SEQUENCE LISTING

<110> ONCOTHERAPY SCIENCE, INC.
THE UNIVERSITY OF TOKYO
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<120> PEPTIDE VACCINES FOR CANCERS EXPRESSING MPHOSPH1 OR DEPDC1 POLYPEPTIDES

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<160> 255

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tgacacaggc atgcaatgtg aaatacgtgt atcatggaga atgaggtatc catcccctca   6025

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Phe Ser Ala Asp Pro Ile Ala Arg Pro Ser Glu Ile Asn Phe Asp Gly
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Ile Lys Leu Asp Leu Ser His Glu Phe Ser Leu Val Ala Pro Asn Thr
        35                  40                  45

Glu Ala Asn Ser Phe Glu Ser Lys Asp Tyr Leu Gln Val Cys Leu Arg
    50                  55                  60
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Ile Arg Pro Phe Thr Gln Ser Glu Lys Glu Leu Glu Ser Glu Gly Cys
65 70 75 80

Val His Ile Leu Asp Ser Gln Thr Val Val Leu Lys Glu Pro Gln Cys
85 90 95

Ile Leu Gly Arg Leu Ser Glu Lys Ser Ser Gly Gln Met Ala Gln Lys
100 105 110

Phe Ser Phe Ser Lys Val Phe Gly Pro Ala Thr Thr Gln Lys Glu Phe
115 120 125

Phe Gln Gly Cys Ile Met Gln Pro Val Lys Asp Leu Leu Lys Gly Gln
130 135 140

Ser Arg Leu Ile Phe Thr Tyr Gly Leu Thr Asn Ser Gly Lys Thr Tyr
145 150 155 160

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

Asn Val Leu Phe Asp Ser Leu Gln Glu Arg Leu Tyr Thr Lys Met Asn
180 185 190

Leu Lys Pro His Arg Ser Arg Glu Tyr Leu Arg Leu Ser Ser Glu Gln
195 200 205

Glu Lys Glu Glu Ile Ala Ser Lys Ser Ala Leu Leu Arg Gln Ile Lys
210 215 220

Glu Val Thr Val His Asn Asp Ser Asp Asp Thr Leu Tyr Gly Ser Leu
225 230 235 240

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

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

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

Pro Val Ser Ser Lys Phe Gln Lys Arg Lys Met Leu Arg Leu Ser Gln
290 295 300

Asp Val Lys Gly Tyr Ser Phe Ile Lys Asp Leu Gln Trp Ile Gln Val
305 310 315 320

Ser Asp Ser Lys Glu Ala Tyr Arg Leu Leu Lys Leu Gly Ile Lys His
325 330 335

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

Ser Ile Phe Thr Val Lys Ile Leu Gln Ile Glu Asp Ser Glu Met Ser
355 360 365

Arg Val Ile Arg Val Ser Glu Leu Ser Leu Cys Asp Leu Ala Gly Ser
370 375 380

Glu Arg Thr Met Lys Thr Gln Asn Glu Gly Glu Arg Leu Arg Glu Thr
385 390 395 400

Gly Asn Ile Asn Thr Ser Leu Leu Thr Leu Gly Lys Cys Ile Asn Val
405 410 415

Leu Lys Asn Ser Glu Lys Ser Lys Phe Gln Gln His Val Pro Phe Arg
420 425 430

Glu Ser Lys Leu Thr His Tyr Phe Gln Ser Phe Phe Asn Gly Lys Gly
435 440 445

Lys Ile Cys Met Ile Val Asn Ile Ser Gln Cys Tyr Leu Ala Tyr Asp
450 455 460

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

Val Pro Asp Thr Leu Asn Ser Ser Gln Glu Lys Leu Phe Gly Pro Val
485 490 495

Lys Ser Ser Gln Asp Val Ser Leu Asp Ser Asn Ser Asn Ser Lys Ile
500 505 510

Leu Asn Val Lys Arg Ala Thr Ile Ser Trp Glu Asn Ser Leu Glu Asp
515 520 525

Leu Met Glu Asp Glu Asp Leu Val Glu Glu Leu Glu Asn Ala Glu Glu
530 535 540

Thr Gln Asn Val Glu Thr Lys Leu Leu Asp Glu Asp Leu Asp Lys Thr
545 550 555 560

Leu Glu Glu Asn Lys Ala Phe Ile Ser His Glu Glu Lys Arg Lys Leu
565 570 575

