatcaaca  | 2040 |
| tttttgaagg | caattcttgg | tcaacttcct  | tgcatgagtg  | gttctaggga | ctcgatacca  | 2100 |
| cctaaactga | tcattagatc | atcgtctgta  | gcctactgtt  | cacaagaatc | ctggataatg  | 2160 |
| aacgcatctg | taagagaaaa | catttctattt | ggtcacaagt  | tcgaccaaga | ttattatgac  | 2220 |
| ctcactatta | aagcatgtca | attgctaccc  | gatttgaaaa  | tactaccaga | tggtgatgaa  | 2280 |
| actttggtag | gtgaaaaggg | catttcccta  | tcaggcggtc  | agaaggcccg | tctttcatta  | 2340 |
| gccagagcgg | tgtactcgag | agcagatatt  | tatttgttgg  | atgacatttt | atctgctgtt  | 2400 |
| gatgcagaag | ttagtaaaaa | tattattgaa  | tatgttttga  | tcggaaagac | ggctttatta  | 2460 |
| aaaaataaaa | caattatttt | aactaccaat  | actgtatcaa  | ttttaaaaca | ttcgcagatg  | 2520 |
| atatatgcgc | tagaaaacgg | tgaaattgtt  | gaacaaggga  | attatgagga | tgtaatgaac  | 2580 |
| cgtaagaaca | atacttcaaa | actgaaaaaa  | ttactagagg  | aatttgattc | tccgattgat  | 2640 |
| aatggaaatg | aaagcgatgt | ccaaactgaa  | caccgatccg  | aaagtgaagt | ggatgaacct  | 2700 |
| ctgcagctta | aagtaactga | atcagaaaact | gaggatgagg  | ttgttactga | gagtgaatta  | 2760 |
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| tctgtaatta | gaagtcctat | gactttcttt  | gagactacac  | cagttggaag | gatcataaac  | 3240 |
| aggttctcat | ctgatatgga | tgcaagtggac | agtaatctac  | agtacatttt | ctcctttttt  | 3300 |
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| tttttagtgt | tcaatatgtt | tttggtgggt  | atctatatatt | actatcaaac | attttacatt  | 3420 |
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<210> 23

<211> 4680

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic: nucleic acid sequence

<400> 23

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| ttcctattga ttggtagcta tcaattgtgg aaactttata agaacaataa agtaccaccc    | 180  |
| agatttaaga actttcctac attaccaagt aaaatcaaca gtcgacatct aacgcatttg    | 240  |
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| aaccagcttt tctattacat gtttcaaatt cttctacagc tcttcttgat attgcagagg    | 480  |
| tactatcatg gttctagtaa cgaaaggctt actgttatta gcggacaaac tgctatgatt    | 540  |
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| ataagtaagg aatttaaggc taactgggaa ttggaaaaat ggttgaatag aaattctctt    | 840  |
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| acatctgatt tactttctgt agtacagccc cagtttctac ggatattcat agatggtttg    | 960  |
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| gctggtttgg ggataagagg ctcttttagct tcttttagtgt atcagaagtc ctttaagattg | 1140 |
| acgctagcag agcgtaacga aaaatctact ggtgacatct taaatttgat gtctgtggat    | 1200 |
| gtgttaagga tccagcgggt tttcgaaaat gcccaaacca ttattggcgc tcctattcag    | 1260 |
| attattgttg tattaacttc cctgtactgg ttgctaggaa aggctgttat tggagggttg    | 1320 |
| gttactatgg ctattatgat gcctatcaat gccttcttat ctagaaagggt aaaaaagcta   | 1380 |
| tcaaaaaactc aaatgaagta taaggacatg agaatcaaga ctattacaga gcttttgaat   | 1440 |
| gctataaaat ctattaaatt atacgcctgg gaggaacctt tgatggcaag attgaatcat    | 1500 |

|                                                                    |      |
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| gaacgtattg atccttcagc ggatgaaaga gcgttacctg ctatagagat gaataatatt  | 1860 |
| acatttttat ggaaatcaaa agaagtatta acatctagcc aatctggaga taatttgagg  | 1920 |
| acagatgaag agtctattat cggatcttct caaattgcgt tgaagaatat cgatcatttt  | 1980 |
| gaagcaaaaa ggggtgattt agtttgtgtt gttggtcggg taggagctgg taaatcaaca  | 2040 |
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| cgtagaaca atacttcaaa actgaaaaaa ttactagagg aatttgattc tccgattgat   | 2640 |
| aatggaaatg aaagcgatgt ccaaactgaa caccgatccg aaagtgaagt ggatgaacct  | 2700 |
| ctgcagctta aagtaactga atcagaaact gaggatgagg ttgttactga gagtgaatta  | 2760 |
| gaactaatca aagccaattc tagaagagct tctctagcta cgctaagacc tagacccttt  | 2820 |
| gtgggagcac aattggattc cgtgaagaaa acggcgcaaa aggccgagaa gacagagggtg | 2880 |
| ggaagagtca aaacaaagat ttatcttgcg tatattaagg cttgtggagt tttagggtgtt | 2940 |
| gttttatattt tcttgtttat gatattaaca agggttttcg acttagcaga gaatttttgg | 3000 |

|                                                                    |      |
|--------------------------------------------------------------------|------|
| ttaaagtact ggtcagaatc taatgaaaaa aatggttcaa atgaaagggt ttggatgttt  | 3060 |
| gttgggtgtg attccttaat cggagtagca tcggccgcat tcaataattt acggagtatt  | 3120 |
| atgatgctac tgtattgttc tattaggggt tctaagaaac tgcataaaag catggccaaa  | 3180 |
| tctgtaatta gaagtcctat gactttcttt gagactacac cagttggaag gatcataaac  | 3240 |
| aggttctcat ctgatatgga tgcagtggac agtaatctac agtacatttt ctcctttttt  | 3300 |
| ttcaaatcaa tactaaccta tttggttact gttatattag tcgggtacaa tatgccatgg  | 3360 |
| tttttagtgt tcaatatgtt tttgggtggt atctatatatt actatcaaac attttacatt | 3420 |
| gtgctatcta gggagctaaa aagattgatc agtatatctt actctccgat tatgtcctta  | 3480 |
| atgagtgaga gcttgaacgg ttattctatt attgatgcat acgatcattt tgagagattc  | 3540 |
| atctatctaa attatgaaaa aatccaatac aacgttgatt ttgtcttcaa ctttagatca  | 3600 |
| acgaatagat ggttatccgt gagattgcaa actattgggt ctacaattgt tttggctact  | 3660 |
| gcaatcttag cactagcaac aatgaatact aaaaggcaac taagttcggg tatggttgggt | 3720 |
| ctactaatga gctattcatt agaggttaca gggttcattga cttggattgt aaggacaact | 3780 |
| gtgacgattg aaaccaacat tgtatcagtg gagagaattg ttgagtactg cgaattacca  | 3840 |
| cctgaagcac agtccattaa ccctgaaaag aggccagatg aaaattggcc atcaaagggt  | 3900 |
| ggatttgaat tcaaaaaacta ttccacaaaa tacagagaaa atttggatcc agtgctgaat | 3960 |
| aatattaacg tgaagattga gccatgtgaa aagggttgga ttgttggcag aacagggtgca | 4020 |
| gggaagtcta cactgagcct ggcatatttt agaatactag aacctaccga aggtaaaatt  | 4080 |
| attattgacg gcattgatat atccgacata ggtctgttcg atttaagaag ccatttggca  | 4140 |
| attattcctc aggatgcaca agcttttgaa ggtacagtaa agaccaattt ggaccctttc  | 4200 |
| aatcgttatt cagaagatga acttaaaagg gctgttgagc aggcacattt aaagcctcat  | 4260 |
| ctggaaaaaa tgctgcacag taaaccaaga ggtgatgatt ctaatgaaga ggatggcaat  | 4320 |
| gttaatgata ttctggatgt caagattaat gagaacggta gtaacttgtc agtggggcaa  | 4380 |
| agacaactac tatgtttggc aagagcgctg ctaaaccgtt ccaaaatatt ggtccttgat  | 4440 |
| gaagcaacgg cttctgtgga tatggaaacc gataaaatta tccaagacac tataagaaga  | 4500 |

