

GPL-B-0001EP2-prio-int-EP1-SL_ST25
SEQUENCE LISTING

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x, X
Philippe, HUGUENEY

<120> 1-DEOXY-D-XYLULOSE 5-PHOSPHATE SYNTHASE DXS2 ALLELES RESPONSIBLE
FOR ENHANCED TERPENE BIOSYNTHESIS

<130> GPL-B-0001 PCT

<150> EP 10013809.8
<151> 2010-10-20

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<170> PatentIn version 3.5

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Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Ser Xaa Xaa

Xaa Xaa Xaa Xaa Xaa Leu Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
35 40 45

Xaa Xaa Xaa Xaa Arg Xaa Xaa Xaa Val Xaa Ala Ser Xaa Xaa Xaa Xaa
50 55 60

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Pro Xaa Xaa Pro Xaa Xaa Asp Thr Xaa
65 70 75 80

Asn Xaa Pro Xaa His Met Lys Asn Leu Ser Xaa Xaa Xaa Leu Xaa Gln
85 90 95

Leu Xaa Xaa Glu Leu Arg Xaa Xaa Xaa Xaa Xaa Val Xaa Xaa Thr
100 105 110

Gly Gly His Leu Xaa Xaa Ser Leu Gly Val Val Xaa Leu Xaa Val Xaa
115 120 125

Leu His Xaa Xaa Phe Xaa Xaa Pro Xaa Asp Xaa Ile Xaa Trp Asp Val
130 135 140

Gly His Lys Xaa Tyr Xaa His Lys Ile Leu Thr Gly Arg Arg Xaa Xaa
145 150 155 160

Met Xaa Thr Xaa Arg Gln Thr Xaa Gly Leu Xaa Gly Phe Xaa Lys Arg
165 170 175

Xaa Glu Ser Xaa Xaa Asp Xaa Phe Gly Xaa Gly His Ser Ser Thr Xaa
180 185 190

Ile Ser Ala Xaa Leu Gly Met Ala Val Xaa Arg Asp Xaa Xaa Gly Xaa
195 200 205

Xaa Asn Xaa Val Xaa Xaa Val Ile Gly Asp Gly Xaa Met Thr Ala Gly
210 215 220

Gln Ala Tyr Glu Ala Met Asn Asn Xaa Gly Xaa Leu Asp Xaa Xaa Xaa
225 230 235 240

Ile Val Xaa Leu Asn Asp Asn Xaa Gln Val Ser Leu Pro Thr Ala Thr
245 250 255

Leu Xaa Gly Pro Xaa Xaa Pro Val Gly Ala Leu Ser Xaa Ala Leu Xaa
260 265 270

Xaa Leu Gln Xaa Xaa Xaa Xaa Xaa Arg Xaa Leu Arg Glu Xaa Ala Xaa
275 280 285

Xaa Xaa Thr Lys Xaa Ile Gly Xaa Xaa Xaa His Xaa Xaa Ala Ala Lys

GPL-B-0001EP2-prio-int-EP1-SL_ST25

290

295

300

Val Asp Xaa Tyr Ala Xaa Gly Met Xaa Ser Xaa Xaa Gly Xaa Xaa Leu
305 310 315 320

Phe Glu Glu Leu Gly Leu Tyr Tyr Ile Gly Pro Val Asp Gly His Xaa
325 330 335

Xaa Xaa Asp Leu Xaa Xaa Ile Xaa Xaa Xaa Val Xaa Xaa Xaa Xaa Xaa
340 345 350

Xaa Gly Pro Val Leu Xaa His Xaa Xaa Thr Glu Lys Gly Xaa Gly Tyr
355 360 365

Pro Xaa Ala Glu Xaa Ala Xaa Asp Xaa Xaa His Gly Val Xaa Lys Phe
370 375 380

Asp Pro Xaa Thr Gly Xaa Gln Phe Lys Xaa Xaa Xaa Xaa Thr Xaa Ser
385 390 395 400

Tyr Thr Xaa Tyr Phe Ala Glu Xaa Leu Xaa Xaa Glu Ala Glu Xaa Asp
405 410 415

Xaa Xaa Xaa Xaa Xaa Ile His Ala Ala Met Gly Gly Gly Thr Gly Xaa
420 425 430

Asn Xaa Phe Xaa Xaa Xaa Phe Pro Xaa Arg Cys Phe Asp Val Gly Ile
435 440 445

Ala Glu Gln His Ala Val Thr Phe Ala Ala Gly Leu Ala Xaa Glu Gly
450 455 460

Xaa Lys Pro Phe Cys Ala Ile Tyr Ser Ser Phe Xaa Gln Arg Xaa Tyr
465 470 475 480

Asp Gln Val Val His Asp Val Asp Leu Gln Xaa Leu Pro Val Xaa Phe
485 490 495

Ala Xaa Asp Arg Ala Gly Leu Val Gly Ala Asp Gly Pro Thr His Cys
500 505 510

Gly Xaa Phe Asp Val Xaa Xaa Met Ala Cys Leu Pro Asn Met Xaa Val
515 520 525

Met Ala Pro Xaa Asp Glu Xaa Xaa Leu Xaa Xaa Xaa Val Ala Thr Ala
530 535 540

Xaa Xaa Ile Xaa Asp Arg Pro Xaa Cys Phe Arg Xaa Pro Arg Gly Asn
545 550 555 560

Gly Xaa Gly Xaa Xaa Leu Pro Xaa Xaa Xaa Lys Gly Xaa Pro Xaa Glu

565 GPL-B-0001EP2-prio-int-EP1-SL_ST25 570 575

Xaa Gly Xaa Gly Arg Xaa Leu Xaa Xaa Gly Xaa Xaa Val Ala Xaa Leu
580 585 590

Gly Tyr Gly Xaa Xaa Val Gln Xaa Cys Xaa Xaa Ala Xaa Xaa Xaa Xaa
595 600 605

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Thr Val Ala Asp Xaa Xaa Phe Cys Lys
610 615 620

