

eolf-seq1
SEQUENCE LISTING

<110> Novozymes A/S
 <120> Improved protein bio-availability of palm kernel cake using milder expeller conditions
 <130> 12964-WO-PCT
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 <170> PatentIn version 3.5
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 <212> PRT
 <213> Talaromyces leycettanus

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 <222> (18)..(431)

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Pro  Thr  Thr  Cys  Asn  Pro  Gly  Trp  Ser  Cys  Gln  Tyr  Leu  Asn  Pro  Tyr
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Thr  Ser  Thr  Gln  Gly  Gly  Ser  Ser  Ser  Thr  Ser  Ile  Pro  Ser  Lys  Asn
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Asn  Thr  Tyr  Trp  Leu  Pro  Phe  Leu  Thr  Asn  Asn  Ala  Asp  Val  Asp  Leu
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Gly  Phe  Asn  Asp  Val  Asn  Thr  Gln  Pro  Gly  Ser  Gly  Thr  Val  Trp  Phe
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Gln Leu Leu Gln Asn Gly Gln Ala Thr Ile Asn Thr Gly Ala Asn Gly
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Leu Gln Arg Leu Asp Tyr Val Val Gln Ser Ala Glu Ala His Asp Ile
160 165 170 175

Lys Leu Ile Ile Asn Phe Val Asn Asn Trp Asn Asp Tyr Gly Gly Ile
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Asn Ala Tyr Val Asn Asn Tyr Gly Gly Asn Ala Thr Thr Trp Tyr Thr
195 200 205

Asn Ser Ala Ala Gln Ala Ala Tyr Arg Asn Tyr Ile Lys Ala Val Ile
210 215 220

Ser Arg Tyr Ile Gly Ser Pro Ala Ile Phe Ala Trp Glu Leu Ala Asn
225 230 235

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

Cys Ile Gly Asp Glu Gly Met Gly Leu Thr Thr Gly Ser Asp Gly Ser
275 280 285

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

Thr Asn Gly Ile Ala Ala Asp Ser Phe Trp Gln Tyr Gly Asp Thr Leu
370 375 380

Ser Thr Gly Gln Ser Pro Asn Asp Gly Tyr Thr Ile Tyr Tyr Gly Ser
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Ser Gln Val His Leu Asp Leu Leu Arg Ala Gly Val Ile Gly Glu Tyr
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His Gly Leu Asn Asp Phe Asn Leu Arg Trp Ile Ala Ala Ala Asn Trp
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Thr Tyr Thr Ser Gln Pro Ile Lys Gly Leu Leu Asp Asn Tyr Asp Ser
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Thr Trp Leu Val Phe Asp Gly Leu Asp Thr Phe Ala Thr Ile Ser Phe
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Cys Gly Gln Gln Ile Ala Ser Thr Asp Asn Gln Phe Arg Gln Tyr Ala
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Phe Asp Val Ser Thr Ala Leu Gly Ser Cys Lys Gly Asp Pro Val Leu
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Ser Ile Asn Phe Gly Ser Ala Pro Asn Ile Val Asp Ala Ile Ala Gln
 125 130 135

Asp Ser Asn Ser Gln Lys Trp Pro Asp Asp Val Gln Leu Thr Tyr Glu
 140 145 150 155

Tyr Pro Asn Arg Trp Phe Met Arg Lys Glu Gln Ser Asp Phe Gly Trp
 160 165 170

Asp Trp Gly Pro Ala Phe Ala Pro Ala Gly Pro Trp Lys Pro Ala Tyr
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Leu Asp Ile Tyr Arg Lys Gly Gln Ile Asn Tyr Leu Pro Pro Asp Gln
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Ser Gln Pro Trp Val Val Asn Ala Ser Ile Asp Ile Leu Gly Pro Leu
220 225 230 235

Pro Thr Lys Pro Thr Met Ser Ile Glu Val Arg Asp Thr His Ser Gly
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Thr Ile Leu Thr Ser Arg Thr Leu Asn Asn Val Ser Val Ala Gly Asn
255 260 265