|                                                                    |      |
|--------------------------------------------------------------------|------|
| gaattttaagg accgtaccat cttacaatt gcacatcgta tcgacactgt attggacagt  | 4560 |
| gataagataa ttgttcttga ccagggtagt gtgagggaat tcgattcacc ctcgaaattg  | 4620 |
| ttatccgata aaacgtctat tttttacagt ctttgtgaga aagggtgggta tttgaaataa | 4680 |

&lt;210&gt; 24

&lt;211&gt; 4680

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Synthetic: nucleic acid sequence

&lt;400&gt; 24

|                                                                    |      |
|--------------------------------------------------------------------|------|
| atgtcttcac tagaagtggg agatgggtgc ccctatggat accgaccata tccagatagt  | 60   |
| ggcacaaatg cattaaatcc atgttttata tcagtaatat ccgcctggca agccgtcttt  | 120  |
| ttcctattga ttggtagcta tcaattgtgg aaactttata agaacaataa agtaccaccc  | 180  |
| agattttaaga actttcctac attaccaagt aaaatcaaca gtcgacatct aacgcatttg | 240  |
| accaatgttt gctttcagtc cacgcttata atttgtgaac tggccttggg atcccaatct  | 300  |
| agcgataggg tttatccatt tatactaaag aaggctctgt acttgaatct ctttttcaat  | 360  |
| ttgggtattt ctctccctac tcaatactta gcttatttta aaagtacatt ttcaatgggc  | 420  |
| aaccagcttt tctattacat gtttcaaatt cttctacagc tcttcttgat attgcagagg  | 480  |
| tactatcatg gttctagtaa cgaaaggctt actgttatta gcggacaaac tgctatgatt  | 540  |
| ttagaagtgc tccttctttt caattctgtg gcaattttta tttatgatct atgcattttt  | 600  |
| gagccaatta acgaattatc tgaatactac aagaaaaatg ggtggatatcc ccccgttcat | 660  |
| gtactatcct atattacatt tatctggatg aacaaactga ttgtggaaac ttaccgtaac  | 720  |
| aagaaaaatca aagatcctaa ccagttacca ttgccgccag tagatctgaa tattaagtcg | 780  |
| ataagtaagg aatttaaggc taactgggaa ttggaaaaat ggttgaatag aaattctctt  | 840  |
| tggaggggcca tttggaagtc atttggtagg actatctctg tggctatgct gtatgaaacg | 900  |
| acatctgatt tactttctgt agtacagccc cagtttctac ggatattcat agatggtttg  | 960  |
| aacccgaaa catcttctaa atatcctcct ttaaagtgtg tatttattgc tctaaccctt   | 1020 |

|                                                                     |      |
|---------------------------------------------------------------------|------|
| ttcgtaatca gcgtggtttc tgtgttcctc accaatcaat tttatatattgg aatttttgag | 1080 |
| gctggtttgg ggataagagg ctcttttagct tcttttagtgt atcagaagtc cttaagattg | 1140 |
| acgctagcag agcgtaacga aaaatctact ggtgacatct taaatttgat gtctgtggat   | 1200 |
| gtgttaagga tccagcgggt tttcgaaaat gcccaaacca ttattggcgc tcctattcag   | 1260 |
| attattgttg tattaacttc cctgtactgg ttgctaggaa aggctgttat tggagggttg   | 1320 |
| gttactatgg ctattatgat gcctatcaat gccttcttat ctagaaaagg aaaaaagcta   | 1380 |
| tcaaaaactc aaatgaagta taaggacatg agaatcaaga ctattacaga gcttttgaat   | 1440 |
| gctataaaat ctattaaatt atacgcctgg gaggaacctt tgatggcaag attgaatcat   | 1500 |
| gttcgtaatg atatggagtt gaaaaatttt cggaatttg gtatagttag caatctgata    | 1560 |
| tattttgcgt ggaatttgtt acctttaatg gtgacatgtt ccacatttgg cttattttct   | 1620 |
| ttatttagtg attctccgtt atctcctgcc attgtcttcc cttcattatc tttatttaat   | 1680 |
| attttgaaca gtgccatcta ttccgttcca tccatgataa ataccattat agagacaagc   | 1740 |
| gtttctatgg aaagattaaa gtcattccta cttagtgacg aaattgatga ttcgttcac    | 1800 |
| gaacgtattg atccttcagc ggatgaaaga gcgttacctg ctatagagat gaataatatt   | 1860 |
| acatttttat ggaaatcaaa agaagtatta acatctagcc aatctggaga taatttgagg   | 1920 |
| acagatgaag agtctattat cggatcttct caaattgcgt tgaagaatat cgatcatttt   | 1980 |
| gaagcaaaaa ggggtgattt agtttgtgtt gttggtcggg taggagctgg taaatcaaca   | 2040 |
| tttttgaagg caattcttgg tcaacttcct tgcatgagtg gttctaggga ctcgatacca   | 2100 |
| cctaaactga tcattagatc atcgtctgta gcctactgtt cacaagaatc ctggataatg   | 2160 |
| aacgcatctg taagagaaaa cattctattt ggtcacaagt tcgaccaaga ttattatgac   | 2220 |
| ctcactatta aagcatgtca attgctaccc gatttgaaaa tactaccaga tggatgatgaa  | 2280 |
| actttggtag gtgaaaaggg catttcccta tcaggcggtc agaaggcccg tctttcatta   | 2340 |
| gccagagcgg gtgactcgag agcagatatt tatttgttgg atgacatttt atctgctgtt   | 2400 |
| gatgcagaag ttagtaaaaa tattattgaa tatgttttga tcggaaaagac ggctttatta  | 2460 |
| aaaaataaaa caattatttt aactaccaat actgtatcaa ttttaaaaca ttcgcagatg   | 2520 |