Pro Leu Asp Xaa Xaa Leu Ile Xaa Xaa Leu Xaa Xaa Xaa His Glu Xaa
625 630 635 640

Leu Xaa Thr Val Glu Xaa Gly Ser Ile Gly Gly Phe Xaa Ser His Val
645 650 655

Xaa Xaa Xaa Xaa Xaa Leu Xaa Gly Xaa Leu Asp Gly Xaa Xaa Lys Xaa
660 665 670

Xaa Xaa Xaa Xaa Leu Pro Asp Arg Tyr Ile Asp His Gly Xaa Pro Xaa
675 680 685

Asp Gln Xaa Xaa Xaa Ala Gly Leu Xaa Xaa Xaa His Ile Xaa Xaa Thr
690 695 700

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Glu Ala Xaa Xaa Xaa Met Leu
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Met Ala Leu Cys Thr Leu Ser Phe Pro Ala His Phe Ser Gln Ala Ala
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Ala Ser Asn Pro Gln Arg Leu Thr Pro Gln Cys Ser His Leu Phe Leu
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Gly Val Asp Leu Gln Cys Gln Ser Gln Gln Arg Ser Lys Ala Arg Lys
35 40 45

GPL-B-0001EP2-prio-int-EP1-SL_ST25

Arg Pro Asn Gly Val Cys Ala Ser Leu Ser Asp Arg Glu Glu Tyr His
 50 55 60
 Ser Gln Arg Pro Pro Thr Pro Leu Leu Asp Thr Ile Asn Tyr Pro Ile
 65 70 75 80
 His Met Lys Asn Leu Ser Val Lys Glu Leu Lys Gln Leu Ala Asp Glu
 85 90 95
 Leu Arg Ser Asp Val Val Phe Asn Val Ser Lys Thr Gly Gly His Leu
 100 105 110
 Gly Ser Ser Leu Gly Val Val Glu Leu Thr Val Ala Leu His Tyr Val
 115 120 125
 Phe Asn Ala Pro Gln Asp Arg Ile Leu Trp Asp Val Gly His Gln Ser
 130 135 140
 Tyr Pro His Lys Ile Leu Thr Gly Arg Arg Asp Gln Met His Thr Met
 145 150 155 160
 Arg Gln Thr Asp Gly Leu Ala Gly Phe Thr Lys Arg Ser Glu Ser Glu
 165 170 175
 Tyr Asp Cys Phe Gly Thr Gly His Ser Ser Thr Thr Ile Ser Ala Gly
 180 185 190
 Leu Gly Met Ala Val Gly Arg Asp Leu Lys Gly Lys Asn Asn Asn Val
 195 200 205
 Ile Ala Val Ile Gly Asp Gly Ala Met Thr Ala Gly Gln Ala Tyr Glu
 210 215 220
 Ala Met Asn Asn Ala Gly Tyr Leu Asp Ser Asp Met Ile Val Ile Leu
 225 230 235 240
 Asn Asp Asn Lys Gln Val Ser Leu Pro Thr Ala Thr Leu Asp Gly Pro
 245 250 255
 Ile Pro Pro Val Gly Ala Leu Ser Ser Ala Leu Ser Arg Leu Gln Ser
 260 265 270
 Asn Arg Pro Leu Arg Glu Leu Arg Glu Val Ala Xaa Gly Val Thr Lys
 275 280 285
 Gln Ile Gly Gly Pro Met His Glu Leu Ala Ala Lys Val Asp Glu Tyr
 290 295 300
 Ala Xaa Gly Met Ile Ser Gly Ser Gly Ser Thr Leu Phe Glu Glu Leu
 305 310 315 320

GPL-B-0001EP2-prio-int-EP1-SL_ST25

Gly Leu Tyr Tyr Ile Gly Pro Val Asp Gly His Asn Ile Asp Asp Leu
 325 330 335
 Val Ala Ile Leu Lys Glu Val Lys Ser Thr Lys Thr Thr Gly Pro Val
 340 345 350
 Leu Ile His Val Val Thr Glu Lys Gly Arg Gly Tyr Pro Tyr Ala Glu
 355 360 365
 Lys Ala Ala Asp Lys Tyr His Gly Val Thr Lys Phe Asp Pro Ala Thr
 370 375 380
 Gly Lys Gln Phe Lys Ser Ser Ala Pro Thr Gln Ser Tyr Thr Thr Tyr
 385 390 395 400
 Phe Ala Glu Ala Leu Ile Ala Glu Ala Glu Val Asp Lys Asp Ile Val
 405 410 415
 Ala Ile His Ala Ala Met Gly Gly Gly Thr Gly Leu Asn Leu Phe His
 420 425 430
 Arg Arg Phe Pro Thr Arg Cys Phe Asp Val Gly Ile Ala Glu Gln His
 435 440 445
 Ala Val Thr Phe Ala Ala Gly Leu Ala Cys Glu Gly Ile Lys Pro Phe
 450 455 460
 Cys Ala Ile Tyr Ser Ser Phe Met Gln Arg Ala Tyr Asp Gln Val Val
 465 470 475 480
 His Asp Val Asp Leu Gln Lys Leu Pro Val Lys Phe Ala Met Asp Arg
 485 490 495
 Ala Gly Leu Val Gly Ala Asp Gly Pro Thr His Cys Gly Ala Phe Asp
 500 505 510
 Val Ala Phe Met Ala Cys Leu Pro Asn Met Val Val Met Ala Pro Ala
 515 520 525
 Asp Glu Ala Glu Leu Phe His Met Val Ala Thr Ala Ala Ala Ile Asp
 530 535 540
 Asp Arg Pro Ser Cys Phe Arg Tyr Pro Arg Gly Asn Gly Val Gly Val
 545 550 555 560
 Glu Leu Pro Pro Gly Asn Lys Gly Ile Pro Ile Glu Val Gly Arg Gly
 565 570 575
 Arg Ile Leu Ile Glu Gly Glu Arg Val Ala Leu Leu Gly Tyr Gly Thr
 580 585 590

GPL-B-0001EP2-prio-int-EP1-SL_ST25

Ala Val Gln Ser Cys Leu Val Ala Ser Ser Leu Leu Glu Gln His Gly
595 600 605

Leu Arg Ile Thr Val Ala Asp Ala Arg Phe Cys Lys Pro Leu Asp His
610 615 620

Ala Leu Ile Arg Ser Leu Ala Lys Ser His Glu Val Leu Ile Thr Val
625 630 635 640

Glu Glu Gly Ser Ile Gly Gly Phe Gly Ser His Val Ala Gln Phe Leu
645 650 655

Ala Leu Asn Gly Leu Leu Asp Gly Thr Thr Lys Trp Ser Pro Met Val
660 665 670

Leu Pro Asp Arg Tyr Ile Asp His Gly Ala Pro Ala Asp Gln Leu Ala
675 680 685

Met Ala Gly Leu Thr Pro Ser His Ile Ala Ala Thr Val Phe Asn Ile
690 695 700

Leu Gly Gln Thr Arg Glu Ala Leu Glu Ile Met Leu
705 710 715

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Met Ala Leu Cys Thr Leu Ser Phe Pro Ala His Phe Ser Gln Ala Ala
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Ala Ser Asn Pro Gln Arg Leu Thr Pro Gln Cys Ser His Leu Phe Leu
20 25 30