Ala Ile Thr Gly Val Thr Val Leu Asp Gly Leu Thr Pro Lys Leu Trp
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Trp Pro Gln Gly Leu Gly Asp Gln Asn Leu Tyr Asn Val Ser Ile Thr
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Val Gln Ser Arg Gly Asn Gln Thr Val Ala Ser Val Asn Lys Arg Thr
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Arg Ala Gln Gly Ile Ala Pro Gly Ala Asn Trp His Phe Glu Val Asn
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Gly His Glu Phe Tyr Ala Lys Gly Ser Asn Leu Ile Pro Pro Asp Ser
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Phe Trp Thr Arg Val Thr Glu Glu Lys Met Ser Arg Leu Phe Asp Ala
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Val Val Val Gly Asn Gln Asn Met Leu Arg Val Trp Ser Ser Gly Ala
380 385 390 395

Tyr Leu His Asp Tyr Ile Tyr Asp Leu Ala Asp Glu Lys Gly Ile Leu
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Leu Trp Ser Glu Phe Glu Phe Ser Asp Ala Leu Tyr Pro Ser Asp Asp
415 420 425

Ala Phe Leu Glu Asn Val Ala Ala Glu Ile Val Tyr Asn Val Arg Arg
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Val Asn His His Pro Ser Leu Ala Leu Trp Ala Gly Gly Asn Glu Ile
445 450 455

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Glu Ser Leu Met Leu Pro Arg Val Lys Asp Ala Ala Pro Ser Ser Tyr
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 Ser Tyr Tyr Val Gly Glu Tyr Glu Lys Met Tyr Ile Ser Leu Phe Leu
 480 485 490
 Pro Leu Val Tyr Glu Asn Thr Arg Ser Ile Ser Tyr Ser Pro Ser Ser
 495 500 505
 Thr Thr Glu Gly Tyr Leu Tyr Ile Asp Leu Ser Ala Pro Val Pro Met
 510 515 520
 Ala Glu Arg Tyr Asp Asn Thr Thr Ser Gly Ser Tyr Tyr Gly Asp Thr
 525 530 535
 Asp His Tyr Asp Tyr Asp Thr Ser Val Ala Phe Asp Tyr Gly Ser Tyr
 540 545 550 555
 Pro Val Gly Arg Phe Ala Asn Glu Phe Gly Phe His Ser Met Pro Ser
 560 565 570
 Leu Gln Thr Trp Gln Gln Ala Val Asp Thr Glu Asp Leu Tyr Phe Asn
 575 580 585
 Ser Ser Val Val Met Leu Arg Asn His His Asp Pro Ala Gly Gly Leu
 590 595 600
 Met Thr Asp Asn Tyr Ala Asn Ser Ala Thr Gly Met Gly Glu Met Thr
 605 610 615
 Met Gly Val Val Ser Tyr Tyr Pro Ile Pro Ser Lys Ser Asp His Ile
 620 625 630 635
 Ser Asn Phe Ser Ala Trp Cys His Ala Thr Gln Leu Phe Gln Ala Asp
 640 645 650
 Met Tyr Lys Ser Gln Ile Gln Phe Tyr Arg Arg Gly Ser Gly Met Pro
 655 660 665
 Glu Arg Gln Leu Gly Ser Leu Tyr Trp Gln Leu Glu Asp Ile Trp Gln
 670 675 680
 Ala Pro Ser Trp Ala Gly Ile Glu Tyr Gly Gly Arg Trp Lys Val Leu
 685 690 695
 His His Val Met Arg Asp Ile Tyr Gln Pro Val Ile Val Ser Pro Phe
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 Trp Asn Tyr Thr Thr Gly Ser Leu Asp Val Tyr Val Thr Ser Asp Leu
 720 725 730

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Trp Ser Pro Ala Ala Gly Thr Val Asp Leu Thr Trp Leu Asp Leu Ser
735 740 745