|            |             |             |            |            |             |      |
|------------|-------------|-------------|------------|------------|-------------|------|
| atatatgcg  | tagaaaacgg  | tgaaattggt  | gaacaaggga | attatgagga | tgtaatgaac  | 2580 |
| cgtaagaaca | atacttcaaa  | actgaaaaaa  | ttactagagg | aatttgattc | tccgattgat  | 2640 |
| aatggaaatg | aaagcgatgt  | ccaaactgaa  | caccgatccg | aaagtgaagt | ggatgaacct  | 2700 |
| ctgcagctta | aagtaactga  | atcagaaaact | gaggatgagg | ttgttactga | gagtgaatta  | 2760 |
| gaactaatca | aagccaattc  | tagaagagct  | tctctagcta | cgctaagacc | tagacccttt  | 2820 |
| gtgggagcac | aattggattc  | cgtgaagaaa  | acggcgcaaa | aggccgagaa | gacagagggtg | 2880 |
| ggaagagtca | aaacaaagat  | ttatcttgcg  | tatattaagg | cttgtggagt | tttaggtggt  | 2940 |
| gttttatttt | tcttgtttat  | gatattaaca  | agggttttcg | acttagcaga | gaatttttgg  | 3000 |
| ttaaagtact | ggtcagaatc  | taatgaaaaa  | aatggttcaa | atgaaagggt | ttggatgttt  | 3060 |
| gttggtgtgt | attccttaat  | cggagtagca  | tcggccgcat | tcaataatth | acggagtatt  | 3120 |
| atgatgctac | tgtattgttc  | tattaggggt  | tctaagaaac | tgcatgaaag | catggccaaa  | 3180 |
| tctgtaatta | gaagtcctat  | gactttcttt  | gagactacac | cagttggaag | gatcataaac  | 3240 |
| aggttctcat | ctgatatgga  | tgacgtggac  | agtaatctac | agtacatttt | ctcctttttt  | 3300 |
| ttcaaataca | tactaaccta  | tttggttact  | gttatattag | tcgggtacaa | tatgccatgg  | 3360 |
| tttttagtgt | tcaatatgtt  | tttgggtggt  | atctatatth | actatcaaac | attttacatt  | 3420 |
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| acgaatagat | ggttatccgt  | gagattgcaa  | actattgggt | ctacaattgt | tttggctact  | 3660 |
| gcaatcttag | cactagcaac  | aatgaatact  | aaaaggcaac | taagttcggg | tatggttggt  | 3720 |
| ctactaatga | gctattcatt  | agaggttaca  | ggttcattga | cttggattgt | aaggacaact  | 3780 |
| gtgacgattg | aaaccaacat  | tgtatcagtg  | gagagaattg | ttgagtactg | cgaattacca  | 3840 |
| cctgaagcac | agtccattaa  | ccctgaaaag  | aggccagatg | aaaattggcc | atcaaagggt  | 3900 |
| ggtattgaat | tcaaaaaacta | ttccacaaaa  | tacagagaaa | atttggatcc | agtgctgaat  | 3960 |
| aatattaacg | tgaagattga  | gccatgtgaa  | aaggttggga | ttgttggcag | aacaggtgca  | 4020 |

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gggaagtcta cactgagcct ggcattatTTT agaatactag aacctaccga aggtaaaatt      4080
attattgacg gcattgatat atccgacata ggtctgttcg atttaagaag ccatttggca      4140
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aatcgttatt cagaagatga acttaaaaagg gctgttgagc aggcacatTTT aaagcctcat      4260
ctggaaaaaaa tgctgcacag taaaccaaga ggtgatgatt ctaatgaaga ggatggcaat      4320
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gaatttaagg accgtaccat cttaacaatt gcacatcgta tcgacactgt attggacagt      4560
gataagataa ttgttcttga ccagggtagt gtgagggaat tcgattcacc ctcgaaattg      4620
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<210> 25