Gly Val Asp Leu Gln Cys Gln Ser Gln Gln Arg Ser Lys Ala Arg Lys
35 40 45

Arg Pro Asn Gly Val Cys Ala Ser Leu Ser Asp Arg Glu Glu Tyr His
50 55 60

Ser Gln Arg Pro Pro Thr Pro Leu Leu Asp Thr Ile Asn Tyr Pro Ile
65 70 75 80

His Met Lys Asn Leu Ser Val Lys Glu Leu Lys Gln Leu Ala Asp Glu
85 90 95

Leu Arg Ser Asp Val Val Phe Asn Val Ser Lys Thr Gly Gly His Leu
100 105 110

GPL-B-0001EP2-prio-int-EP1-SL_ST25

Gly Ser Ser Leu Gly Val Val Glu Leu Thr Val Ala Leu His Tyr Val
115 120 125

Phe Asn Ala Pro Gln Asp Arg Ile Leu Trp Asp Val Gly His Gln Ser
130 135 140

Tyr Pro His Lys Ile Leu Thr Gly Arg Arg Asp Gln Met His Thr Met
145 150 155 160

Arg Gln Thr Asp Gly Leu Ala Gly Phe Thr Lys Arg Ser Glu Ser Glu
165 170 175

Tyr Asp Cys Phe Gly Thr Gly His Ser Ser Thr Thr Ile Ser Ala Gly
180 185 190

Leu Gly Met Ala Val Gly Arg Asp Leu Lys Gly Lys Asn Asn Asn Val
195 200 205

Ile Ala Val Ile Gly Asp Gly Ala Met Thr Ala Gly Gln Ala Tyr Glu
210 215 220

Ala Met Asn Asn Ala Gly Tyr Leu Asp Ser Asp Met Ile Val Ile Leu
225 230 235 240

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

Ile Pro Pro Val Gly Ala Leu Ser Ser Ala Leu Ser Arg Leu Gln Ser
260 265 270

Asn Arg Pro Leu Arg Glu Leu Arg Glu Val Ala Lys Gly Val Thr Lys
275 280 285

Gln Ile Gly Gly Pro Met His Glu Leu Ala Ala Lys Val Asp Glu Tyr
290 295 300

Ala Arg Gly Met Ile Ser Gly Ser Gly Ser Thr Leu Phe Glu Glu Leu
305 310 315 320

Gly Leu Tyr Tyr Ile Gly Pro Val Asp Gly His Asn Ile Asp Asp Leu
325 330 335

Val Ala Ile Leu Lys Glu Val Lys Ser Thr Lys Thr Thr Gly Pro Val
340 345 350

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

Lys Ala Ala Asp Lys Tyr His Gly Val Thr Lys Phe Asp Pro Ala Thr
370 375 380

GPL-B-0001EP2-prio-int-EP1-SL_ST25

Gly Lys Gln Phe Lys Ser Ser Ala Pro Thr Gln Ser Tyr Thr Thr Tyr
385 390 395 400

Phe Ala Glu Ala Leu Ile Ala Glu Ala Glu Val Asp Lys Asp Ile Val
405 410 415

Ala Ile His Ala Ala Met Gly Gly Gly Thr Gly Leu Asn Leu Phe His
420 425 430

Arg Arg Phe Pro Thr Arg Cys Phe Asp Val Gly Ile Ala Glu Gln His
435 440 445

Ala Val Thr Phe Ala Ala Gly Leu Ala Cys Glu Gly Ile Lys Pro Phe
450 455 460

Cys Ala Ile Tyr Ser Ser Phe Met Gln Arg Ala Tyr Asp Gln Val Val
465 470 475 480

His Asp Val Asp Leu Gln Lys Leu Pro Val Lys Phe Ala Met Asp Arg
485 490 495

Ala Gly Leu Val Gly Ala Asp Gly Pro Thr His Cys Gly Ala Phe Asp
500 505 510

Val Ala Phe Met Ala Cys Leu Pro Asn Met Val Val Met Ala Pro Ala
515 520 525

Asp Glu Ala Glu Leu Phe His Met Val Ala Thr Ala Ala Ala Ile Asp
530 535 540

Asp Arg Pro Ser Cys Phe Arg Tyr Pro Arg Gly Asn Gly Val Gly Val
545 550 555 560

Glu Leu Pro Pro Gly Asn Lys Gly Ile Pro Ile Glu Val Gly Arg Gly
565 570 575

Arg Ile Leu Ile Glu Gly Glu Arg Val Ala Leu Leu Gly Tyr Gly Thr
580 585 590

Ala Val Gln Ser Cys Leu Val Ala Ser Ser Leu Leu Glu Gln His Gly
595 600 605

Leu Arg Ile Thr Val Ala Asp Ala Arg Phe Cys Lys Pro Leu Asp His
610 615 620

Ala Leu Ile Arg Ser Leu Ala Lys Ser His Glu Val Leu Ile Thr Val
625 630 635 640

Glu Glu Gly Ser Ile Gly Gly Phe Gly Ser His Val Ala Gln Phe Leu
645 650 655

GPL-B-0001EP2-prio-int-EP1-SL_ST25

Ala Leu Asn Gly Leu Leu Asp Gly Thr Thr Lys Trp Ser Pro Met Val
660 665 670

Leu Pro Asp Arg Tyr Ile Asp His Gly Ala Pro Ala Asp Gln Leu Ala
675 680 685

Met Ala Gly Leu Thr Pro Ser His Ile Ala Ala Thr Val Phe Asn Ile
690 695 700

Leu Gly Gln Thr Arg Glu Ala Leu Glu Ile Met Leu
705 710 715

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Met Ala Leu Cys Thr Leu Ser Phe Pro Ala His Phe Ser Gln Ala Ala
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Ala Ser Asn Pro Gln Arg Leu Thr Pro Gln Cys Ser His Leu Phe Leu
20 25 30