Leu Asp Leu Ile Glu Asp Leu Lys Lys Lys Leu Ile Asn Glu Lys Lys
580 585 590

Glu Lys Leu Thr Leu Glu Phe Lys Ile Arg Glu Glu Val Thr Gln Glu
595 600 605

Phe Thr Gln Tyr Trp Ala Gln Arg Glu Ala Asp Phe Lys Glu Thr Leu
610 615 620

Leu Gln Glu Arg Glu Ile Leu Glu Glu Asn Ala Glu Arg Arg Leu Ala
625 630 635 640

Ile Phe Lys Asp Leu Val Gly Lys Cys Asp Thr Arg Glu Glu Ala Ala
645 650 655

Lys Asp Ile Cys Ala Thr Lys Val Glu Thr Glu Glu Ala Thr Ala Cys
660 665 670

Leu Glu Leu Lys Phe Asn Gln Ile Lys Ala Glu Leu Ala Lys Thr Lys
675 680 685

Gly Glu Leu Ile Lys Thr Lys Glu Glu Leu Lys Lys Arg Glu Asn Glu
690 695 700

Ser Asp Ser Leu Ile Gln Glu Leu Glu Thr Ser Asn Lys Lys Ile Ile
705 710 715 720

Thr Gln Asn Gln Arg Ile Lys Glu Leu Ile Asn Ile Ile Asp Gln Lys
725 730 735

Glu Asp Thr Ile Asn Glu Phe Gln Asn Leu Lys Ser His Met Glu Asn
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Thr Phe Lys Cys Asn Asp Lys Ala Asp Thr Ser Ser Leu Ile Ile Asn
755 760 765

Asn Lys Leu Ile Cys Asn Glu Thr Val Glu Val Pro Lys Asp Ser Lys
770 775 780

Ser Lys Ile Cys Ser Glu Arg Lys Arg Val Asn Glu Asn Glu Leu Gln
785 790 795 800

Gln Asp Glu Pro Pro Ala Lys Lys Gly Ser Ile His Val Ser Ser Ala
805 810 815

Ile Thr Glu Asp Gln Lys Lys Ser Glu Glu Val Arg Pro Asn Ile Ala
820 825 830

Glu Ile Glu Asp Ile Arg Val Leu Gln Glu Asn Asn Glu Gly Leu Arg
835 840 845

Ala Phe Leu Leu Thr Ile Glu Asn Glu Leu Lys Asn Glu Lys Glu Glu
850 855 860

Lys Ala Glu Leu Asn Lys Gln Ile Val His Phe Gln Gln Glu Leu Ser
865 870 875 880

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

Gln Ser Asn Tyr Asp Ile Ala Ile Ala Glu Leu His Val Gln Lys Ser
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Lys Asn Gln Glu Gln Glu Glu Lys Ile Met Lys Leu Ser Asn Glu Ile
        915                 920                 925

Glu Thr Ala Thr Arg Ser Ile Thr Asn Asn Val Ser Gln Ile Lys Leu
    930                 935                 940

Met His Thr Lys Ile Asp Glu Leu Arg Thr Leu Asp Ser Val Ser Gln
945                 950                 955                 960

Ile Ser Asn Ile Asp Leu Leu Asn Leu Arg Asp Leu Ser Asn Gly Ser
                965                 970                 975

Glu Glu Asp Asn Leu Pro Asn Thr Gln Leu Asp Leu Leu Gly Asn Asp
            980                 985                 990

Tyr Leu Val Ser Lys Gln Val Lys  Glu Tyr Arg Ile Gln  Glu Pro Asn
        995                 1000                1005

Arg Glu  Asn Ser Phe His Ser  Ser Ile Glu Ala Ile  Trp Glu Glu
    1010                1015                1020

Cys Lys  Glu Ile Val Lys Ala  Ser Ser Lys Lys Ser  His Gln Ile
    1025                1030                1035

Glu Glu  Leu Glu Gln Gln Ile  Glu Lys Leu Gln Ala  Glu Val Lys
    1040                1045                1050

Gly Tyr  Lys Asp Glu Asn Asn  Arg Leu Lys Glu Lys  Glu His Lys
    1055                1060                1065

Asn Gln  Asp Asp Leu Leu Lys  Glu Lys Glu Thr Leu  Ile Gln Gln
    1070                1075                1080

Leu Lys  Glu Glu Leu Gln Glu  Lys Asn Val Thr Leu  Asp Val Gln
    1085                1090                1095

Ile Gln  His Val Val Glu Gly  Lys Arg Ala Leu Ser  Glu Leu Thr
    1100                1105                1110