<211> 4680

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic: nucleic acid sequence

<400> 25

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ggcacaaatg cattaaatcc atgtttttata tcagtaatat ccgcctggca agccgtcttt      120
ttcctattga ttggtagcta tcaattgtgg aaactttata agaacaataa agtaccaccc      180
agatttaaga actttcctac attaccaagt aaaatcaaca gtcgacatct aacgcatttg      240
accaatgttt gctttcagtc cacgcttata atttgtgaac tggccttggt atcccaatct      300
agcgataggg tttatccatt tatactaaag aaggctctgt acttgaatct ctttttcaat      360
ttgggtatTTT ctctccctac tcaatactta gcttatTTTta aaagtacatt ttcaatgggc      420
aaccagctTTT tctattacat gtttcaaatt cttctacagc tcttcttgat attgcagagg      480
tactatcatg gttctagtaa cgaaaggctt actgttatta gcggacaaac tgctatgatt      540

```

|                                                                      |      |
|----------------------------------------------------------------------|------|
| ttagaagtgc tccttctttt caattctgtg gcaattttta tttatgatct atgcattttt    | 600  |
| gagccaatta acgaattatc tgaatactac aagaaaaatg ggtggatatcc ccccgttcat   | 660  |
| gtactatcct atattacatt tatctggatg aacaaactga ttgtggaaac ttaccgtaac    | 720  |
| aagaaaatca aagatcctaa ccagttacca ttgccgccag tagatctgaa tattaagtcg    | 780  |
| ataagtaagg aatttaaggc taactgggaa ttggaaaaat ggttgaatag aaattctctt    | 840  |
| tggagggcca tttggaagtc atttggtagg actatttctg tggctatgct gtatgaaacg    | 900  |
| acatctgatt tactttctgt agtacagccc cagtttctac ggatattcat agatggtttg    | 960  |
| aaccggaaa catcttctaa atatcctcct ttaaattggtg tatttattgc tctaaccctt    | 1020 |
| ttcgtaatca gcgtggtttc tgtgttcctc accaatcaat tttatattgg aatttttgag    | 1080 |
| gctggtttgg ggataagagg ctcttttagct tcttttagtgt atcagaagtc ctttaagattg | 1140 |
| acgctagcag agcgtaacga aaaatctact ggtgacatct taaatttgat gtctgtggat    | 1200 |
| gtgttaagga tccagcggtt tttcgaaaaat gcccaaacca ttattggcgc tcctattcag   | 1260 |
| attattgttg tattaacttc cctgtactgg ttgctaggaa aggctgttat tggagggttg    | 1320 |
| gttactatgg ctattatgat gcctatcaat gccttcttat ctagaaagggt aaaaaagcta   | 1380 |
| tcaaaaaactc aaatgaagta taaggacatg agaatcaaga ctattacaga gcttttgaat   | 1440 |
| gctataaaaat ctattaaatt atacgcctgg gaggaaccta tgatggcaag attgaatcat   | 1500 |
| gttcgtaatg atatggagtt gaaaaatttt cgaaaaattg gtatagttag caatctgata    | 1560 |
| tattttgcgt ggaatttgtgt acctttaatg gtgacatggt ccacatttgg cttattttct   | 1620 |
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| attttgaaca gtgccatcta ttccgttcca tccatgataa ataccattat agagacaagc    | 1740 |
| gtttctatgg aaagattaaa gtcattccta cttagtacg aaattgatga ttcgttcatc     | 1800 |
| gaacgtattg atccttcagc ggatgaaaga gcgttacctg ctatagagat gaataatatt    | 1860 |
| acatttttat ggaaatcaaa agaagtatta acatctagcc aatctggaga taatttgagg    | 1920 |
| acagatgaag agtctattat cggatcttct caaattgcgt tgaagaatat cgatcatttt    | 1980 |
| gaagcaaaaa ggggtgattt agtttgtgtt gttggctggg taggagctgg taaatcaaca    | 2040 |

|                                                                     |      |
|---------------------------------------------------------------------|------|
| tttttgaagg caattcttgg tcaacttcct tgcattgagtg gttctaggga ctcgatacca  | 2100 |
| cctaaactga tcattagatc atcgtctgta gcctactgtt cacaagaatc ctggataatg   | 2160 |
| aacgcatctg taagagaaaa catttctatctt ggtcacaagt tcgaccaaga ttattatgac | 2220 |
| ctcactatta aagcatgtca attgctaccc gatttgaaaa tactaccaga tggatgatgaa  | 2280 |
| actttggtag gtgaaaaggg catttcccta tcaggcggtc agaaggcccg tctttcatta   | 2340 |
| gccagagcgg tgtactcgag agcagatatt tatttggttg atgacatttt atctgctgtt   | 2400 |
| gatgcagaag ttagtaaaaa tattattgaa tatgttttga tcggaaagac ggctttatta   | 2460 |
| aaaaataaaa caattatttt aactaccaat actgtatcaa ttttaaaaca ttcgcagatg   | 2520 |
| atatatgcgc tagaaaacgg tgaaattgtt gaacaaggga attatgagga tgtaatgaac   | 2580 |
| cgtaagaaca atacttcaaa actgaaaaaa ttactagagg aatttgattc tccgattgat   | 2640 |
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| ctgcagctta aagtaactga atcagaaaact gaggatgagg ttgttactga gagtgaatta  | 2760 |
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| gtgggagcac aattggattc cgtgaagaaa acggcgcaaa aggccgagaa gacagagggtg  | 2880 |
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| gttttatctt tcttgtttat gatattaaca agggttttcg acttagcaga gaatttttgg   | 3000 |
| ttaaagtact ggtcagaatc taatgaaaaa aatgggtcaa atgaaagggt ttggatgttt   | 3060 |
| gttgggtgtg attccttaat cggagtagca tcggccgcat tcaataattt acggagtatt   | 3120 |
| atgatgctac tgtattgttc tattaggggt tctaagaaac tgcattgaaag catggccaaa  | 3180 |
| tctgtaatta gaagtcctat gactttcttt gagactacac cagttggaag gatcataaac   | 3240 |
| aggttctcat ctgatatgga tgcagtggac agtaatctac agtacatttt ctcctttttt   | 3300 |
| ttcaaatcaa tactaaccta tttggttact gttatattag tcgggtacaa tatgccatgg   | 3360 |
| tttttagtgt tcaatatgtt tttggtgggt atctatatctt actatcaaac attttacatt  | 3420 |
| gtgctatcta gggagctaaa aagattgatc agtatatctt actctccgat tatgtcctta   | 3480 |
| atgagtgaga gcttgaacgg ttatttctatt attgatgcat acgatcattt tgagagattc  | 3540 |

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gataagataa ttgttcttga ccagggtagt gtgagggaat tcgattcacc ctcgaaattg      4620
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<210> 26

<211> 4680

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic: nucleic acid sequence

<400> 26

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| ttcctattga ttggtagcta tcaattgtgg aaactttata agaacaataa agtaccaccc    | 180  |
| agatttaaga acttttcctac attaccaagt aaaatcaaca gtcgacatct aacgcatttg   | 240  |
| accaatgttt gctttcagtc cacgcttata atttgtgaac tggccttggt atcccaatct    | 300  |
| agcgataggg tttatccatt tataactaaag aaggctctgt acttgaatct ccttttcaat   | 360  |
| ttgggtattt ctctccctac tcaataactta gcttatttta aaagtacatt ttcaatgggc   | 420  |
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Ser Asn Tyr Glu Met His Leu Ala Arg Ile Leu Glu Lys Asp Arg Ala  
