SEQUENCE LISTING

<110> Kyoto University

<120> METHOD OF EFFICIENTLY ESTABLISHING INDUCED PLURIPOTENT STEM CELLS

<130> 091382

<150> US 61/076,487
<151> 2008-06-27

<150> US 61/095,573
<151> 2008-09-09

<150> US 61/194,700
<151> 2008-09-30

<150> US 61/200,307
<151> 2008-11-25

<150> US 61/209,686
<151> 2009-03-10

<160> 60

<170> PatentIn version 3.5

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aagactgg atg act gcc atg gag gag tca cag tcg gat atc agc ctc gag 170
Met Thr Ala Met Glu Glu Ser Gln Ser Asp Ile Ser Leu Glu
1 5 10

ctc cct ctg agc cag gag aca ttt tca ggc tta tgg aaa cta ctt cct 218
Leu Pro Leu Ser Gln Glu Thr Phe Ser Gly Leu Trp Lys Leu Leu Pro
15 20 25 30

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35 40 45

ccc cag gat gtt gag gag ttt ttt gaa ggc cca agt gaa gcc ctc cga 314
Pro Gln Asp Val Glu Glu Phe Phe Glu Gly Pro Ser Glu Ala Leu Arg
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gtg tca gga gct cct gca gca cag gac cct gtc acc gag acc cct ggg 362
Val Ser Gly Ala Pro Ala Ala Gln Asp Pro Val Thr Glu Thr Pro Gly
65 70 75

cca gtg gcc cct gcc cca gcc act cca tgg ccc ctg tca tct ttt gtc 410
Pro Val Ala Pro Ala Pro Ala Thr Pro Trp Pro Leu Ser Ser Phe Val
80 85 90

cct tct caa aaa act tac cag ggc aac tat ggc ttc cac ctg ggc ttc 458
Pro Ser Gln Lys Thr Tyr Gln Gly Asn Tyr Gly Phe His Leu Gly Phe
95 100 105 110

ctg cag tct ggg aca gcc aag tct gtt atg tgc acg tac tct cct ccc 506
Leu Gln Ser Gly Thr Ala Lys Ser Val Met Cys Thr Tyr Ser Pro Pro
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tgg gtc agc gcc aca cct cca gct ggg agc cgt gtc cgc gcc atg gcc        602
Trp Val Ser Ala Thr Pro Pro Ala Gly Ser Arg Val Arg Ala Met Ala
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atc tac aag aag tca cag cac atg acg gag gtc gtg aga cgc tgc ccc        650
Ile Tyr Lys Lys Ser Gln His Met Thr Glu Val Val Arg Arg Cys Pro
    160                 165                 170

cac cat gag cgc tgc tcc gat ggt gat ggc ctg gct cct ccc cag cat        698
His His Glu Arg Cys Ser Asp Gly Asp Gly Leu Ala Pro Pro Gln His
175                 180                 185                 190

ctt atc cgg gtg gaa gga aat ttg tat ccc gag tat ctg gaa gac agg        746
Leu Ile Arg Val Glu Gly Asn Leu Tyr Pro Glu Tyr Leu Glu Asp Arg
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cag act ttt cgc cac agc gtg gtg gta cct tat gag cca ccc gag gcc        794
Gln Thr Phe Arg His Ser Val Val Val Pro Tyr Glu Pro Pro Glu Ala
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ggc tct gag tat acc acc atc cac tac aag tac atg tgt aat agc tcc        842
Gly Ser Glu Tyr Thr Thr Ile His Tyr Lys Tyr Met Cys Asn Ser Ser
        225                 230                 235

tgc atg ggg ggc atg aac cgc cga cct atc ctt acc atc atc aca ctg        890
Cys Met Gly Gly Met Asn Arg Arg Pro Ile Leu Thr Ile Ile Thr Leu
    240                 245                 250

gaa gac tcc agt ggg aac ctt ctg gga cgg gac agc ttt gag gtt cgt        938
Glu Asp Ser Ser Gly Asn Leu Leu Gly Arg Asp Ser Phe Glu Val Arg
255                 260                 265                 270