Gln Gly  Val Thr Cys Tyr Lys  Ala Lys Ile Lys Glu  Leu Glu Thr
    1115                1120                1125

Ile Leu  Glu Thr Gln Lys Val  Glu Cys Ser His Ser  Ala Lys Leu
    1130                1135                1140
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Glu Gln Asp Ile Leu Glu Lys Glu Ser Ile Ile Leu Lys Leu Glu
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Arg Asn Leu Lys Glu Phe Gln Glu His Leu Gln Asp Ser Val Lys
1160                1165                1170

Asn Thr Lys Asp Leu Asn Val Lys Glu Leu Lys Leu Lys Glu Glu
1175                1180                1185

Ile Thr Gln Leu Thr Asn Asn Leu Gln Asp Met Lys His Leu Leu
1190                1195                1200

Gln Leu Lys Glu Glu Glu Glu Glu Thr Asn Arg Gln Glu Thr Glu
1205                1210                1215

Lys Leu Lys Glu Glu Leu Ser Ala Ser Ser Ala Arg Thr Gln Asn
1220                1225                1230

Leu Lys Ala Asp Leu Gln Arg Lys Glu Glu Asp Tyr Ala Asp Leu
1235                1240                1245

Lys Glu Lys Leu Thr Asp Ala Lys Lys Gln Ile Lys Gln Val Gln
1250                1255                1260

Lys Glu Val Ser Val Met Arg Asp Glu Asp Lys Leu Leu Arg Ile
1265                1270                1275

Lys Ile Asn Glu Leu Glu Lys Lys Lys Asn Gln Cys Ser Gln Glu
1280                1285                1290

Leu Asp Met Lys Gln Arg Thr Ile Gln Gln Leu Lys Glu Gln Leu
1295                1300                1305

Asn Asn Gln Lys Val Glu Glu Ala Ile Gln Gln Tyr Glu Arg Ala
1310                1315                1320

Cys Lys Asp Leu Asn Val Lys Glu Lys Ile Ile Glu Asp Met Arg
1325                1330                1335

Met Thr Leu Glu Glu Gln Glu Gln Thr Gln Val Glu Gln Asp Gln
1340                1345                1350

Val Leu Glu Ala Lys Leu Glu Glu Val Glu Arg Leu Ala Thr Glu
1355                1360                1365

Leu Glu Lys Trp Lys Glu Lys Cys Asn Asp Leu Glu Thr Lys Asn
1370                1375                1380

Asn Gln Arg Ser Asn Lys Glu His Glu Asn Asn Thr Asp Val Leu
1385                1390                1395
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Gly Lys Leu Thr Asn Leu Gln Asp Glu Leu Gln Glu Ser Glu Gln
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1415 1420 1425

Leu Ile Thr Gln Ala Lys Glu Ala Glu Asn Ile Arg Asn Lys Glu
1430 1435 1440

Met Lys Lys Tyr Ala Glu Asp Arg Glu Arg Phe Phe Lys Gln Gln
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Asn Glu Met Glu Ile Leu Thr Ala Gln Leu Thr Glu Lys Asp Ser
1460 1465 1470

Asp Leu Gln Lys Trp Arg Glu Glu Arg Asp Gln Leu Val Ala Ala
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Leu Glu Ile Gln Leu Lys Ala Leu Ile Ser Ser Asn Val Gln Lys
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Asp Asn Glu Ile Glu Gln Leu Lys Arg Ile Ile Ser Glu Thr Ser
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Lys Ile Glu Thr Gln Ile Met Asp Ile Lys Pro Lys Arg Ile Ser
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Ser Ala Asp Pro Asp Lys Leu Gln Thr Glu Pro Leu Ser Thr Ser
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Phe Glu Ile Ser Arg Asn Lys Ile Glu Asp Gly Ser Val Val Leu
1550 1555 1560

Asp Ser Cys Glu Val Ser Thr Glu Asn Asp Gln Ser Thr Arg Phe
1565 1570 1575

Pro Lys Pro Glu Leu Glu Ile Gln Phe Thr Pro Leu Gln Pro Asn
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Lys Met Ala Val Lys His Pro Gly Cys Thr Thr Pro Val Thr Val
1595 1600 1605