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Lys Ala Arg Ala Lys Asp Pro Thr Leu Thr Asp Glu Asp Leu Lys Asn  
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Arg Glu Tyr Pro Lys Asn Ala Val Ile Lys Ala Leu Phe Leu Thr Phe  
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Tyr Ala Ile Gly Val Thr Phe Met Leu Gly Thr Ser Gly Ile Leu Ile  
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Asn His Phe Leu Tyr Leu Ser Leu Thr Val Gly Ala His Cys Lys Ala  
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435

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445

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Phe Thr Ala Gly Asp Gln Thr Glu Ile Gly Glu Arg Gly Ile Thr Leu  
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675 680 685

Asp Lys Thr Arg Ile Leu Ala Thr His Gln Leu Ser Leu Ile Glu Ala  
690 695 700

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

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Leu Lys Ala Met Lys Arg Val Leu His Thr Pro Met His Phe Leu Asp  
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Ile Ala Asn Gln Arg Trp Ile Ser Val Asn Leu Asp Leu Val Ser  
 1025 1030 1035

Cys Cys Phe Val Phe Leu Ile Ser Met Leu Ser Val Phe Arg Val  
 1040 1045 1050

Phe Asp Ile Asn Ala Ser Ser Val Gly Leu Val Val Thr Ser Val  
 1055 1060 1065

Leu Gln Ile Gly Gly Leu Met Ser Leu Ile Met Arg Ala Tyr Thr  
 1070 1075 1080

Thr Val Glu Asn Glu Met Asn Ser Val Glu Arg Leu Cys His Tyr  
 1085 1090 1095

Ala Asn Lys Leu Glu Gln Glu Ala Pro Tyr Ile Met Asn Glu Thr  
 1100 1105 1110

Lys Pro Arg Pro Thr Trp Pro Glu His Gly Ala Ile Glu Phe Lys  
 1115 1120 1125

His Ala Ser Met Arg Tyr Arg Glu Gly Leu Pro Leu Val Leu Lys  
 1130 1135 1140

Asp Leu Thr Ile Ser Val Lys Gly Gly Glu Lys Ile Gly Ile Cys  
 1145 1150 1155

Gly Arg Thr Gly Ala Gly Lys Ser Thr Ile Met Asn Ala Leu Tyr  
 1160 1165 1170

Arg Leu Thr Glu Leu Ala Glu Gly Ser Ile Thr Ile Asp Gly Val  
 1175 1180 1185

Glu Ile Ser Gln Leu Gly Leu Tyr Asp Leu Arg Ser Lys Leu Ala  
 1190 1195 1200

Ile Ile Pro Gln Asp Pro Val Leu Phe Arg Gly Thr Ile Arg Lys  
 1205 1210 1215

Asn Leu Asp Pro Phe Gly Gln Asn Asp Asp Glu Thr Leu Trp Asp

|                                                             |  |      |  |      |
|-------------------------------------------------------------|--|------|--|------|
| 1220                                                        |  | 1225 |  | 1230 |
| Ala Leu Arg Arg Ser Gly Leu Val Glu Gly Ser Ile Leu Asn Thr |  |      |  |      |
| 1235                                                        |  | 1240 |  | 1245 |
| Ile Lys Ser Gln Ser Lys Asp Asp Pro Asn Phe His Lys Phe His |  |      |  |      |
| 1250                                                        |  | 1255 |  | 1260 |
| Leu Asp Gln Thr Val Glu Asp Glu Gly Ala Asn Phe Ser Leu Gly |  |      |  |      |
| 1265                                                        |  | 1270 |  | 1275 |
| Glu Arg Gln Leu Ile Ala Leu Ala Arg Ala Leu Val Arg Asn Ser |  |      |  |      |
| 1280                                                        |  | 1285 |  | 1290 |
| Lys Ile Leu Ile Leu Asp Glu Ala Thr Ser Ser Val Asp Tyr Glu |  |      |  |      |
| 1295                                                        |  | 1300 |  | 1305 |
| Thr Asp Ser Lys Ile Gln Lys Thr Ile Ser Thr Val Phe Ser His |  |      |  |      |
| 1310                                                        |  | 1315 |  | 1320 |
| Cys Thr Ile Leu Cys Ile Ala His Arg Leu Lys Thr Ile Leu Thr |  |      |  |      |
| 1325                                                        |  | 1330 |  | 1335 |
| Tyr Asp Arg Ile Leu Val Leu Glu Lys Gly Glu Val Glu Glu Phe |  |      |  |      |
| 1340                                                        |  | 1345 |  | 1350 |
| Asp Thr Pro Arg Val Leu Tyr Ser Lys Asn Gly Val Phe Arg Gln |  |      |  |      |
| 1355                                                        |  | 1360 |  | 1365 |
| Met Cys Glu Arg Ser Glu Ile Thr Ser Ala Asp Phe Val         |  |      |  |      |
| 1370                                                        |  | 1375 |  | 1380 |

<210> 29  
 <211> 1381  
 <212> PRT  
 <213> Artificial Sequence  
  
 <220>  
 <223> Synthetic: Fungal\_5\_muA2

&lt;400&gt; 29

Met Thr Ser Pro Gly Ser Glu Lys Cys Thr Pro Arg Ser Asp Glu Asp  
 1 5 10 15

Leu Glu Arg Ser Glu Pro Gln Leu Gln Arg Arg Leu Leu Thr Pro Phe  
 20 25 30

Leu Leu Ser Lys Lys Val Pro Pro Ile Pro Lys Glu Asp Glu Arg Lys  
 35 40 45

Pro Tyr Pro Tyr Leu Lys Thr Asn Pro Leu Ser Gln Ile Leu Phe Trp  
 50 55 60

Trp Leu Asn Pro Leu Leu Arg Val Gly Tyr Lys Arg Thr Leu Asp Pro  
 65 70 75 80

Asn Asp Phe Tyr Tyr Leu Glu His Ser Gln Asp Ile Glu Thr Thr Tyr  
 85 90 95

Ser Asn Tyr Glu Met His Leu Ala Arg Ile Leu Glu Lys Asp Arg Ala  
 100 105 110

Lys Ala Arg Ala Lys Asp Pro Thr Leu Thr Asp Glu Asp Leu Lys Asn  
 115 120 125

Arg Glu Tyr Pro Lys Asn Ala Val Ile Lys Ala Leu Phe Leu Thr Phe  
 130 135 140

Lys Trp Lys Tyr Leu Trp Ser Ile Phe Leu Lys Leu Leu Ser Asp Ile  
 145 150 155 160

Val Leu Val Leu Asn Pro Leu Leu Ser Lys Ala Leu Ile Asn Phe Val  
 165 170 175

Asp Glu Lys Met Tyr Asn Pro Asp Met Ser Val Gly Arg Gly Val Gly  
 180 185 190

Tyr Ala Ile Gly Val Thr Phe Met Leu Gly Thr Ser Gly Ile Leu Ile  
 195 200 205

Asn His Phe Leu Tyr Leu Ser Leu Thr Val Gly Ala His Cys Lys Ala  
 210 215 220

Val Leu Thr Thr Ala Ile Met Asn Lys Ser Phe Arg Ala Ser Ala Lys  
 225 230 235 240

Ser Lys His Glu Tyr Pro Ser Gly Arg Val Thr Ser Leu Met Ser Thr  
 245 250 255

Asp Leu Ala Arg Ile Asp Leu Ala Ile Gly Phe Gln Pro Phe Ala Ile  
 260 265 270

Thr Val Pro Val Pro Ile Gly Val Ala Ile Ala Leu Leu Ile Val Asn  
 275 280 285

Ile Gly Val Ser Ala Leu Ala Gly Ile Ala Val Phe Leu Val Cys Ile  
 290 295 300