Gly Val Asp Leu Gln Cys Gln Ser Gln Gln Arg Ser Lys Ala Arg Lys
35 40 45

Arg Pro Asn Gly Val Cys Ala Ser Leu Ser Asp Arg Glu Glu Tyr His
50 55 60

Ser Gln Arg Pro Pro Thr Pro Leu Leu Asp Thr Ile Asn Tyr Pro Ile
65 70 75 80

His Met Lys Asn Leu Ser Val Lys Glu Leu Lys Gln Leu Ala Asp Glu
85 90 95

Leu Arg Ser Asp Val Val Phe Asn Val Ser Lys Thr Gly Gly His Leu
100 105 110

Gly Ser Ser Leu Gly Val Val Glu Leu Thr Val Ala Leu His Tyr Val
115 120 125

Phe Asn Ala Pro Gln Asp Arg Ile Leu Trp Asp Val Gly His Gln Ser
130 135 140

Tyr Pro His Lys Ile Leu Thr Gly Arg Arg Asp Gln Met His Thr Met
145 150 155 160

Arg Gln Thr Asp Gly Leu Ala Gly Phe Thr Lys Arg Ser Glu Ser Glu
165 170 175

Tyr Asp Cys Phe Gly Thr Gly His Ser Ser Thr Thr Ile Ser Ala Gly
Pge p

GPL-B-0001EP2-prio-int-EP1-SL_ST25

180

185

190

Leu Gly Met Ala Val Gly Arg Asp Leu Lys Gly Lys Asn Asn Asn Val
195 200 205
Ile Ala Val Ile Gly Asp Gly Ala Met Thr Ala Gly Gln Ala Tyr Glu
210 215 220
Ala Met Asn Asn Ala Gly Tyr Leu Asp Ser Asp Met Ile Val Ile Leu
225 230 235 240
Asn Asp Asn Lys Gln Val Ser Leu Pro Thr Ala Thr Leu Asp Gly Pro
245 250 255
Ile Pro Pro Val Gly Ala Leu Ser Ser Ala Leu Ser Arg Leu Gln Ser
260 265 270
Asn Arg Pro Leu Arg Glu Leu Arg Glu Val Ala Asn Gly Val Thr Lys
275 280 285
Gln Ile Gly Gly Pro Met His Glu Leu Ala Ala Lys Val Asp Glu Tyr
290 295 300
Ala Arg Gly Met Ile Ser Gly Ser Gly Ser Thr Leu Phe Glu Glu Leu
305 310 315 320
Gly Leu Tyr Tyr Ile Gly Pro Val Asp Gly His Asn Ile Asp Asp Leu
325 330 335
Val Ala Ile Leu Lys Glu Val Lys Ser Thr Lys Thr Thr Gly Pro Val
340 345 350
Leu Ile His Val Val Thr Glu Lys Gly Arg Gly Tyr Pro Tyr Ala Glu
355 360 365
Lys Ala Ala Asp Lys Tyr His Gly Val Thr Lys Phe Asp Pro Ala Thr
370 375 380
Gly Lys Gln Phe Lys Ser Ser Ala Pro Thr Gln Ser Tyr Thr Thr Tyr
385 390 395 400
Phe Ala Glu Ala Leu Ile Ala Glu Ala Glu Val Asp Lys Asp Ile Val
405 410 415
Ala Ile His Ala Ala Met Gly Gly Gly Thr Gly Leu Asn Leu Phe His
420 425 430
Arg Arg Phe Pro Thr Arg Cys Phe Asp Val Gly Ile Ala Glu Gln His
435 440 445
Ala Val Thr Phe Ala Ala Gly Leu Ala Cys Glu Gly Ile Lys Pro Phe

GPL-B-0001EP2-prio-int-EP1-SL_ST25

450

455

460

Cys Ala Ile Tyr Ser Ser Phe Met Gln Arg Ala Tyr Asp Gln Val Val
465 470 475 480

His Asp Val Asp Leu Gln Lys Leu Pro Val Lys Phe Ala Met Asp Arg
485 490 495

Ala Gly Leu Val Gly Ala Asp Gly Pro Thr His Cys Gly Ala Phe Asp
500 505 510

Val Ala Phe Met Ala Cys Leu Pro Asn Met Val Val Met Ala Pro Ala
515 520 525

Asp Glu Ala Glu Leu Phe His Met Val Ala Thr Ala Ala Ala Ile Asp
530 535 540

Asp Arg Pro Ser Cys Phe Arg Tyr Pro Arg Gly Asn Gly Val Gly Ile
545 550 555 560

Glu Leu Pro Pro Gly Asn Lys Gly Ile Pro Ile Glu Val Gly Arg Gly
565 570 575

Arg Ile Leu Ile Glu Gly Glu Arg Val Ala Leu Leu Gly Tyr Gly Thr
580 585 590

Ala Val Gln Ser Cys Leu Val Ala Ser Ser Leu Leu Glu Gln His Gly
595 600 605

Leu Arg Ile Thr Val Ala Asp Ala Arg Phe Cys Lys Pro Leu Asp His
610 615 620

Ala Leu Ile Arg Ser Leu Ala Lys Ser His Glu Val Leu Ile Thr Val
625 630 635 640

Glu Glu Gly Ser Ile Gly Gly Phe Gly Ser His Val Ala Gln Phe Leu
645 650 655

Ala Leu Asn Gly Leu Leu Asp Gly Thr Thr Lys Trp Ser Pro Met Val
660 665 670

Leu Pro Asp Arg Tyr Ile Asp His Gly Ala Pro Ala Asp Gln Leu Ala
675 680 685

Met Ala Gly Leu Thr Pro Ser His Ile Ala Ala Thr Val Phe Asn Ile
690 695 700

Leu Gly Gln Thr Arg Glu Ala Leu Glu Ile Met Leu
705 710 715

<210> 5

GPL-B-0001EP2-prio-int-EP1-SL_ST25

<211> 664

<212> PRT

<213> Artificial sequence

<220>

<223> Truncated DXS polypeptide

<400> 5

Val Cys Ala Ser Leu Ser Asp Arg Glu Glu Tyr His Ser Gln Arg Pro
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Pro Thr Pro Leu Leu Asp Thr Ile Asn Tyr Pro Ile His Met Lys Asn
20 25 30