Lys Ile Pro Lys Ala Arg Lys Arg Lys Ser Asn Glu Met Glu Glu
1610 1615 1620

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1625 1630 1635

Asn Leu Lys Phe Pro Ile Ser Asp Asp Arg Asn Ser Ser Val Lys
1640 1645 1650

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Lys Glu  Gln Lys Val Ala Ile  Arg Pro Ser Ser Lys  Lys Thr Tyr
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Ser Leu  Arg Ser Gln Ala Ser  Ile Ile Gly Val Asn  Leu Ala Thr
    1670                 1675                 1680

Lys Lys  Lys Glu Gly Thr Leu  Gln Lys Phe Gly Asp  Phe Leu Gln
    1685                 1690                 1695

His Ser  Pro Ser Ile Leu Gln  Ser Lys Ala Lys Lys  Ile Ile Glu
    1700                 1705                 1710

Thr Met  Ser Ser Ser Lys Leu  Ser Asn Val Glu Ala  Ser Lys Glu
    1715                 1720                 1725

Asn Val  Ser Gln Pro Lys Arg  Ala Lys Arg Lys Leu  Tyr Thr Ser
    1730                 1735                 1740

Glu Ile  Ser Ser Pro Ile Asp  Ile Ser Gly Gln Val  Ile Leu Met
    1745                 1750                 1755

Asp Gln  Lys Met Lys Glu Ser  Asp His Gln Ile Ile  Lys Arg Arg
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Leu Arg  Thr Lys Thr Ala Lys
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                      Met Glu Ser Gln Gly Val Pro Pro Gly Pro Tyr
                      1               5                  10

cgg gcc acc aag ctg tgg aat gaa gtt acc aca tct ttt cga gca gga      159
Arg Ala Thr Lys Leu Trp Asn Glu Val Thr Thr Ser Phe Arg Ala Gly
            15                  20                  25

atg cct cta aga aaa cac aga caa cac ttt aaa aaa tat ggc aat tgt      207
Met Pro Leu Arg Lys His Arg Gln His Phe Lys Lys Tyr Gly Asn Cys
        30                  35                  40

ttc aca gca gga gaa gca gtg gat tgg ctt tat gac cta tta aga aat      255
Phe Thr Ala Gly Glu Ala Val Asp Trp Leu Tyr Asp Leu Leu Arg Asn
    45                  50                  55

aat agc aat ttt ggt cct gaa gtt aca agg caa cag act atc caa ctg      303
Asn Ser Asn Phe Gly Pro Glu Val Thr Arg Gln Gln Thr Ile Gln Leu
60                  65                  70                  75
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ttg agg aaa ttt ctt aag aat cat gta att gaa gat atc aaa ggg agg      351
Leu Arg Lys Phe Leu Lys Asn His Val Ile Glu Asp Ile Lys Gly Arg
                80                  85                  90

tgg gga tca gaa aat gtt gat gat aac aac cag ctc ttc aga ttt cct      399
Trp Gly Ser Glu Asn Val Asp Asp Asn Asn Gln Leu Phe Arg Phe Pro
            95                  100                 105

gca act tcg cca ctt aaa act cta cca cga agg tat cca gaa ttg aga      447
Ala Thr Ser Pro Leu Lys Thr Leu Pro Arg Arg Tyr Pro Glu Leu Arg
        110                 115                 120

aaa aac aac ata gag aac ttt tcc aaa gat aaa gat agc att ttt aaa      495
Lys Asn Asn Ile Glu Asn Phe Ser Lys Asp Lys Asp Ser Ile Phe Lys
    125                 130                 135

tta cga aac tta tct cgt aga act cct aaa agg cat gga tta cat tta      543
Leu Arg Asn Leu Ser Arg Arg Thr Pro Lys Arg His Gly Leu His Leu
140                 145                 150                 155

tct cag gaa aat ggc gag aaa ata aag cat gaa ata atc aat gaa gat      591
Ser Gln Glu Asn Gly Glu Lys Ile Lys His Glu Ile Ile Asn Glu Asp
                160                 165                 170

caa gaa aat gca att gat aat aga gaa cta agc cag gaa gat gtt gaa      639
Gln Glu Asn Ala Ile Asp Asn Arg Glu Leu Ser Gln Glu Asp Val Glu
            175                 180                 185

gaa gtt tgg aga tat gtt att ctg atc tac ctg caa acc att tta ggt      687
Glu Val Trp Arg Tyr Val Ile Leu Ile Tyr Leu Gln Thr Ile Leu Gly
        190                 195                 200

gtg cca tcc cta gaa gaa gtc ata aat cca aaa caa gta att ccc caa      735
Val Pro Ser Leu Glu Glu Val Ile Asn Pro Lys Gln Val Ile Pro Gln
    205                 210                 215