Gly Arg Pro Ile Ala Gly Asn Ala Gly Thr Pro Lys Ser Val Pro Phe
750 755 760

Thr Val Gly Gly Leu Asn Ser Thr Arg Ile Tyr Gly Thr Asn Val Ser
765 770 775

Ser Leu Gly Leu Pro Asp Thr Lys Asp Ala Val Leu Ile Leu Ser Leu
780 785 790 795

Ser Ala His Gly Arg Leu Pro Asn Ser Asp Arg Thr Thr Asn Leu Thr
800 805 810

His Glu Asn Tyr Ala Thr Leu Ser Trp Pro Lys Asp Leu Lys Ile Val
815 820 825

Asp Pro Gly Leu Lys Ile Gly His Ser Ser Lys Lys Thr Thr Val Thr
830 835 840

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 15 20 25
 Ile Gly Phe Leu Thr Asp Asn Ser Asp Val Asp Leu Val Met Ser His
 30 35 40 45
 Leu Lys Ser Ser Gly Leu Lys Ile Leu Arg Val Trp Gly Phe Asn Asp
 50 55 60
 Val Thr Ser Gln Pro Ser Ser Gly Thr Val Trp Tyr Gln Leu His Gln
 65 70 75
 Asp Gly Lys Ser Thr Ile Asn Thr Gly Ala Asp Gly Leu Gln Arg Leu
 80 85 90
 Asp Tyr Val Val Ser Ser Ala Glu Gln His Asp Ile Lys Leu Ile Ile
 95 100 105
 Asn Phe Val Asn Tyr Trp Thr Asp Tyr Gly Gly Met Ser Ala Tyr Val
 110 115 120 125
 Ser Ala Tyr Gly Gly Ser Asp Glu Thr Asp Phe Tyr Thr Ser Asp Thr
 130 135 140
 Ile Gln Ser Ala Tyr Gln Thr Tyr Ile Lys Thr Val Val Glu Arg Tyr
 145 150 155
 Ser Asn Ser Ser Ala Val Phe Ala Trp Glu Leu Ala Asn Glu Pro Arg
 160 165 170
 Cys Pro Ser Cys Asp Thr Ser Val Leu Tyr Asn Trp Ile Glu Lys Thr
 175 180 185
 Ser Lys Phe Ile Lys Gly Leu Asp Ala Asp His Met Val Cys Ile Gly
 190 195 200 205
 Asp Glu Gly Phe Gly Leu Asn Ile Asp Ser Asp Gly Ser Tyr Pro Tyr
 210 215 220
 Gln Phe Ser Glu Gly Leu Asn Phe Thr Met Asn Leu Gly Ile Asp Thr
 225 230 235
 Ile Asp Phe Gly Thr Leu His Leu Tyr Pro Asp Ser Trp Gly Thr Ser
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Ala 270 Ala Gly Lys Pro Cys 275 Leu Leu Glu Glu Tyr 280 Gly Val Thr Ser Asn 285

His Cys Ser Val Glu 290 Ser Pro Trp Gln Lys 295 Thr Ala Leu Asn Thr 300 Thr

Gly Val Gly Ala 305 Asp Leu Phe Trp Gln 310 Tyr Gly Asp Asp Leu 315 Ser Thr

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Tyr Glu 335 Cys Leu Val Thr Asp 340 His Val Ala Ala Ile 345 Gly Ser Ala

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Asn Cys 50 Tyr Thr Gly Asn Thr 55 Trp Asp Ala Thr Leu 60 Cys Pro Asp Asp