Leu Ser Val Lys Glu Leu Lys Gln Leu Ala Asp Glu Leu Arg Ser Asp
35 40 45

Val Val Phe Asn Val Ser Lys Thr Gly Gly His Leu Gly Ser Ser Leu
50 55 60

Gly Val Val Glu Leu Thr Val Ala Leu His Tyr Val Phe Asn Ala Pro
65 70 75 80

Gln Asp Arg Ile Leu Trp Asp Val Gly His Gln Ser Tyr Pro His Lys
85 90 95

Ile Leu Thr Gly Arg Arg Asp Gln Met His Thr Met Arg Gln Thr Asp
100 105 110

Gly Leu Ala Gly Phe Thr Lys Arg Ser Glu Ser Glu Tyr Asp Cys Phe
115 120 125

Gly Thr Gly His Ser Ser Thr Thr Ile Ser Ala Gly Leu Gly Met Ala
130 135 140

Val Gly Arg Asp Leu Lys Gly Lys Asn Asn Asn Val Ile Ala Val Ile
145 150 155 160

Gly Asp Gly Ala Met Thr Ala Gly Gln Ala Tyr Glu Ala Met Asn Asn
165 170 175

Ala Gly Tyr Leu Asp Ser Asp Met Ile Val Ile Leu Asn Asp Asn Lys
180 185 190

Gln Val Ser Leu Pro Thr Ala Thr Leu Asp Gly Pro Ile Pro Pro Val
195 200 205

Gly Ala Leu Ser Ser Ala Leu Ser Arg Leu Gln Ser Asn Arg Pro Leu
210 215 220

Arg Glu Leu Arg Glu Val Ala Asn Gly Val Thr Lys Gln Ile Gly Gly
225 230 235 240

GPL-B-0001EP2-prio-int-EP1-SL_ST25

Pro Met His Glu Leu₂₄₅ Ala Ala Lys Val Asp₂₅₀ Glu Tyr Ala Arg Gly₂₅₅ Met
Ile Ser Gly Ser₂₆₀ Gly Ser Thr Leu Phe₂₆₅ Glu Glu Leu Gly Leu₂₇₀ Tyr Tyr
Ile Gly Pro₂₇₅ Val Asp Gly His Asn₂₈₀ Ile Asp Asp Leu Val₂₈₅ Ala Ile Leu
Lys Glu₂₉₀ Val Lys Ser Thr Lys₂₉₅ Thr Thr Gly Pro Val₃₀₀ Leu Ile His Val
Val₃₀₅ Thr Glu Lys Gly Arg₃₁₀ Gly Tyr Pro Tyr Ala₃₁₅ Glu Lys Ala Ala Asp₃₂₀
Lys Tyr His Gly Val₃₂₅ Thr Lys Phe Asp Pro₃₃₀ Ala Thr Gly Lys Gln₃₃₅ Phe
Lys Ser Ser Ala₃₄₀ Pro Thr Gln Ser Tyr₃₄₅ Thr Thr Tyr Phe Ala₃₅₀ Glu Ala
Leu Ile Ala₃₅₅ Glu Ala Glu Val Asp₃₆₀ Lys Asp Ile Val Ala₃₆₅ Ile His Ala
Ala Met₃₇₀ Gly Gly Gly Thr Gly₃₇₅ Leu Asn Leu Phe His₃₈₀ Arg Arg Phe Pro
Thr Arg Cys Phe Asp Val₃₉₀ Gly Ile Ala Glu Gln₃₉₅ His Ala Val Thr Phe₄₀₀
Ala Ala Gly Leu Ala₄₀₅ Cys Glu Gly Ile Lys₄₁₀ Pro Phe Cys Ala Ile₄₁₅ Tyr
Ser Ser Phe Met₄₂₀ Gln Arg Ala Tyr Asp₄₂₅ Gln Val Val His Asp₄₃₀ Val Asp
Leu Gln Lys₄₃₅ Leu Pro Val Lys Phe₄₄₀ Ala Met Asp Arg Ala₄₄₅ Gly Leu Val
Gly Ala₄₅₀ Asp Gly Pro Thr His₄₅₅ Cys Gly Ala Phe Asp₄₆₀ Val Ala Phe Met
Ala Cys Leu Pro Asn Met₄₇₀ Val Val Met Ala Pro₄₇₅ Ala Asp Glu Ala Glu₄₈₀
Leu Phe His Met Val₄₈₅ Ala Thr Ala Ala Ala₄₉₀ Ile Asp Asp Arg Pro Ser₄₉₅
Cys Phe Arg Tyr₅₀₀ Pro Arg Gly Asn Gly₅₀₅ Val Gly Ile Glu Leu₅₁₀ Pro Pro

GPL-B-0001EP2-prio-int-EP1-SL-ST25

Gly Asn Lys Gly Ile Pro Ile Glu Val Gly Arg Gly Arg Ile Leu Ile
515 520 525

Glu Gly Glu Arg Val Ala Leu Leu Gly Tyr Gly Thr Ala Val Gln Ser
530 535 540

Cys Leu Val Ala Ser Ser Leu Leu Glu Gln His Gly Leu Arg Ile Thr
545 550 555 560

Val Ala Asp Ala Arg Phe Cys Lys Pro Leu Asp His Ala Leu Ile Arg
565 570 575

Ser Leu Ala Lys Ser His Glu Val Leu Ile Thr Val Glu Glu Gly Ser
580 585 590

Ile Gly Gly Phe Gly Ser His Val Ala Gln Phe Leu Ala Leu Asn Gly
595 600 605

Leu Leu Asp Gly Thr Thr Lys Trp Ser Pro Met Val Leu Pro Asp Arg
610 615 620

Tyr Ile Asp His Gly Ala Pro Ala Asp Gln Leu Ala Met Ala Gly Leu
625 630 635 640

Thr Pro Ser His Ile Ala Ala Thr Val Phe Asn Ile Leu Gly Gln Thr
645 650 655

Arg Glu Ala Leu Glu Ile Met Leu
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<210> 6

<211> 716

<212> PRT

<213> Vitis Vinifera

<400> 6

Met Ala Leu Cys Thr Leu Ser Phe Pro Ala His Phe Ser Gln Ala Ala
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Ala Ser Asn Pro Gln Arg Leu Thr Pro Gln Cys Ser His Leu Phe Leu
20 25 30