tat ata atg tac aac atg gcc aat aca agt aaa cgt gga gta gtt ata      783
Tyr Ile Met Tyr Asn Met Ala Asn Thr Ser Lys Arg Gly Val Val Ile
220                 225                 230                 235

cta caa aac aaa tca gat gac ctc cct cac tgg gta tta tct gcc atg      831
Leu Gln Asn Lys Ser Asp Asp Leu Pro His Trp Val Leu Ser Ala Met
                240                 245                 250

aag tgc cta gca aat tgg cca aga agc aat gat atg aat aat cca act      879
Lys Cys Leu Ala Asn Trp Pro Arg Ser Asn Asp Met Asn Asn Pro Thr
            255                 260                 265

tat gtt gga ttt gaa cga gat gta ttc aga aca atc gca gat tat ttt      927
Tyr Val Gly Phe Glu Arg Asp Val Phe Arg Thr Ile Ala Asp Tyr Phe
        270                 275                 280

cta gat ctc cct gaa cct cta ctt act ttt gaa tat tac gaa tta ttt      975
Leu Asp Leu Pro Glu Pro Leu Leu Thr Phe Glu Tyr Tyr Glu Leu Phe
    285                 290                 295

gta aac att ttg gtt gtt tgt ggc tac atc aca gtt tca gat aga tcc     1023
Val Asn Ile Leu Val Val Cys Gly Tyr Ile Thr Val Ser Asp Arg Ser
300                 305                 310                 315

agt ggg ata cat aaa att caa gat gat cca cag tct tca aaa ttc ctt     1071
Ser Gly Ile His Lys Ile Gln Asp Asp Pro Gln Ser Ser Lys Phe Leu
                320                 325                 330

cac tta aac aat ttg aat tcc ttc aaa tca act gag tgc ctt ctt ctc     1119
His Leu Asn Asn Leu Asn Ser Phe Lys Ser Thr Glu Cys Leu Leu Leu
            335                 340                 345
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agt ctg ctt cat aga gaa aaa aac aaa gaa gaa tca gat tct act gag      1167
Ser Leu Leu His Arg Glu Lys Asn Lys Glu Glu Ser Asp Ser Thr Glu
        350                 355                 360

aga cta cag ata agc aat cca gga ttt caa gaa aga tgt gct aag aaa      1215
Arg Leu Gln Ile Ser Asn Pro Gly Phe Gln Glu Arg Cys Ala Lys Lys
    365                 370                 375

atg cag cta gtt aat tta aga aac aga aga gtg agt gct aat gac ata      1263
Met Gln Leu Val Asn Leu Arg Asn Arg Arg Val Ser Ala Asn Asp Ile
380                 385                 390                 395

atg gga gga agt tgt cat aat tta ata ggg tta agt aat atg cat gat      1311
Met Gly Gly Ser Cys His Asn Leu Ile Gly Leu Ser Asn Met His Asp
                400                 405                 410

cta tcc tct aac agc aaa cca agg tgc tgt tct ttg gaa gga att gta      1359
Leu Ser Ser Asn Ser Lys Pro Arg Cys Cys Ser Leu Glu Gly Ile Val
            415                 420                 425

gat gtg cca ggg aat tca agt aaa gag gca tcc agt gtc ttt cat caa      1407
Asp Val Pro Gly Asn Ser Ser Lys Glu Ala Ser Ser Val Phe His Gln
        430                 435                 440

tct ttt ccg aac ata gaa gga caa aat aat aaa ctg ttt tta gag tct      1455
Ser Phe Pro Asn Ile Glu Gly Gln Asn Asn Lys Leu Phe Leu Glu Ser
    445                 450                 455

aag ccc aaa cag gaa ttc ctg ttg aat ctt cat tca gag gaa aat att      1503
Lys Pro Lys Gln Glu Phe Leu Leu Asn Leu His Ser Glu Glu Asn Ile
460                 465                 470                 475

caa aag cca ttc agt gct ggt ttt aag aga acc tct act ttg act gtt      1551
Gln Lys Pro Phe Ser Ala Gly Phe Lys Arg Thr Ser Thr Leu Thr Val
                480                 485                 490

caa gac caa gag gag ttg tgt aat ggg aaa tgc aag tca aaa cag ctt      1599
Gln Asp Gln Glu Glu Leu Cys Asn Gly Lys Cys Lys Ser Lys Gln Leu
            495                 500                 505