Val Val Ile Ser Ala Ser Ser Lys Ser Leu Leu Lys Met Arg Lys Gly  
 305 310 315 320

Ala Asn Gln Tyr Thr Asp Ala Arg Ile Ser Tyr Met Arg Glu Ile Leu  
 325 330 335

Gln Asn Met Arg Ile Ile Lys Phe Tyr Ser Trp Glu Asp Ala Tyr Glu  
 340 345 350

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

Met Gln Ser Ile Arg Asn Phe Leu Leu Ala Leu Ser Leu Ser Leu Pro  
 370 375 380

Ala Ile Ile Ser Met Val Ala Phe Leu Val Leu Tyr Gly Val Ser Asn

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 385 |     | 390 |     | 395 |     | 400 |     |     |     |     |     |     |     |     |     |
| Asp | Lys | Asn | Pro | Gly | Asn | Ile | Phe | Ser | Ser | Ile | Ser | Leu | Phe | Ser | Val |
|     |     |     |     | 405 |     |     |     |     | 410 |     |     |     |     | 415 |     |
| Leu | Ala | Gln | Gln | Thr | Met | Met | Leu | Pro | Met | Ala | Leu | Ala | Thr | Gly | Ala |
|     |     |     | 420 |     |     |     |     | 425 |     |     |     |     | 430 |     |     |
| Asp | Ala | Lys | Ile | Gly | Leu | Glu | Arg | Leu | Arg | Gln | Tyr | Leu | Gln | Ser | Gly |
|     |     | 435 |     |     |     |     | 440 |     |     |     |     | 445 |     |     |     |
| Asp | Ile | Glu | Lys | Glu | Tyr | Glu | Asp | His | Glu | Lys | Pro | Gly | Asp | Arg | Asp |
|     | 450 |     |     |     |     | 455 |     |     |     |     | 460 |     |     |     |     |
| Val | Val | Leu | Pro | Asp | Asn | Val | Ala | Val | Glu | Leu | Asn | Asn | Ala | Ser | Phe |
| 465 |     |     |     |     | 470 |     |     |     |     | 475 |     |     |     |     | 480 |
| Ile | Trp | Glu | Lys | Phe | Asp | Asp | Ala | Asp | Asp | Asn | Asp | Gly | Asn | Ser | Glu |
|     |     |     |     | 485 |     |     |     |     | 490 |     |     |     |     | 495 |     |
| Lys | Thr | Lys | Glu | Val | Val | Val | Thr | Ser | Lys | Ser | Ser | Leu | Thr | Asp | Ser |
|     |     |     | 500 |     |     |     |     | 505 |     |     |     |     | 510 |     |     |
| Ser | His | Ile | Asp | Lys | Ser | Thr | Asp | Ser | Ala | Asp | Gly | Glu | Tyr | Ile | Lys |
|     |     | 515 |     |     |     |     | 520 |     |     |     |     | 525 |     |     |     |
| Ser | Val | Phe | Glu | Gly | Phe | Asn | Asn | Ile | Asn | Leu | Thr | Ile | Lys | Lys | Gly |
|     | 530 |     |     |     |     | 535 |     |     |     |     | 540 |     |     |     |     |
| Glu | Phe | Val | Ile | Ile | Thr | Gly | Pro | Ile | Gly | Ser | Gly | Lys | Ser | Ser | Leu |
| 545 |     |     |     |     | 550 |     |     |     |     | 555 |     |     |     |     | 560 |
| Leu | Val | Ala | Leu | Ala | Gly | Phe | Met | Lys | Lys | Thr | Ser | Gly | Thr | Leu | Gly |
|     |     |     |     | 565 |     |     |     |     | 570 |     |     |     |     | 575 |     |
| Val | Asn | Gly | Thr | Met | Leu | Leu | Cys | Gly | Gln | Pro | Trp | Val | Gln | Asn | Cys |
|     |     |     | 580 |     |     |     |     | 585 |     |     |     |     | 590 |     |     |

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

Tyr Asp Arg Val Val Glu Val Cys Ala Leu Gly Asp Asp Leu Lys Met  
 610 615 620

Phe Thr Ala Gly Asp Gln Thr Glu Ile Gly Glu Arg Gly Ile Thr Leu  
 625 630 635 640

Ser Gly Gly Gln Lys Ala Arg Ile Asn Leu Ala Arg Ala Val Tyr Ala  
 645 650 655

Asn Lys Asp Ile Ile Leu Leu Asp Asp Ala Leu Ser Ala Val Asp Ala  
 660 665 670

Arg Val Gly Lys Leu Ile Val Asp Asp Cys Leu Thr Ser Phe Leu Gly  
 675 680 685

Asp Lys Thr Arg Ile Leu Ala Thr His Gln Leu Ser Leu Ile Glu Ala  
 690 695 700

Ala Asp Arg Val Ile Tyr Leu Asn Gly Asp Gly Thr Ile His Ile Gly  
 705 710 715 720

Thr Val Gln Glu Leu Leu Glu Ser Asn Glu Gly Phe Leu Lys Leu Met  
 725 730 735

Glu Phe Ser Arg Lys Ser Glu Ser Glu Asp Glu Glu Asp Val Glu Ala  
 740 745 750

Ala Asn Glu Lys Asp Val Ser Leu Gln Lys Ala Val Ser Val Val Gln  
 755 760 765

Glu Gln Asp Ala His Ala Gly Val Leu Ile Gly Gln Glu Glu Arg Ala  
 770 775 780

Val Asn Gly Ile Glu Trp Asp Ile Tyr Lys Glu Tyr Leu His Glu Gly

|                                                                 |  |     |  |     |  |     |
|-----------------------------------------------------------------|--|-----|--|-----|--|-----|
| 785                                                             |  | 790 |  | 795 |  | 800 |
| Arg Gly Lys Leu Gly Ile Phe Ala Ile Pro Thr Ile Ile Met Leu Leu |  |     |  |     |  |     |
|                                                                 |  | 805 |  | 810 |  | 815 |
| Val Leu Asp Val Phe Thr Ser Ile Phe Val Asn Val Trp Leu Ser Phe |  |     |  |     |  |     |
|                                                                 |  | 820 |  | 825 |  | 830 |
| Trp Ile Ser His Lys Phe Lys Ala Arg Ser Asp Gly Phe Tyr Ile Gly |  |     |  |     |  |     |
|                                                                 |  | 835 |  | 840 |  | 845 |
| Leu Tyr Val Met Phe Val Ile Leu Ser Val Ile Trp Ile Thr Ala Glu |  |     |  |     |  |     |
|                                                                 |  | 850 |  | 855 |  | 860 |
| Phe Val Val Met Gly Asn Phe Ser Ser Thr Ala Ala Arg Arg Leu Asn |  |     |  |     |  |     |
| 865                                                             |  | 870 |  | 875 |  | 880 |
| Leu Lys Ala Met Lys Arg Val Leu His Thr Pro Met His Phe Leu Asp |  |     |  |     |  |     |
|                                                                 |  | 885 |  | 890 |  | 895 |
| Val Thr Pro Met Gly Arg Ile Leu Asn Arg Phe Thr Lys Asp Thr Asp |  |     |  |     |  |     |
|                                                                 |  | 900 |  | 905 |  | 910 |
| Val Leu Asp Asn Glu Ile Gly Glu Gln Ala Arg Met Phe Leu His Pro |  |     |  |     |  |     |
|                                                                 |  | 915 |  | 920 |  | 925 |