Gly Val Asp Leu Gln Cys Gln Ser Gln Gln Arg Ser Lys Ala Arg Lys
35 40 45

Arg Pro Asn Gly Val Cys Ala Ser Leu Ser Asp Arg Glu Glu Tyr His
50 55 60

Ser Gln Arg Pro Pro Thr Pro Leu Leu Asp Thr Ile Asn Tyr Pro Ile
65 70 75 80

GPL-B-0001EP2-prio-int-EP1-SL_ST25

His Met Lys Asn Leu Ser Val Lys Glu Leu Lys Gln Leu Ala Asp Glu
85 90 95

Leu Arg Ser Asp Val Val Phe Asn Val Ser Lys Thr Gly Gly His Leu
100 105 110

Gly Ser Ser Leu Gly Val Val Glu Leu Thr Val Ala Leu His Tyr Val
115 120 125

Phe Asn Ala Pro Gln Asp Arg Ile Leu Trp Asp Val Gly His Gln Ser
130 135 140

Tyr Pro His Lys Ile Leu Thr Gly Arg Arg Asp Gln Met His Thr Met
145 150 155 160

Arg Gln Thr Asp Gly Leu Ala Gly Phe Thr Lys Arg Ser Glu Ser Glu
165 170 175

Tyr Asp Cys Phe Gly Thr Gly His Ser Ser Thr Thr Ile Ser Ala Gly
180 185 190

Leu Gly Met Ala Val Gly Arg Asp Leu Lys Gly Lys Asn Asn Asn Val
195 200 205

Ile Ala Val Ile Gly Asp Gly Ala Met Thr Ala Gly Gln Ala Tyr Glu
210 215 220

Ala Met Asn Asn Ala Gly Tyr Leu Asp Ser Asp Met Ile Val Ile Leu
225 230 235 240

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

Ile Pro Pro Val Gly Ala Leu Ser Ser Ala Leu Ser Arg Leu Gln Ser
260 265 270

Asn Arg Pro Leu Arg Glu Leu Arg Glu Val Ala Lys Gly Val Thr Lys
275 280 285

Gln Ile Gly Gly Pro Met His Glu Leu Ala Ala Lys Val Asp Glu Tyr
290 295 300

Ala Cys Gly Met Ile Ser Gly Ser Gly Ser Thr Leu Phe Glu Glu Leu
305 310 315 320

Gly Leu Tyr Tyr Ile Gly Pro Val Asp Gly His Asn Ile Asp Asp Leu
325 330 335

Val Ala Ile Leu Lys Glu Val Lys Ser Thr Lys Thr Thr Gly Pro Val
340 345 350

GPL-B-0001EP2-prio-int-EP1-SL_ST25

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

Lys Ala Ala Asp Lys Tyr His Gly Val Thr Lys Phe Asp Pro Ala Thr
370 375 380

Gly Lys Gln Phe Lys Ser Ser Ala Pro Thr Gln Ser Tyr Thr Thr Tyr
385 390 395 400

Phe Ala Glu Ala Leu Ile Ala Glu Ala Glu Val Asp Lys Asp Ile Val
405 410 415

Ala Ile His Ala Ala Met Gly Gly Gly Thr Gly Leu Asn Leu Phe His
420 425 430

Arg Arg Phe Pro Thr Arg Cys Phe Asp Val Gly Ile Ala Glu Gln His
435 440 445

Ala Val Thr Phe Ala Ala Gly Leu Ala Cys Glu Gly Ile Lys Pro Phe
450 455 460

Cys Ala Ile Tyr Ser Ser Phe Met Gln Arg Ala Tyr Asp Gln Val Val
465 470 475 480

His Asp Val Asp Leu Gln Lys Leu Pro Val Lys Phe Ala Met Asp Arg
485 490 495

Ala Gly Leu Val Gly Ala Asp Gly Pro Thr His Cys Gly Ala Phe Asp
500 505 510

Val Ala Phe Met Ala Cys Leu Pro Asn Met Val Val Met Ala Pro Ala
515 520 525

Asp Glu Ala Glu Leu Phe His Met Val Ala Thr Ala Ala Ala Ile Asp
530 535 540

Asp Arg Pro Ser Cys Phe Arg Tyr Pro Arg Gly Asn Gly Val Gly Val
545 550 555 560

Glu Leu Pro Pro Gly Asn Lys Gly Ile Pro Ile Glu Val Gly Arg Gly
565 570 575

Arg Ile Leu Ile Glu Gly Glu Arg Val Ala Leu Leu Gly Tyr Gly Thr
580 585 590

Ala Val Gln Ser Cys Leu Val Ala Ser Ser Leu Leu Glu Gln His Gly
595 600 605

Leu Arg Ile Thr Val Ala Asp Ala Arg Phe Cys Lys Pro Leu Asp His
610 615 620

GPL-B-0001EP2-prio-int-EP1-SL_ST25

Ala Leu Ile Arg Ser Leu Ala Lys Ser His Glu Val Leu Ile Thr Val
625 630 635 640

Glu Glu Gly Ser Ile Gly Gly Phe Gly Ser His Val Ala Gln Phe Leu
645 650 655

Ala Leu Asn Gly Leu Leu Asp Gly Thr Thr Lys Trp Ser Pro Met Val
660 665 670

Leu Pro Asp Arg Tyr Ile Asp His Gly Ala Pro Ala Asp Gln Leu Ala
675 680 685

Met Ala Gly Leu Thr Pro Ser His Ile Ala Ala Thr Val Phe Asn Ile
690 695 700

Leu Gly Gln Thr Arg Glu Ala Leu Glu Ile Met Leu
705 710 715

<210> 7

<211> 664

<212> PRT

<213> Artificial sequence

<220>

<223> Truncated DXS polypeptide

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Val Cys Ala Ser Leu Ser Asp Arg Glu Glu Tyr His Ser Gln Arg Pro
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Pro Thr Pro Leu Leu Asp Thr Ile Asn Tyr Pro Ile His Met Lys Asn
20 25 30