gtt tgt gcc tgc cct ggg aga gac cgc cgt aca gaa gaa gaa aat ttc        986
Val Cys Ala Cys Pro Gly Arg Asp Arg Arg Thr Glu Glu Glu Asn Phe
                275                 280                 285

cgc aaa aag gaa gtc ctt tgc cct gaa ctg ccc cca ggg agc gca aag       1034
Arg Lys Lys Glu Val Leu Cys Pro Glu Leu Pro Pro Gly Ser Ala Lys
            290                 295                 300

aga gcg ctg ccc acc tgc aca agc gcc tct ccc ccg caa aag aaa aaa       1082
Arg Ala Leu Pro Thr Cys Thr Ser Ala Ser Pro Pro Gln Lys Lys Lys
        305                 310                 315

cca ctt gat gga gag tat ttc acc ctc aag atc cgc ggg cgt aaa cgc       1130
Pro Leu Asp Gly Glu Tyr Phe Thr Leu Lys Ile Arg Gly Arg Lys Arg
    320                 325                 330

ttc gag atg ttc cgg gag ctg aat gag gcc tta gag tta aag gat gcc       1178
Phe Glu Met Phe Arg Glu Leu Asn Glu Ala Leu Glu Leu Lys Asp Ala
335                 340                 345                 350

cat gct aca gag gag tct gga gac agc agg gct cac tcc agc tac ctg       1226
His Ala Thr Glu Glu Ser Gly Asp Ser Arg Ala His Ser Ser Tyr Leu
                355                 360                 365

aag acc aag aag ggc cag tct act tcc cgc cat aaa aaa aca atg gtc       1274
Lys Thr Lys Lys Gly Gln Ser Thr Ser Arg His Lys Lys Thr Met Val
            370                 375                 380

aag aaa gtg ggg cct gac tca gac tga ctgcctctgc atcccgtccc             1321
Lys Lys Val Gly Pro Asp Ser Asp
        385                 390

catcaccagc ctccccctct ccttgctgtc ttatgacttc agggctgaga cacaatcctc     1381

ccggtccctt ctgctgcctt ttttaccttg tagctagggc tcagcccccc ctctgagtag     1441

tggttcctgg cccaagttgg ggaataggtt gatagttgtc aggtctctgc tggcccagcg     1501

aaattctatc cagccagttg ttggaccctg gcacctacaa tgaaatctca ccctacccca     1561
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caccctgtaa gattctatct tgggccctca tagggtccat atcctccagg gcctactttc 1621

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<213> Mus musculus

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Ala Pro Ala Pro Ala Thr Pro Trp Pro Leu Ser Ser Phe Val Pro Ser
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100 105 110

Ser Gly Thr Ala Lys Ser Val Met Cys Thr Tyr Ser Pro Pro Leu Asn
115 120 125

Lys Leu Phe Cys Gln Leu Ala Lys Thr Cys Pro Val Gln Leu Trp Val
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Ser Ala Thr Pro Pro Ala Gly Ser Arg Val Arg Ala Met Ala Ile Tyr
145 150 155 160

Lys Lys Ser Gln His Met Thr Glu Val Val Arg Arg Cys Pro His His
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Glu Arg Cys Ser Asp Gly Asp Gly Leu Ala Pro Pro Gln His Leu Ile
180 185 190

Arg Val Glu Gly Asn Leu Tyr Pro Glu Tyr Leu Glu Asp Arg Gln Thr
195 200 205

Phe Arg His Ser Val Val Val Pro Tyr Glu Pro Pro Glu Ala Gly Ser
210 215 220

Glu Tyr Thr Thr Ile His Tyr Lys Tyr Met Cys Asn Ser Ser Cys Met
225 230 235 240

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Gly Gly Met Asn Arg Arg Pro Ile Leu Thr Ile Ile Thr Leu Glu Asp
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Ser Ser Gly Asn Leu Leu Gly Arg Asp Ser Phe Glu Val Arg Val Cys
            260                 265                 270