tgt agg tct cag agt ttg ctt tta aga agt agt aca aga agg aat agt      1647
Cys Arg Ser Gln Ser Leu Leu Leu Arg Ser Ser Thr Arg Arg Asn Ser
        510                 515                 520

tat atc aat aca cca gtg gct gaa att atc atg aaa cca aat gtt gga      1695
Tyr Ile Asn Thr Pro Val Ala Glu Ile Ile Met Lys Pro Asn Val Gly
    525                 530                 535

caa ggc agc aca agt gtg caa aca gct atg gaa agt gaa ctc gga gag      1743
Gln Gly Ser Thr Ser Val Gln Thr Ala Met Glu Ser Glu Leu Gly Glu
540                 545                 550                 555

tct agt gcc aca atc aat aaa aga ctc tgc aaa agt aca ata gaa ctt      1791
Ser Ser Ala Thr Ile Asn Lys Arg Leu Cys Lys Ser Thr Ile Glu Leu
                560                 565                 570

tca gaa aat tct tta ctt cca gct tct tct atg ttg act ggc aca caa      1839
Ser Glu Asn Ser Leu Leu Pro Ala Ser Ser Met Leu Thr Gly Thr Gln
            575                 580                 585

agc ttg ctg caa cct cat tta gag agg gtt gcc atc gat gct cta cag      1887
Ser Leu Leu Gln Pro His Leu Glu Arg Val Ala Ile Asp Ala Leu Gln
        590                 595                 600

tta tgt tgt ttg tta ctt ccc cca cca aat cgt aga aag ctt caa ctt      1935
Leu Cys Cys Leu Leu Leu Pro Pro Pro Asn Arg Arg Lys Leu Gln Leu
    605                 610                 615
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tta atg cgt atg att tcc cga atg agt caa aat gtt gat atg ccc aaa      1983
Leu Met Arg Met Ile Ser Arg Met Ser Gln Asn Val Asp Met Pro Lys
620                 625                 630                 635

ctt cat gat gca atg ggt acg agg tca ctg atg ata cat acc ttt tct      2031
Leu His Asp Ala Met Gly Thr Arg Ser Leu Met Ile His Thr Phe Ser
                640                 645                 650

cga tgt gtg tta tgc tgt gct gaa gaa gtg gat ctt gat gag ctt ctt      2079
Arg Cys Val Leu Cys Cys Ala Glu Glu Val Asp Leu Asp Glu Leu Leu
            655                 660                 665

gct gga aga tta gtt tct ttc tta atg gat cat cat cag gaa att ctt      2127
Ala Gly Arg Leu Val Ser Phe Leu Met Asp His His Gln Glu Ile Leu
        670                 675                 680

caa gta ccc tct tac tta cag act gca gtg gaa aaa cat ctt gac tac      2175
Gln Val Pro Ser Tyr Leu Gln Thr Ala Val Glu Lys His Leu Asp Tyr
    685                 690                 695

tta aaa aag gga cat att gaa aat cct gga gat gga cta ttt gct cct      2223
Leu Lys Lys Gly His Ile Glu Asn Pro Gly Asp Gly Leu Phe Ala Pro
700                 705                 710                 715

ttg cca act tac tca tac tgt aag cag att agt gct cag gag ttt gat      2271
Leu Pro Thr Tyr Ser Tyr Cys Lys Gln Ile Ser Ala Gln Glu Phe Asp
                720                 725                 730

gag caa aaa gtt tct acc tct caa gct gca att gca gaa ctt tta gaa      2319
Glu Gln Lys Val Ser Thr Ser Gln Ala Ala Ile Ala Glu Leu Leu Glu
            735                 740                 745

aat att att aaa aac agg agt tta cct cta aag gag aaa aga aaa aaa      2367
Asn Ile Ile Lys Asn Arg Ser Leu Pro Leu Lys Glu Lys Arg Lys Lys
        750                 755                 760

cta aaa cag ttt cag aag gaa tat cct ttg ata tat cag aaa aga ttt      2415
Leu Lys Gln Phe Gln Lys Glu Tyr Pro Leu Ile Tyr Gln Lys Arg Phe
    765                 770                 775

cca acc acg gag agt gaa gca gca ctt ttt ggt gac aaa cct aca atc      2463
Pro Thr Thr Glu Ser Glu Ala Ala Leu Phe Gly Asp Lys Pro Thr Ile
780                 785                 790                 795