Leu Ser Val Lys Glu Leu Lys Gln Leu Ala Asp Glu Leu Arg Ser Asp
35 40 45

Val Val Phe Asn Val Ser Lys Thr Gly Gly His Leu Gly Ser Ser Leu
50 55 60

Gly Val Val Glu Leu Thr Val Ala Leu His Tyr Val Phe Asn Ala Pro
65 70 75 80

Gln Asp Arg Ile Leu Trp Asp Val Gly His Gln Ser Tyr Pro His Lys
85 90 95

Ile Leu Thr Gly Arg Arg Asp Gln Met His Thr Met Arg Gln Thr Asp
100 105 110

Gly Leu Ala Gly Phe Thr Lys Arg Ser Glu Ser Glu Tyr Asp Cys Phe
115 120 125

Gly Thr Gly His Ser Ser Thr Thr Ile Ser Ala Gly Leu Gly Met Ala
130 135 140

GPL-B-0001EP2-prio-int-EP1-SL_ST25

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

GPL-B-0001EP2-prio-int-EP1-SL_ST25

Ser Ser Phe Met Gln Arg Ala Tyr Asp Gln Val Val His Asp Val Asp
420 425 430

Leu Gln Lys Leu Pro Val Lys Phe Ala Met Asp Arg Ala Gly Leu Val
435 440 445

Gly Ala Asp Gly Pro Thr His Cys Gly Ala Phe Asp Val Ala Phe Met
450 455 460

Ala Cys Leu Pro Asn Met Val Val Met Ala Pro Ala Asp Glu Ala Glu
465 470 475 480

Leu Phe His Met Val Ala Thr Ala Ala Ala Ile Asp Asp Arg Pro Ser
485 490 495

Cys Phe Arg Tyr Pro Arg Gly Asn Gly Val Gly Val Glu Leu Pro Pro
500 505 510

Gly Asn Lys Gly Ile Pro Ile Glu Val Gly Arg Gly Arg Ile Leu Ile
515 520 525

Glu Gly Glu Arg Val Ala Leu Leu Gly Tyr Gly Thr Ala Val Gln Ser
530 535 540

Cys Leu Val Ala Ser Ser Leu Leu Glu Gln His Gly Leu Arg Ile Thr
545 550 555 560

Val Ala Asp Ala Arg Phe Cys Lys Pro Leu Asp His Ala Leu Ile Arg
565 570 575

Ser Leu Ala Lys Ser His Glu Val Leu Ile Thr Val Glu Glu Gly Ser
580 585 590

Ile Gly Gly Phe Gly Ser His Val Ala Gln Phe Leu Ala Leu Asn Gly
595 600 605

Leu Leu Asp Gly Thr Thr Lys Trp Ser Pro Met Val Leu Pro Asp Arg
610 615 620

Tyr Ile Asp His Gly Ala Pro Ala Asp Gln Leu Ala Met Ala Gly Leu
625 630 635 640

Thr Pro Ser His Ile Ala Ala Thr Val Phe Asn Ile Leu Gly Gln Thr
645 650 655

Arg Glu Ala Leu Glu Ile Met Leu
660

<210> 8
<211> 1846

GPL-B-0001EP2-prio-int-EP1-SL_ST25

<212> DNA

<213> *Vitis vinifera*

<400> 8

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GPL-B-0001EP2-prio-int-EP1-SL_ST25

<211> 2151

<212> DNA

<213> Vitis Vinifera

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GPL-B-0001EP2-prio-int-EP1-SL_ST25

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<210> 10
 <211> 2151
 <212> DNA
 <213> Vitis Vinifera

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GPL-B-0001EP2-prio-int-EP1-SL_ST25

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 <211> 1863
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GPL-B-0001EP2-prio-int-EP1-SL_ST25

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GPL-B-0001EP2-prio-int-EP1-SL_ST25

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GPL-B-0001EP2-prio-int-EP1-SL_ST25

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GPL-B-0001EP2-prio-int-EP1-SL_ST25

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GPL-B-0001EP2-prio-int-EP1-SL_ST25

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taa	1863

<210> 17
 <211> 620
 <212> PRT
 <213> Escherichia coli

<400> 17

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His Phe Ala Ser Gly Leu Gly Thr Val Glu Leu Thr Val Ala Leu His	50 55 60
Tyr Val Tyr Asn Thr Pro Phe Asp Gln Leu Ile Trp Asp Val Gly His	65 70 75 80
Gln Ala Tyr Pro His Lys Ile Leu Thr Gly Arg Arg Asp Lys Ile Gly	85 90 95
Thr Ile Arg Gln Lys Gly Gly Leu His Pro Phe Pro Trp Arg Gly Glu	100 105 110
Ser Glu Tyr Asp Val Leu Ser Val Gly His Ser Ser Thr Ser Ile Ser	115 120 125
Ala Gly Ile Gly Ile Ala Val Ala Ala Glu Lys Glu Gly Lys Asn Arg	130 135 140
Arg Thr Val Cys Val Ile Gly Asp Gly Ala Ile Thr Ala Gly Met Ala	145 150 155 160
Phe Glu Ala Met Asn His Ala Gly Asp Ile Arg Pro Asp Met Leu Val	

165

170

175

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Asn Asn His 195 Leu Ala Gln Leu 200 Ser Gly Lys Leu Tyr 205 Ser Ser Leu

Arg Glu 210 Gly Gly Lys Lys Val 215 Phe Ser Gly Val Pro 220 Pro Ile Lys Glu

Leu 225 Leu Lys Arg Thr Glu 230 Glu His Ile Lys Gly 235 Met Val Val Pro Gly 240

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

His Asp Val 260 Leu Gly Leu Ile Thr Thr 265 Leu Lys Asn Met Arg 270 Asp Leu

Lys Gly Pro 275 Gln Phe Leu His Ile 280 Met Thr Lys Lys Gly 285 Arg Gly Tyr

Glu Pro 290 Ala Glu Lys Asp Pro 295 Ile Thr Phe His Ala 300 Val Pro Lys Phe

Asp 305 Pro Ser Ser Gly Cys 310 Leu Pro Lys Ser Ser 315 Gly Gly Leu Pro Ser 320

Tyr Ser Lys Ile 325 Phe Gly Asp Trp Leu Cys 330 Glu Thr Ala Ala Lys 335 Asp

Asn Lys Leu 340 Met Ala Ile Thr Pro Ala 345 Met Arg Glu Gly Ser 350 Gly Met

Val Glu Phe 355 Ser Arg Lys Phe Pro 360 Asp Arg Tyr Phe Asp 365 Val Ala Ile

Ala Glu 370 Gln His Ala Val Thr Phe Ala Ala Gly Leu 380 Ala Ile Gly Gly

Tyr 385 Lys Pro Ile Val Ala 390 Ile Tyr Ser Thr Phe 395 Leu Gln Arg Ala Tyr 400

Asp Gln Val Leu 405 His Asp Val Ala Ile Gln 410 Lys Leu Pro Val Leu 415 Phe

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GPL-B-0001EP2-prio-int-EP1-SL_ST25

435

440

445

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Gly Ile Val Lys Arg Arg Gly Glu Lys Leu Ala Ile Leu Asn Phe Gly
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Thr Leu Met Pro Glu Ala Ala Lys Val Ala Glu Ser Leu Asn Ala Thr
515 520 525