Ala Cys Pro Gly Arg Asp Arg Arg Thr Glu Glu Glu Asn Phe Arg Lys
        275                 280                 285

Lys Glu Val Leu Cys Pro Glu Leu Pro Pro Gly Ser Ala Lys Arg Ala
    290                 295                 300

Leu Pro Thr Cys Thr Ser Ala Ser Pro Pro Gln Lys Lys Lys Pro Leu
305                 310                 315                 320

Asp Gly Glu Tyr Phe Thr Leu Lys Ile Arg Gly Arg Lys Arg Phe Glu
                325                 330                 335

Met Phe Arg Glu Leu Asn Glu Ala Leu Glu Leu Lys Asp Ala His Ala
            340                 345                 350

Thr Glu Glu Ser Gly Asp Ser Arg Ala His Ser Ser Tyr Leu Lys Thr
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Lys Lys Gly Gln Ser Thr Ser Arg His Lys Lys Thr Met Val Lys Lys
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Val Gly Pro Asp Ser Asp
385                 390
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cgggctggga gcgtgctttc cacgacggtg acacgcttcc ctggattggc agccagactg     180

ccttccgggt cactgcc atg gag gag ccg cag tca gat cct agc gtc gag         230
                  Met Glu Glu Pro Gln Ser Asp Pro Ser Val Glu
                  1               5                   10

ccc cct ctg agt cag gaa aca ttt tca gac cta tgg aaa cta ctt cct        278
Pro Pro Leu Ser Gln Glu Thr Phe Ser Asp Leu Trp Lys Leu Leu Pro
            15                  20                  25

gaa aac aac gtt ctg tcc ccc ttg ccg tcc caa gca atg gat gat ttg        326
Glu Asn Asn Val Leu Ser Pro Leu Pro Ser Gln Ala Met Asp Asp Leu
        30                  35                  40

atg ctg tcc ccg gac gat att gaa caa tgg ttc act gaa gac cca ggt        374
Met Leu Ser Pro Asp Asp Ile Glu Gln Trp Phe Thr Glu Asp Pro Gly
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cca gat gaa gct ccc aga atg cca gag gct gct ccc ccc gtg gcc cct        422
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Pro Asp Glu Ala Pro Arg Met Pro Glu Ala Ala Pro Pro Val Ala Pro
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gca cca gca gct cct aca ccg gcg gcc cct gca cca gcc ccc tcc tgg      470
Ala Pro Ala Ala Pro Thr Pro Ala Ala Pro Ala Pro Ala Pro Ser Trp
                80                  85                  90

ccc ctg tca tct tct gtc cct tcc cag aaa acc tac cag ggc agc tac      518
Pro Leu Ser Ser Ser Val Pro Ser Gln Lys Thr Tyr Gln Gly Ser Tyr
            95                  100                 105

ggt ttc cgt ctg ggc ttc ttg cat tct ggg aca gcc aag tct gtg act      566
Gly Phe Arg Leu Gly Phe Leu His Ser Gly Thr Ala Lys Ser Val Thr
        110                 115                 120

tgc acg tac tcc cct gcc ctc aac aag atg ttt tgc caa ctg gcc aag      614
Cys Thr Tyr Ser Pro Ala Leu Asn Lys Met Phe Cys Gln Leu Ala Lys
    125                 130                 135

acc tgc cct gtg cag ctg tgg gtt gat tcc aca ccc ccg ccc ggc acc      662
Thr Cys Pro Val Gln Leu Trp Val Asp Ser Thr Pro Pro Pro Gly Thr
140                 145                 150                 155

cgc gtc cgc gcc atg gcc atc tac aag cag tca cag cac atg acg gag      710
Arg Val Arg Ala Met Ala Ile Tyr Lys Gln Ser Gln His Met Thr Glu
                160                 165                 170