| Ala Ala Tyr Val Ile Gly Val Leu Ile Leu Cys Ile Ile Asn Ile Pro |  |     |  |     |  |     |
|                                                                 |  | 930 |  | 935 |  | 940 |
| Trp Phe Ala Ile Ala Ile Pro Pro Leu Ala Ile Pro Phe Thr Phe Ile |  |     |  |     |  |     |
| 945                                                             |  | 950 |  | 955 |  | 960 |
| Thr Asn Phe Tyr Ile Ala Ser Ser Arg Glu Val Lys Arg Ile Glu Ala |  |     |  |     |  |     |
|                                                                 |  | 965 |  | 970 |  | 975 |
| Ile Gln Arg Ser Leu Val Tyr Asn Asn Phe Asn Glu Val Leu Asn Gly |  |     |  |     |  |     |
|                                                                 |  | 980 |  | 985 |  | 990 |

Leu Gln Thr Leu Lys Ala Tyr Asn Ala Thr Ser Arg Phe Met Glu Lys  
 995 1000 1005

Asn Lys Arg Leu Leu Asn Arg Met Asn Glu Ala Tyr Leu Leu Val  
 1010 1015 1020

Ile Ala Asn Gln Arg Trp Ile Ser Val Asn Leu Asp Leu Val Ser  
 1025 1030 1035

Cys Cys Phe Val Phe Leu Ile Ser Met Leu Ser Val Phe Arg Val  
 1040 1045 1050

Phe Asp Ile Asn Ala Ser Ser Val Gly Leu Val Val Thr Ser Val  
 1055 1060 1065

Leu Gln Ile Gly Gly Leu Met Ser Leu Ile Met Arg Ala Tyr Thr  
 1070 1075 1080

Thr Val Glu Asn Glu Met Asn Ser Val Glu Arg Leu Cys His Tyr  
 1085 1090 1095

Ala Asn Lys Leu Glu Gln Glu Ala Pro Tyr Ile Met Asn Glu Thr  
 1100 1105 1110

Lys Pro Arg Pro Thr Trp Pro Glu His Gly Ala Ile Glu Phe Lys  
 1115 1120 1125

His Ala Ser Met Arg Tyr Arg Glu Gly Leu Pro Leu Val Leu Lys  
 1130 1135 1140

Asp Leu Thr Ile Ser Val Lys Gly Gly Glu Lys Ile Gly Ile Cys  
 1145 1150 1155

Gly Arg Thr Gly Ala Gly Lys Ser Thr Ile Met Asn Ala Leu Tyr  
 1160 1165 1170

Arg Leu Thr Glu Leu Ala Glu Gly Ser Ile Thr Ile Asp Gly Val

|                                                             |      |      |      |      |
|-------------------------------------------------------------|------|------|------|------|
| 1175                                                        |      | 1180 |      | 1185 |
| Glu Ile Ser Gln Leu Gly Leu Tyr Asp Leu Arg Ser Lys Leu Ala | 1190 | 1195 | 1200 |      |
| Ile Ile Pro Gln Asp Pro Val Leu Phe Arg Gly Thr Ile Arg Lys | 1205 | 1210 | 1215 |      |
| Asn Leu Asp Pro Phe Gly Gln Asn Asp Asp Glu Thr Leu Trp Asp | 1220 | 1225 | 1230 |      |
| Ala Leu Arg Arg Ser Gly Leu Val Glu Gly Ser Ile Leu Asn Thr | 1235 | 1240 | 1245 |      |
| Ile Lys Ser Gln Ser Lys Asp Asp Pro Asn Phe His Lys Phe His | 1250 | 1255 | 1260 |      |
| Leu Asp Gln Thr Val Glu Asp Glu Gly Ala Asn Phe Ser Leu Gly | 1265 | 1270 | 1275 |      |
| Glu Arg Gln Leu Ile Ala Leu Ala Arg Ala Leu Val Arg Asn Ser | 1280 | 1285 | 1290 |      |
| Lys Ile Leu Ile Leu Asp Glu Ala Thr Ser Ser Val Asp Tyr Glu | 1295 | 1300 | 1305 |      |
| Thr Asp Ser Lys Ile Gln Lys Thr Ile Ser Thr Glu Phe Ser His | 1310 | 1315 | 1320 |      |
| Cys Thr Ile Leu Cys Ile Ala His Arg Leu Lys Thr Ile Leu Thr | 1325 | 1330 | 1335 |      |
| Tyr Asp Arg Ile Leu Val Leu Glu Lys Gly Glu Val Glu Glu Phe | 1340 | 1345 | 1350 |      |
| Asp Thr Pro Arg Val Leu Tyr Ser Lys Asn Gly Val Phe Arg Gln | 1355 | 1360 | 1365 |      |

Met Cys Glu Arg Ser Glu Ile Thr Ser Ala Asp Phe Val  
 1370 1375 1380

<210> 30  
 <211> 1381  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic: Fungal\_5\_muA3

<400> 30

Met Thr Ser Pro Gly Ser Glu Lys Cys Thr Pro Arg Ser Asp Glu Asp  
 1 5 10 15

Leu Glu Arg Ser Glu Pro Gln Leu Gln Arg Arg Leu Leu Thr Pro Phe  
 20 25 30

Leu Leu Ser Lys Lys Val Pro Pro Ile Pro Lys Glu Asp Glu Arg Lys  
 35 40 45

Pro Tyr Pro Tyr Leu Lys Thr Asn Pro Leu Ser Gln Ile Leu Phe Trp  
 50 55 60

Trp Leu Asn Pro Leu Leu Arg Val Gly Tyr Lys Arg Thr Leu Asp Pro  
 65 70 75 80

Asn Asp Phe Tyr Tyr Leu Glu His Ser Gln Asp Ile Glu Thr Thr Tyr  
 85 90 95

Ser Asn Tyr Glu Met His Leu Ala Arg Ile Leu Glu Lys Asp Arg Ala  
 100 105 110

Lys Ala Arg Ala Lys Asp Pro Thr Leu Thr Asp Glu Asp Leu Lys Asn  
 115 120 125

Arg Glu Tyr Pro Lys Asn Ala Val Ile Lys Ala Leu Phe Leu Thr Phe  
 130 135 140

Lys Trp Lys Tyr Leu Trp Ser Ile Phe Leu Lys Leu Leu Ser Asp Ile  
 145 150 155 160

Val Leu Val Leu Asn Pro Leu Leu Ser Lys Ala Leu Ile Asn Phe Val  
 165 170 175

Asp Glu Lys Met Tyr Asn Pro Asp Met Ser Val Gly Arg Gly Val Gly  
 180 185 190

Tyr Ala Ile Gly Val Thr Phe Met Leu Gly Thr Ser Gly Ile Leu Ile  
 195 200 205

Asn His Phe Leu Tyr Leu Ser Leu Thr Val Gly Ala His Cys Lys Ala  
 210 215 220

Val Leu Thr Thr Ala Ile Met Asn Lys Ser Phe Arg Ala Ser Ala Lys  
 225 230 235 240

Ser Lys His Glu Tyr Pro Ser Gly Arg Val Thr Ser Leu Met Ser Thr  
 245 250 255

Asp Leu Ala Arg Ile Asp Leu Ala Ile Gly Phe Gln Pro Phe Ala Ile  
 260 265 270

Thr Val Pro Val Pro Ile Gly Val Ala Ile Ala Leu Leu Ile Val Asn  
 275 280 285

Ile Gly Val Ser Ala Leu Ala Gly Ile Ala Val Phe Leu Val Cys Ile  
 290 295 300

Val Val Ile Ser Ala Ser Ser Lys Ser Leu Leu Lys Met Arg Lys Gly  
 305 310 315 320

Ala Asn Gln Tyr Thr Asp Ala Arg Ile Ser Tyr Met Arg Glu Ile Leu  
 325 330 335

Gln Asn Met Arg Ile Ile Lys Phe Tyr Ser Trp Glu Asp Ala Tyr Glu

340

345

350

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

Met Gln Ser Ile Arg Asn Phe Leu Leu Ala Leu Ser Leu Ser Leu Pro  
 370 375 380

Ala Ile Ile Ser Met Val Ala Phe Leu Val Leu Tyr Gly Val Ser Asn  
 385 390 395 400

Asp Lys Asn Pro Gly Asn Ile Phe Ser Ser Ile Ser Leu Phe Ser Val  
 405 410 415

Leu Ala Gln Gln Thr Met Met Leu Pro Met Ala Leu Ala Thr Gly Ala  
 420 425 430

Asp Ala Lys Ile Gly Leu Glu Arg Leu Arg Gln Tyr Leu Gln Ser Gly  
 435 440 445

Asp Ile Glu Lys Glu Tyr Glu Asp His Glu Lys Pro Gly Asp Arg Asp  
 450 455 460

Val Val Leu Pro Asp Asn Val Ala Val Glu Leu Asn Asn Ala Ser Phe  
 465 470 475 480

Ile Trp Glu Lys Phe Asp Asp Ala Asp Asp Asn Asp Gly Asn Ser Glu  
 485 490 495