Leu Val Asp Met Arg Phe Val Lys Pro Leu Asp Glu Ala Leu Ile Leu
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Glu Met Ala Ala Ser His Glu Ala Leu Val Thr Val Glu Glu Asn Ala
545 550 555 560

Ile Met Gly Gly Ala Gly Ser Gly Val Asn Glu Val Leu Met Ala His
565 570 575

Arg Lys Pro Val Pro Val Leu Asn Ile Gly Leu Pro Asp Phe Phe Ile
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Pro Gln Gly Thr Gln Glu Glu Met Arg Ala Glu Leu Gly Leu Asp Ala
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<220>

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Asp Glu Leu Arg Arg Tyr Leu Leu Asp Ser Val Ser Arg Ser Ser Gly
35 40 45

GPL-B-0001EP2-prio-int-EP1-SL_ST25

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

Gln Ala Tyr Pro His Lys Ile Leu Thr Gly Arg Arg Asp Lys Ile Gly
85 90 95

Thr Ile Arg Gln Lys Gly Gly Leu His Pro Phe Pro Trp Arg Gly Glu
100 105 110

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

Ala Gly Ile Gly Ile Ala Val Ala Ala Glu Lys Glu Gly Lys Asn Arg
130 135 140

Arg Thr Val Cys Val Ile Gly Asp Gly Ala Ile Thr Ala Gly Met Ala
145 150 155 160

Phe Glu Ala Met Asn His Ala Gly Asp Ile Arg Pro Asp Met Leu Val
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Ile Leu Asn Asp Asn Glu Met Ser Ile Ser Glu Asn Val Gly Ala Leu
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Arg Glu Gly Gly Asn Lys Val Phe Ser Gly Phe
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<210> 19
<211> 620
<212> PRT
<213> Escherichia coli

<400> 19

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Asp Glu Leu Arg Arg Tyr Leu Leu Asp Ser Val Ser Arg Ser Ser Gly
35 40 45

His Phe Ala Ser Gly Leu Gly Thr Val Glu Leu Thr Val Ala Leu His
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GPL-B-0001EP2-prio-int-EP1-SL_ST25

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 Gln Ala Tyr Pro His Lys Ile Leu Thr Gly Arg Arg Asp Lys Ile Gly
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 His Asp Val Leu Gly Leu Ile Thr Thr Leu Lys Asn Met Arg Asp Leu
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 Lys Gly Pro Gln Phe Leu His Ile Met Thr Lys Lys Gly Arg Gly Tyr
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 Asp Pro Ser Ser Gly Cys Leu Pro Lys Ser Ser Gly Gly Leu Pro Ser
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 Tyr Ser Lys Ile Phe Gly Asp Trp Leu Cys Glu Thr Ala Ala Lys Asp
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GPL-B-0001EP2-prio-int-EP1-SL_ST25

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Ala Ile Asp Arg Ala Gly Ile Val Gly Ala Asp Gly Gln Thr His Gln
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Gly Ala Phe Asp Leu Ser Tyr Leu Arg Cys Ile Pro Glu Met Val Ile
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Pro Gln Gly Thr Gln Glu Glu Met Arg Ala Glu Leu Gly Leu Asp Ala
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GPL-B-0001EP2-prio-int-EP1-SL_ST25

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GPL-B-0001EP2-prio-int-EP1-SL_ST25

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GPL-B-0001EP2-prio-int-EP1-SL_ST25

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GPL-B-0001EP2-prio-int-EP1-SL-ST25

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Xaa Glu Leu Arg Xaa Xaa Leu Leu Xaa Xaa Val Ser Xaa Ser Ser Gly
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His Phe Ala Ser Gly Leu Gly Xaa Val Glu Leu Thr Val Ala Xaa His
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Tyr Val Tyr Xaa Thr Pro Phe Asp Xaa Xaa Xaa Trp Asp Val Gly His
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Gln Ala Tyr Pro His Lys Ile Leu Thr Gly Arg Arg Asp Xaa Ile Xaa
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Xaa Ile Arg Gln Lys Xaa Gly Xaa His Pro Phe Pro Trp Arg Xaa Glu
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GPL-B-0001EP2-prio-int-EP1-SL_ST25

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Lys Xaa Pro Gln Xaa Leu His Xaa Met Thr Lys Lys Gly Xaa Gly Tyr
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Xaa Pro Ala Glu Xaa Asp Pro Ile Xaa Xaa His Ala Val Pro Lys Phe
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GPL-B-0001EP2-prio-int-EP1-SL-ST25

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GPL-B-0001EP2-prio-int-EP1-SL_ST25

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Asp Xaa Xaa Xaa Trp Asp Val Gly His Gln Xaa Tyr Xaa His Lys Ile
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Xaa Xaa Met Val Ala Thr Xaa Xaa Ala Ile Asp Asp Xaa Pro Ser Cys
465 470 475 480

Phe Xaa Xaa Pro Arg Gly Asn Gly Xaa Gly Xaa Xaa Leu Xaa Xaa Xaa
485 490 495

Xaa Xaa Xaa Xaa Xaa Xaa Lys Gly Xaa Pro Xaa Glu Xaa Gly Xaa Gly
500 505 510

Xaa Xaa Xaa Xaa Xaa Gly Xaa Xaa Val Xaa Leu Xaa Xaa Tyr Gly Xaa
515 520 525

Xaa Val Xaa Xaa Xaa Xaa Xaa Ala Xaa Xaa Xaa Leu Glx Xaa Xaa Xaa
530 535 540

Xaa Xaa Xaa Thr Val Xaa Asp Ala Arg Phe Cys Lys Pro Leu Asp Xaa
545 550 555 560

Xaa Leu Xaa Arg Xaa Xaa Ala Xaa Xaa His Xaa Val Xaa Xaa Xaa Xaa
565 570 575

Glu Glu Gly Xaa Xaa Gly Gly Phe Xaa Xaa His Val Xaa Xaa Phe Leu
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Xaa Leu Xaa Gly Xaa Leu Asp Gly Xaa Xaa Lys Xaa Xaa Pro Met Xaa
595 600 605

Xaa Pro Asp Xaa Xaa Ile Xaa His Gly Xaa Xaa Xaa Asp Gln Xaa Xaa
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Xaa Ala Gly Leu Xaa Xaa Xaa His Ile Ala Xaa Xaa Xaa Xaa Xaa Xaa

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Xaa Gly Xaa Xaa Xaa Xaa Ala Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
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Xaa

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GPL-B-0001EP2-prio-int-EP1-SL_ST25

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