gtt gtg agg cgc tgc ccc cac cat gag cgc tgc tca gat agc gat ggt      758
Val Val Arg Arg Cys Pro His His Glu Arg Cys Ser Asp Ser Asp Gly
            175                 180                 185

ctg gcc cct cct cag cat ctt atc cga gtg gaa gga aat ttg cgt gtg      806
Leu Ala Pro Pro Gln His Leu Ile Arg Val Glu Gly Asn Leu Arg Val
        190                 195                 200

gag tat ttg gat gac aga aac act ttt cga cat agt gtg gtg gtg ccc      854
Glu Tyr Leu Asp Asp Arg Asn Thr Phe Arg His Ser Val Val Val Pro
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tat gag ccg cct gag gtt ggc tct gac tgt acc acc atc cac tac aac      902
Tyr Glu Pro Pro Glu Val Gly Ser Asp Cys Thr Thr Ile His Tyr Asn
220                 225                 230                 235

tac atg tgt aac agt tcc tgc atg ggc ggc atg aac cgg agg ccc atc      950
Tyr Met Cys Asn Ser Ser Cys Met Gly Gly Met Asn Arg Arg Pro Ile
                240                 245                 250

ctc acc atc atc aca ctg gaa gac tcc agt ggt aat cta ctg gga cgg      998
Leu Thr Ile Ile Thr Leu Glu Asp Ser Ser Gly Asn Leu Leu Gly Arg
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aac agc ttt gag gtg cgt gtt tgt gcc tgt cct ggg aga gac cgg cgc     1046
Asn Ser Phe Glu Val Arg Val Cys Ala Cys Pro Gly Arg Asp Arg Arg
        270                 275                 280

aca gag gaa gag aat ctc cgc aag aaa ggg gag cct cac cac gag ctg     1094
Thr Glu Glu Glu Asn Leu Arg Lys Lys Gly Glu Pro His His Glu Leu
    285                 290                 295

ccc cca ggg agc act aag cga gca ctg ccc aac aac acc agc tcc tct     1142
Pro Pro Gly Ser Thr Lys Arg Ala Leu Pro Asn Asn Thr Ser Ser Ser
300                 305                 310                 315

ccc cag cca aag aag aaa cca ctg gat gga gaa tat ttc acc ctt cag     1190
Pro Gln Pro Lys Lys Lys Pro Leu Asp Gly Glu Tyr Phe Thr Leu Gln
                320                 325                 330

atc cgt ggg cgt gag cgc ttc gag atg ttc cga gag ctg aat gag gcc     1238
Ile Arg Gly Arg Glu Arg Phe Glu Met Phe Arg Glu Leu Asn Glu Ala
            335                 340                 345

ttg gaa ctc aag gat gcc cag gct ggg aag gag cca ggg ggg agc agg     1286
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gct cac tcc agc cac ctg aag tcc aaa aag ggt cag tct acc tcc cgc        1334
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cat aaa aaa ctc atg ttc aag aca gaa ggg cct gac tca gac tga            1379
His Lys Lys Leu Met Phe Lys Thr Glu Gly Pro Asp Ser Asp
380                 385                 390

cattctccac ttcttgttcc ccactgacag cctcccaccc ccatctctcc ctcccctgcc      1439

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acattctagg taggggccca cttcaccgta ctaaccaggg aagctgtccc tcactgttga      1739

attttctcta acttcaaggc ccatatctgt gaaatgctgg catttgcacc tacctcacag      1799

agtgcattgt gagggttaat gaaataatgt acatctggcc ttgaaaccac cttttattac      1859

atggggtcta gaacttgacc cccttgaggg tgcttgttcc ctctccctgt tggtcggtgg      1919

gttggtagtt tctacagttg ggcagctggt taggtagagg gagttgtcaa gtctctgctg      1979

gcccagccaa accctgtctg acaacctctt ggtgaacctt agtacctaaa aggaaatctc      2039

accccatccc acaccctgga ggatttcatc tcttgtatat gatgatctgg atccaccaag      2099

acttgtttta tgctcagggt caatttcttt tttctttttt ttttttttt ttcttttttct      2159

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agtgttgccc aggctggtct caaactcctg ggctcaggcg atccacctgt ctcagcctcc      2399

cagagtgctg ggattacaat tgtgagccac cacgtccagc tggaagggtc aacatctttt      2459

acattctgca agcacatctg cattttcacc ccacccttcc cctccttctc ccttttttata     2519

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Ser Pro Leu Pro Ser Gln Ala Met Asp Asp Leu Met Leu Ser Pro Asp
        35                  40                  45