Val Thr Cys Ala Ala Asn 70 Cys Ala Leu Asp Gly 75 Ala Asp Tyr Ser Gly 80

Thr Tyr Gly Val Thr 85 Thr Ser Gly Asn Ser 90 Leu Arg Leu Asn Phe 95 Val

Thr Gln Ala Ser 100 Gln Lys Asn Val Gly 105 Ser Arg Leu Tyr Leu 110 Met Glu

Asn Asp Thr 115 Thr Tyr Gln Ile Phe 120 Lys Leu Leu Asn Gln 125 Glu Phe Thr

Phe Asp 130 Val Asp Val Ser Asn 135 Leu Pro Cys Gly Leu 140 Asn Gly Ala Leu

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Tyr Leu Val Ala Met Asp Ala Asp Gly Gly Met Ala Lys Tyr Pro Thr
 145 150 155 160

Asn Lys Ala Gly Ala Lys Tyr Gly Thr Gly Tyr Cys Asp Ser Gln Cys
 165 170 175

Pro Arg Asp Leu Lys Phe Ile Asn Gly Glu Ala Asn Val Glu Gly Trp
 180 185 190

Gln Pro Ser Ser Asn Asp Pro Asn Ser Gly Ile Gly Asn His Gly Ser
 195 200 205

Cys Cys Ala Glu Met Asp Ile Trp Glu Ala Asn Ser Ile Ser Asn Ala
 210 215 220

Val Thr Pro His Pro Cys Asp Thr Pro Gly Gln Val Met Cys Thr Gly
 225 230 235 240

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

Asp Pro Asp Gly Cys Asp Phe Asn Pro Tyr Arg Met Gly Asn His Ser
 260 265 270

Phe Tyr Gly Pro Lys Gln Ile Val Asp Thr Ser Ser Lys Phe Thr Val
 275 280 285

Val Thr Gln Phe Leu Thr Asp Asp Gly Thr Ser Thr Gly Thr Leu Ser
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Glu Ile Arg Arg Phe Tyr Val Gln Asn Gly Gln Val Ile Pro Asn Ser
 305 310 315 320

Val Ser Thr Ile Ser Gly Val Ser Gly Asn Ser Ile Thr Thr Glu Phe
 325 330 335

Cys Thr Ala Gln Lys Gln Ala Phe Gly Asp Thr Asp Asp Phe Ser Lys
 340 345 350

His Gly Gly Leu Ser Gly Met Ser Ala Ala Leu Ser Gln Gly Met Val
 355 360 365

Leu Val Met Ser Leu Trp Asp Asp His Ala Ala Asn Met Leu Trp Leu
 370 375 380

Asp Ser Thr Tyr Pro Thr Asn Ala Thr Ser Ser Thr Pro Gly Ala Ala
 385 390 395 400

Arg Gly Thr Cys Asp Ile Ser Ser Gly Val Pro Ala Asp Val Glu Ser
 405 410 415

Asn Asp Pro Asn Ala Tyr Val Val Tyr Ser Asn Ile Lys Val Gly Pro
 420 425 430

Ile Gly Ser Thr Phe Ser Ser Ser Gly Ser Gly Ser Ser Ser Ser Ser
 435 440 445

Ser Thr Thr Thr Thr Thr Thr Ala Ser Pro Thr Thr Thr Thr Ser Ser
 450 455 460

Ala Ser Ser Thr Gly Thr Gly Val Ala Gln His Trp Gly Gln Cys Gly
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 35 40 45

Thr Thr Thr Ser Ser Lys Ser Ser Thr Thr Thr Ser Ser Lys Ser Ser
 50 55 60

Thr Thr Thr Gly Gly Ser Gly Gly Gly Thr Thr Thr Ser Thr Ser Ala
 65 70 75 80

Thr Ile Thr Ala Ala Pro Ser Gly Asn Pro Tyr Ser Gly Tyr Gln Leu
 85 90 95

Tyr Val Asn Gln Glu Tyr Ser Ser Glu Val Tyr Ala Ser Ala Ile Pro
 100 105 110

Ser Leu Thr Gly Thr Leu Val Ala Lys Ala Ser Ala Ala Ala Glu Val
 115 120 125

Pro Ser Phe Leu Trp Leu Asp Thr Ala Ser Lys Val Pro Leu Met Gly
 130 135 140

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

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420

425

430

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<212> PRT

<213> Aspergillus fumigatus

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Trp Glu Met Asp Arg Cys Val Gly Gln Thr Gly Ser Val Pro Arg Leu
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Gly Ile Asn Trp Gly Leu Cys Gly Gln Asp Ser Pro Leu Gly Ile Arg
65 70 75 80