Lys Thr Lys Glu Val Val Val Thr Ser Lys Ser Ser Leu Thr Asp Ser  
 500 505 510

Ser His Ile Asp Lys Ser Thr Asp Ser Ala Asp Gly Glu Tyr Ile Lys  
 515 520 525

Ser Val Phe Glu Gly Phe Asn Asn Ile Asn Leu Thr Ile Lys Lys Gly  
 530 535 540

Glu Phe Val Ile Ile Thr Gly Pro Ile Gly Ser Gly Lys Ser Ser Leu  
545 550 555 560

Leu Val Ala Leu Ala Gly Phe Met Lys Lys Thr Ser Gly Thr Leu Gly  
565 570 575

Val Asn Gly Thr Met Leu Leu Cys Gly Gln Pro Trp Val Gln Asn Cys  
580 585 590

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

Tyr Asp Arg Val Val Glu Val Cys Ala Leu Gly Asp Asp Leu Lys Met  
610 615 620

Phe Thr Ala Gly Asp Gln Thr Glu Ile Gly Glu Arg Gly Ile Thr Leu  
625 630 635 640

Ser Gly Gly Gln Lys Ala Arg Ile Asn Leu Ala Arg Ala Val Tyr Ala  
645 650 655

Asn Lys Asp Ile Ile Leu Leu Asp Asp Ala Leu Ser Ala Val Asp Ala  
660 665 670

Arg Val Gly Lys Leu Ile Val Asp Asp Cys Leu Thr Ser Phe Leu Gly  
675 680 685

Asp Lys Thr Arg Ile Leu Ala Thr His Gln Leu Ser Leu Ile Glu Ala  
690 695 700

Ala Asp Arg Val Ile Tyr Leu Asn Gly Asp Gly Thr Ile His Ile Gly  
705 710 715 720

Thr Val Gln Glu Leu Leu Glu Ser Asn Glu Gly Phe Leu Lys Leu Met  
725 730 735

Glu Phe Ser Arg Lys Ser Glu Ser Glu Asp Glu Glu Asp Val Glu Ala

740

745

750

Ala Asn Glu Lys Asp Val Ser Leu Gln Lys Ala Val Ser Val Val Gln  
 755 760 765

Glu Gln Asp Ala His Ala Gly Val Leu Ile Gly Gln Glu Glu Arg Ala  
 770 775 780

Val Asn Gly Ile Glu Trp Asp Ile Tyr Lys Glu Tyr Leu His Glu Gly  
 785 790 795 800

Arg Gly Lys Leu Gly Ile Phe Ala Ile Pro Thr Ile Ile Met Leu Leu  
 805 810 815

Val Leu Asp Val Phe Thr Ser Ile Phe Val Asn Val Trp Leu Ser Phe  
 820 825 830

Trp Ile Ser His Lys Phe Lys Ala Arg Ser Asp Gly Phe Tyr Ile Gly  
 835 840 845

Leu Tyr Val Met Phe Val Ile Leu Ser Val Ile Trp Ile Thr Ala Glu  
 850 855 860

Phe Val Val Met Gly Asn Phe Ser Ser Thr Ala Ala Arg Arg Leu Asn  
 865 870 875 880

Leu Lys Ala Met Lys Arg Val Leu His Thr Pro Met His Phe Leu Asp  
 885 890 895

Val Thr Pro Met Gly Arg Ile Leu Asn Arg Phe Thr Lys Asp Thr Asp  
 900 905 910

Val Leu Asp Asn Glu Ile Gly Glu Gln Ala Arg Met Phe Leu His Pro  
 915 920 925

Ala Ala Tyr Val Ile Gly Val Leu Ile Leu Cys Ile Ile Asn Ile Pro  
 930 935 940

Trp Phe Ala Ile Ala Ile Pro Pro Leu Ala Ile Leu Phe Thr Phe Ile  
 945 950 955 960

Thr Asn Phe Tyr Ile Ala Ser Ser Arg Glu Val Lys Arg Ile Glu Ala  
 965 970 975

Ile Gln Arg Ser Leu Val Tyr Asn Asn Phe Asn Glu Val Leu Asn Gly  
 980 985 990

Leu Gln Thr Leu Lys Ala Tyr Asn Ala Thr Ser Arg Phe Met Glu Lys  
 995 1000 1005

Asn Lys Arg Leu Leu Asn Arg Met Asn Glu Ala Tyr Leu Leu Val  
 1010 1015 1020

Ile Ala Asn Gln Arg Trp Ile Ser Val Asn Leu Asp Leu Val Ser  
 1025 1030 1035

Cys Cys Phe Val Phe Leu Ile Ser Met Leu Ser Val Phe Arg Val  
 1040 1045 1050

Phe Asp Ile Asn Ala Ser Ser Val Gly Leu Val Val Thr Ser Val  
 1055 1060 1065

Leu Gln Ile Gly Gly Leu Met Ser Leu Ile Met Arg Ala Tyr Thr  
 1070 1075 1080

Thr Val Glu Asn Glu Met Asn Ser Val Glu Arg Leu Cys His Tyr  
 1085 1090 1095

Ala Asn Lys Leu Glu Gln Glu Ala Pro Tyr Ile Met Asn Glu Thr  
 1100 1105 1110

Lys Pro Arg Pro Thr Trp Pro Glu His Gly Ala Ile Glu Phe Lys  
 1115 1120 1125

His Ala Ser Met Arg Tyr Arg Glu Gly Leu Pro Leu Val Leu Lys

|                                                             |  |      |  |      |
|-------------------------------------------------------------|--|------|--|------|
| 1130                                                        |  | 1135 |  | 1140 |
| Asp Leu Thr Ile Ser Val Lys Gly Gly Glu Lys Ile Gly Ile Cys |  |      |  |      |
| 1145                                                        |  | 1150 |  | 1155 |
| Gly Arg Thr Gly Ala Gly Lys Ser Thr Ile Met Asn Ala Leu Tyr |  |      |  |      |
| 1160                                                        |  | 1165 |  | 1170 |
| Arg Leu Thr Glu Leu Ala Glu Gly Ser Ile Thr Ile Asp Gly Val |  |      |  |      |
| 1175                                                        |  | 1180 |  | 1185 |
| Glu Ile Ser Gln Leu Gly Leu Tyr Asp Leu Arg Ser Lys Leu Ala |  |      |  |      |
| 1190                                                        |  | 1195 |  | 1200 |
| Ile Ile Pro Gln Asp Pro Val Leu Phe Arg Gly Thr Ile Arg Lys |  |      |  |      |
| 1205                                                        |  | 1210 |  | 1215 |
| Asn Leu Asp Pro Phe Gly Gln Asn Asp Asp Glu Thr Leu Trp Asp |  |      |  |      |
| 1220                                                        |  | 1225 |  | 1230 |
| Ala Leu Arg Arg Ser Gly Leu Val Glu Gly Ser Ile Leu Asn Thr |  |      |  |      |
| 1235                                                        |  | 1240 |  | 1245 |
| Ile Lys Ser Gln Ser Lys Asp Asp Pro Asn Phe His Lys Phe His |  |      |  |      |
| 1250                                                        |  | 1255 |  | 1260 |
| Leu Asp Gln Thr Val Glu Asp Glu Gly Ala Asn Phe Ser Leu Gly |  |      |  |      |
| 1265                                                        |  | 1270 |  | 1275 |
| Glu Arg Gln Leu Ile Ala Leu Ala Arg Ala Leu Val Arg Asn Ser |  |      |  |      |
| 1280                                                        |  | 1285 |  | 1290 |
| Lys Ile Leu Ile Leu Asp Glu Ala Thr Ser Ser Val Asp Tyr Glu |  |      |  |      |
| 1295                                                        |  | 1300 |  | 1305 |
| Thr Asp Ser Lys Ile Gln Lys Thr Ile Ser Thr Glu Phe Ser His |  |      |  |      |
| 1310                                                        |  | 1315 |  | 1320 |

Cys Thr Ile Leu Cys Ile Ala His Arg Leu Lys Thr Ile Leu Thr  
1325 1330 1335

Tyr Asp Arg Ile Leu Val Leu Glu Lys Gly Glu Val Glu Glu Phe  
1340 1345 1350

Asp Thr Pro Arg Val Leu Tyr Ser Lys Asn Gly Val Phe Arg Gln  
1355 1360 1365

Met Cys Glu Arg Ser Glu Ile Thr Ser Ala Asp Phe Val  
1370 1375 1380