Asp Ile Glu Gln Trp Phe Thr Glu Asp Pro Gly Pro Asp Glu Ala Pro
    50                  55                  60

Arg Met Pro Glu Ala Ala Pro Pro Val Ala Pro Ala Pro Ala Ala Pro
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85 90 95

Val Pro Ser Gln Lys Thr Tyr Gln Gly Ser Tyr Gly Phe Arg Leu Gly
100 105 110

Phe Leu His Ser Gly Thr Ala Lys Ser Val Thr Cys Thr Tyr Ser Pro
115 120 125

Ala Leu Asn Lys Met Phe Cys Gln Leu Ala Lys Thr Cys Pro Val Gln
130 135 140

Leu Trp Val Asp Ser Thr Pro Pro Pro Gly Thr Arg Val Arg Ala Met
145 150 155 160

Ala Ile Tyr Lys Gln Ser Gln His Met Thr Glu Val Val Arg Arg Cys
165 170 175

Pro His His Glu Arg Cys Ser Asp Ser Asp Gly Leu Ala Pro Pro Gln
180 185 190

His Leu Ile Arg Val Glu Gly Asn Leu Arg Val Glu Tyr Leu Asp Asp
195 200 205

Arg Asn Thr Phe Arg His Ser Val Val Val Pro Tyr Glu Pro Pro Glu
210 215 220

Val Gly Ser Asp Cys Thr Thr Ile His Tyr Asn Tyr Met Cys Asn Ser
225 230 235 240

Ser Cys Met Gly Gly Met Asn Arg Arg Pro Ile Leu Thr Ile Ile Thr
245 250 255

Leu Glu Asp Ser Ser Gly Asn Leu Leu Gly Arg Asn Ser Phe Glu Val
260 265 270

Arg Val Cys Ala Cys Pro Gly Arg Asp Arg Arg Thr Glu Glu Glu Asn
275 280 285

Leu Arg Lys Lys Gly Glu Pro His His Glu Leu Pro Pro Gly Ser Thr
290 295 300

Lys Arg Ala Leu Pro Asn Asn Thr Ser Ser Ser Pro Gln Pro Lys Lys
305 310 315 320

Lys Pro Leu Asp Gly Glu Tyr Phe Thr Leu Gln Ile Arg Gly Arg Glu
325 330 335

Arg Phe Glu Met Phe Arg Glu Leu Asn Glu Ala Leu Glu Leu Lys Asp
340 345 350

Ala Gln Ala Gly Lys Glu Pro Gly Gly Ser Arg Ala His Ser Ser His
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agcaccgtcc ctccccggat tagtgcgtac gagcgcccag tgccctggcc cggagagtgg      180

aatgatcccc gaggcccagg gcgtcgtgct tccgcgcgcc ccgtgaagga aactggggag      240

tcttgaggga cccccgactc caagcgcgaa aaccccgg atg gtg agg agc agg caa       296
                                        Met Val Arg Ser Arg Gln
                                        1               5

atg tgc aat acc aac atg tct gta cct act gat ggt gct gta acc acc       344
Met Cys Asn Thr Asn Met Ser Val Pro Thr Asp Gly Ala Val Thr Thr
            10                  15                  20

tca cag att cca gct tcg gaa caa gag acc ctg gtt aga cca aag cca       392
Ser Gln Ile Pro Ala Ser Glu Gln Glu Thr Leu Val Arg Pro Lys Pro
        25                  30                  35