Asp Ser Asp Leu Asn Ser Ala Phe Pro Ala Gly Thr Asn Val Ala Ala
85 90 95

Thr Trp Asp Lys Thr Leu Ala Tyr Leu Arg Gly Lys Ala Met Gly Glu
100 105 110

Glu Phe Asn Asp Lys Gly Val Asp Ile Leu Leu Gly Pro Ala Ala Gly
115 120 125

Pro Leu Gly Lys Tyr Pro Asp Gly Gly Arg Ile Trp Glu Gly Phe Ser
130 135 140

Pro Asp Pro Val Leu Thr Gly Val Leu Phe Ala Glu Thr Ile Lys Gly
145 150 155 160

Ile Gln Asp Ala Gly Val Ile Ala Thr Ala Lys His Tyr Ile Leu Asn
165 170 175

Glu Gln Glu His Phe Arg Gln Val Gly Glu Ala Gln Gly Tyr Gly Tyr
180 185 190

Asn Ile Thr Glu Thr Ile Ser Ser Asn Val Asp Asp Lys Thr Met His
195 200 205

Glu Leu Tyr Leu Trp Pro Phe Ala Asp Ala Val Arg Ala Gly Val Gly
210 215 220

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Ala Val Met Cys Ser Tyr Asn Gln Ile Asn Asn Ser Tyr Gly Cys Gln
225 230 235 240

Asn Ser Gln Thr Leu Asn Lys Leu Leu Lys Ala Glu Leu Gly Phe Gln
245 250 255

Gly Phe Val Met Ser Asp Trp Gly Ala His His Ser Gly Val Gly Ala
260 265 270

Ala Leu Ala Gly Leu Asp Met Ser Met Pro Gly Asp Ile Ser Phe Asp
275 280 285

Asp Gly Leu Ser Phe Trp Gly Thr Asn Leu Thr Val Ser Val Leu Asn
290 295 300

Gly Thr Val Pro Ala Trp Arg Val Asp Asp Met Ala Val Arg Ile Met
305 310 315 320

Thr Ala Tyr Tyr Lys Val Gly Arg Asp Arg Leu Arg Ile Pro Pro Asn
325 330 335

Phe Ser Ser Trp Thr Arg Asp Glu Tyr Gly Trp Glu His Ser Ala Val
340 345 350

Ser Glu Gly Ala Trp Thr Lys Val Asn Asp Phe Val Asn Val Gln Arg
355 360 365

Ser His Ser Gln Ile Ile Arg Glu Ile Gly Ala Ala Ser Thr Val Leu
370 375 380

Leu Lys Asn Thr Gly Ala Leu Pro Leu Thr Gly Lys Glu Val Lys Val
385 390 395 400

Gly Val Leu Gly Glu Asp Ala Gly Ser Asn Pro Trp Gly Ala Asn Gly
405 410 415

Cys Pro Asp Arg Gly Cys Asp Asn Gly Thr Leu Ala Met Ala Trp Gly
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Ser Gly Thr Ala Glu Phe Pro Tyr Leu Val Thr Pro Glu Gln Ala Ile
435 440 445

Gln Arg Glu Val Ile Ser Asn Gly Gly Asn Val Phe Ala Val Thr Asp
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Asn Gly Ala Leu Ser Gln Met Ala Asp Val Ala Ser Gln Ser Ser Val
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Ser Leu Val Phe Val Asn Ala Asp Ser Gly Glu Gly Tyr Ile Ser Val
485 490 495