aag caa cca atg ctg att tta aga aaa cca aag ttc cgt agt cta aga      2511
Lys Gln Pro Met Leu Ile Leu Arg Lys Pro Lys Phe Arg Ser Leu Arg
                800                 805                 810

taactaactg aattaaaaat tatgtaatac ttgtggaact ttgataaatg aagccatatc   2571

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Pro Glu Val Thr Arg Gln Gln Thr Ile Gln Leu Leu Arg Lys Phe Leu
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Val Cys Gly Tyr Ile Thr Val Ser Asp Arg Ser Ser Gly Ile His Lys
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Val Gln Thr Ala Met Glu Ser Glu Leu Gly Glu Ser Ser Ala Thr Ile
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Asn Lys Arg Leu Cys Lys Ser Thr Ile Glu Leu Ser Glu Asn Ser Leu
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Leu Pro Ala Ser Ser Met Leu Thr Gly Thr Gln Ser Leu Leu Gln Pro
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His Leu Glu Arg Val Ala Ile Asp Ala Leu Gln Leu Cys Cys Leu Leu
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Leu Pro Pro Pro Asn Arg Arg Lys Leu Gln Leu Leu Met Arg Met Ile
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Ser Arg Met Ser Gln Asn Val Asp Met Pro Lys Leu His Asp Ala Met
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Gly Thr Arg Ser Leu Met Ile His Thr Phe Ser Arg Cys Val Leu Cys
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Cys Ala Glu Glu Val Asp Leu Asp Glu Leu Leu Ala Gly Arg Leu Val
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Ser Phe Leu Met Asp His His Gln Glu Ile Leu Gln Val Pro Ser Tyr
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Leu Gln Thr Ala Val Glu Lys His Leu Asp Tyr Leu Lys Lys Gly His
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Tyr Cys Lys Gln Ile Ser Ala Gln Glu Phe Asp Glu Gln Lys Val Ser
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Thr Ser Gln Ala Ala Ile Ala Glu Leu Leu Glu Asn Ile Ile Lys Asn
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Met Pro Leu Arg Lys His Arg Gln His Phe Lys Lys Tyr Gly Asn Cys
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Leu Arg Lys Phe Leu Lys Asn His Val Ile Glu Asp Ile Lys Gly Arg
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Ala Thr Ser Pro Leu Lys Thr Leu Pro Arg Arg Tyr Pro Glu Leu Arg
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Lys Asn Asn Ile Glu Asn Phe Ser Lys Asp Lys Asp Ser Ile Phe Lys
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Leu Arg Asn Leu Ser Arg Arg Thr Pro Lys Arg His Gly Leu His Leu
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gaa gtt tgg aga tat gtt att ctg atc tac ctg caa acc att tta ggt      687
Glu Val Trp Arg Tyr Val Ile Leu Ile Tyr Leu Gln Thr Ile Leu Gly
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gtg cca tcc cta gaa gaa gtc ata aat cca aaa caa gta att ccc caa      735
Val Pro Ser Leu Glu Glu Val Ile Asn Pro Lys Gln Val Ile Pro Gln
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Tyr Ile Met Tyr Asn Met Ala Asn Thr Ser Lys Arg Gly Val Val Ile
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cta caa aac aaa tca gat gac ctc cct cac tgg gta tta tct gcc atg      831
Leu Gln Asn Lys Ser Asp Asp Leu Pro His Trp Val Leu Ser Ala Met
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Lys Cys Leu Ala Asn Trp Pro Arg Ser Asn Asp Met Asn Asn Pro Thr
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Tyr Val Gly Phe Glu Arg Asp Val Phe Arg Thr Ile Ala Asp Tyr Phe
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Val Asn Ile Leu Val Val Cys Gly Tyr Ile Thr Val Ser Asp Arg Ser
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agt ggg ata cat aaa att caa gat gat cca cag tct tca aaa ttc ctt     1071
Ser Gly Ile His Lys Ile Gln Asp Asp Pro Gln Ser Ser Lys Phe Leu
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cac tta aac aat ttg aat tcc ttc aaa tca act gag tgc ctt ctt ctc     1119
His Leu Asn Asn Leu Asn Ser Phe Lys Ser Thr Glu Cys Leu Leu Leu
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agt ctg ctt cat aga gaa aaa aac aaa gaa gaa tca gat tct act gag     1167
Ser Leu Leu His Arg Glu Lys Asn Lys Glu Glu Ser Asp Ser Thr Glu
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aga cta cag ata agc aat cca gga ttt caa gaa aga tgt gct aag aaa     1215
Arg Leu Gln Ile Ser Asn Pro Gly Phe Gln Glu Arg Cys Ala Lys Lys
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Met Gln Leu Val Asn Leu Arg Asn Arg Arg Val Ser Ala Asn Asp Ile
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Met Gly Gly Ser Cys His Asn Leu Ile Gly Leu Ser Asn Met His Asp
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Leu Ser Ser Asn Ser Lys Pro Arg Cys Cys Ser Leu Glu Gly Ile Val
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Lys Pro Lys Gln Glu Phe Leu Leu Asn Leu His Ser Glu Glu Asn Ile
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Gln Lys Pro Phe Ser Ala Gly Phe Lys Arg Thr Ser Thr Leu Thr Val
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Cys Arg Ser Gln Ser Leu Leu Leu Arg Ser Ser Thr Arg Arg Asn Ser
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Ala Val Asp Trp Leu Tyr Asp Leu Leu Arg Asn Asn Ser Asn Phe Gly
    50                  55                  60

Pro Glu Val Thr Arg Gln Gln Thr Ile Gln Leu Leu Arg Lys Phe Leu
65                  70                  75                  80

Lys Asn His Val Ile Glu Asp Ile Lys Gly Arg Trp Gly Ser Glu Asn
                85                  90                  95

Val Asp Asp Asn Asn Gln Leu Phe Arg Phe Pro Ala Thr Ser Pro Leu
            100                 105                 110

Lys Thr Leu Pro Arg Arg Tyr Pro Glu Leu Arg Lys Asn Asn Ile Glu
        115                 120                 125

Asn Phe Ser Lys Asp Lys Asp Ser Ile Phe Lys Leu Arg Asn Leu Ser
    130                 135                 140

Arg Arg Thr Pro Lys Arg His Gly Leu His Leu Ser Gln Glu Asn Gly
145                 150                 155                 160

Glu Lys Ile Lys His Glu Ile Ile Asn Glu Asp Gln Glu Asn Ala Ile
                165                 170                 175

Asp Asn Arg Glu Leu Ser Gln Glu Asp Val Glu Glu Val Trp Arg Tyr
            180                 185                 190

Val Ile Leu Ile Tyr Leu Gln Thr Ile Leu Gly Val Pro Ser Leu Glu
        195                 200                 205

Glu Val Ile Asn Pro Lys Gln Val Ile Pro Gln Tyr Ile Met Tyr Asn
    210                 215                 220

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

Asp Asp Leu Pro His Trp Val Leu Ser Ala Met Lys Cys Leu Ala Asn
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Trp Pro Arg Ser Asn Asp Met Asn Asn Pro Thr Tyr Val Gly Phe Glu
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Arg Asp Val Phe Arg Thr Ile Ala Asp Tyr Phe Leu Asp Leu Pro Glu
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Pro Leu Leu Thr Phe Glu Tyr Tyr Glu Leu Phe Val Asn Ile Leu Val
    290                 295                 300

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

Ile Gln Asp Asp Pro Gln Ser Ser Lys Phe Leu His Leu Asn Asn Leu
                325                 330                 335

Asn Ser Phe Lys Ser Thr Glu Cys Leu Leu Leu Ser Leu Leu His Arg
            340                 345                 350

Glu Lys Asn Lys Glu Glu Ser Asp Ser Thr Glu Arg Leu Gln Ile Ser
        355                 360                 365

Asn Pro Gly Phe Gln Glu Arg Cys Ala Lys Lys Met Gln Leu Val Asn
    370                 375                 380

Leu Arg Asn Arg Arg Val Ser Ala Asn Asp Ile Met Gly Gly Ser Cys
385                 390                 395                 400

His Asn Leu Ile Gly Leu Ser Asn Met His Asp Leu Ser Ser Asn Ser
                405                 410                 415

Lys Pro Arg Cys Cys Ser Leu Glu Gly Ile Val Asp Val Pro Gly Asn
            420                 425                 430

Ser Ser Lys Glu Ala Ser Ser Val Phe His Gln Ser Phe Pro Asn Ile
        435                 440                 445

Glu Gly Gln Asn Asn Lys Leu Phe Leu Glu Ser Lys Pro Lys Gln Glu
    450                 455                 460

Phe Leu Leu Asn Leu His Ser Glu Glu Asn Ile Gln Lys Pro Phe Ser
465                 470                 475                 480

Ala Gly Phe Lys Arg Thr Ser Thr Leu Thr Val Gln Asp Gln Glu Glu
                485                 490                 495

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