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 Glu Ala Val Ile Asp Thr Val Val Ser His Cys Asn Asn Thr Ile Val
 515 520 525
 Val Ile His Ser Val Gly Pro Val Leu Ile Asp Arg Trp Tyr Asp Asn
 530 535 540
 Pro Asn Val Thr Ala Ile Ile Trp Ala Gly Leu Pro Gly Gln Glu Ser
 545 550 555 560
 Gly Asn Ser Leu Val Asp Val Leu Tyr Gly Arg Val Asn Pro Ser Ala
 565 570 575
 Lys Thr Pro Phe Thr Trp Gly Lys Thr Arg Glu Ser Tyr Gly Ala Pro
 580 585 590
 Leu Leu Thr Glu Pro Asn Asn Gly Asn Gly Ala Pro Gln Asp Asp Phe
 595 600 605
 Asn Glu Gly Val Phe Ile Asp Tyr Arg His Phe Asp Lys Arg Asn Glu
 610 615 620
 Thr Pro Ile Tyr Glu Phe Gly His Gly Leu Ser Tyr Thr Thr Phe Gly
 625 630 635 640
 Tyr Ser His Leu Arg Val Gln Ala Leu Asn Ser Ser Ser Ser Ala Tyr
 645 650 655
 Val Pro Thr Ser Gly Glu Thr Lys Pro Ala Pro Thr Tyr Gly Glu Ile
 660 665 670
 Gly Ser Ala Ala Asp Tyr Leu Tyr Pro Glu Gly Leu Lys Arg Ile Thr
 675 680 685
 Lys Phe Ile Tyr Pro Trp Leu Asn Ser Thr Asp Leu Glu Asp Ser Ser
 690 695 700
 Asp Asp Pro Asn Tyr Gly Trp Glu Asp Ser Glu Tyr Ile Pro Glu Gly
 705 710 715 720
 Ala Arg Asp Gly Ser Pro Gln Pro Leu Leu Lys Ala Gly Gly Ala Pro
 725 730 735
 Gly Gly Asn Pro Thr Leu Tyr Gln Asp Leu Val Arg Val Ser Ala Thr
 740 745 750
 Ile Thr Asn Thr Gly Asn Val Ala Gly Tyr Glu Val Pro Gln Leu Tyr
 755 760 765

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Val Ser Leu Gly Gly Pro Asn Glu Pro Arg Val Val Leu Arg Lys Phe
770 775 780

Asp Arg Ile Phe Leu Ala Pro Gly Glu Gln Lys Val Trp Thr Thr Thr
785 790 795 800

Leu Asn Arg Arg Asp Leu Ala Asn Trp Asp Val Glu Ala Gln Asp Trp
805 810 815

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

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

Leu Thr Ala Pro Val Ala Ala Gly Gly Thr Val Glu Leu Gln Trp Thr
65 70 75 80

Pro Trp Pro Asp Ser His His Gly Pro Val Ile Thr Tyr Leu Ala Pro
85 90 95

Cys Asn Gly Asn Cys Ser Thr Val Asp Lys Thr Thr Leu Glu Phe Phe
100 105 110

Lys Ile Asp Gln Gln Gly Leu Ile Asp Asp Thr Ser Pro Pro Gly Thr
115 120 125

Trp Ala Ser Asp Asn Leu Ile Ala Asn Asn Asn Ser Trp Thr Val Thr
130 135 140

Ile Pro Asn Ser Val Ala Pro Gly Asn Tyr Val Leu Arg His Glu Ile
145 150 155 160

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Ile Ala Leu His Ser Ala Asn Asn Lys Asp Gly Ala Gln Asn Tyr Pro
165 170 175

Gln Cys Ile Asn Ile Glu Val Thr Gly Gly Gly Ser Asp Ala Pro Glu
180 185 190

Gly Thr Leu Gly Glu Asp Leu Tyr His Asp Thr Asp Pro Gly Ile Leu
195 200 205

Val Asp Ile Tyr Glu Pro Ile Ala Thr Tyr Thr Ile Pro Gly Pro Pro
210 215 220

Glu Pro Thr Phe
225