ttg ctt ttg aag tta tta aag tct gtt ggt gca caa aaa gac act tat       440
Leu Leu Leu Lys Leu Leu Lys Ser Val Gly Ala Gln Lys Asp Thr Tyr
    40                  45                  50

act atg aaa gag gtt ctt ttt tat ctt ggc cag tat att atg act aaa       488
Thr Met Lys Glu Val Leu Phe Tyr Leu Gly Gln Tyr Ile Met Thr Lys
55                  60                  65                  70

cga tta tat gat gag aag caa caa cat att gta tat tgt tca aat gat       536
Arg Leu Tyr Asp Glu Lys Gln Gln His Ile Val Tyr Cys Ser Asn Asp
                75                  80                  85

ctt cta gga gat ttg ttt ggc gtg cca agc ttc tct gtg aaa gag cac       584
Leu Leu Gly Asp Leu Phe Gly Val Pro Ser Phe Ser Val Lys Glu His
            90                  95                  100

agg aaa ata tat acc atg atc tac agg aac ttg gta gta gtc aat cag       632
Arg Lys Ile Tyr Thr Met Ile Tyr Arg Asn Leu Val Val Val Asn Gln
        105                 110                 115

cag gaa tca tcg gac tca ggt aca tct gtg agt gag aac agg tgt cac       680
Gln Glu Ser Ser Asp Ser Gly Thr Ser Val Ser Glu Asn Arg Cys His
    120                 125                 130

ctt gaa ggt ggg agt gat caa aag gac ctt gta caa gag ctt cag gaa       728
Leu Glu Gly Gly Ser Asp Gln Lys Asp Leu Val Gln Glu Leu Gln Glu
135                 140                 145                 150

gag aaa cct tca tct tca cat ttg gtt tct aga cca tct acc tca tct       776
Glu Lys Pro Ser Ser Ser His Leu Val Ser Arg Pro Ser Thr Ser Ser
                155                 160                 165

aga agg aga gca att agt gag aca gaa gaa aat tca gat gaa tta tct       824
Arg Arg Arg Ala Ile Ser Glu Thr Glu Glu Asn Ser Asp Glu Leu Ser
            170                 175                 180

ggt gaa cga caa aga aaa cgc cac aaa tct gat agt att tcc ctt tcc       872
Gly Glu Arg Gln Arg Lys Arg His Lys Ser Asp Ser Ile Ser Leu Ser
        185                 190                 195

ttt gat gaa agc ctg gct ctg tgt gta ata agg gag ata tgt tgt gaa       920
Phe Asp Glu Ser Leu Ala Leu Cys Val Ile Arg Glu Ile Cys Cys Glu
    200                 205                 210

aga agc agt agc agt gaa tct aca ggg acg cca tcg aat ccg gat ctt       968
Arg Ser Ser Ser Ser Glu Ser Thr Gly Thr Pro Ser Asn Pro Asp Leu
215                 220                 225                 230

gat gct ggt gta agt gaa cat tca ggt gat tgg ttg gat cag gat tca      1016
Asp Ala Gly Val Ser Glu His Ser Gly Asp Trp Leu Asp Gln Asp Ser
                235                 240                 245

gtt tca gat cag ttt agt gta gaa ttt gaa gtt gaa tct ctc gac tca      1064
Val Ser Asp Gln Phe Ser Val Glu Phe Glu Val Glu Ser Leu Asp Ser
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            250                 255                 260

gaa gat tat agc ctt agt gaa gaa gga caa gaa ctc tca gat gaa gat      1112
Glu Asp Tyr Ser Leu Ser Glu Glu Gly Gln Glu Leu Ser Asp Glu Asp
        265                 270                 275

gat gag gta tat caa gtt act gtg tat cag gca ggg gag agt gat aca      1160
Asp Glu Val Tyr Gln Val Thr Val Tyr Gln Ala Gly Glu Ser Asp Thr
    280                 285                 290

gat tca ttt gaa gaa gat cct gaa att tcc tta gct gac tat tgg aaa      1208
Asp Ser Phe Glu Glu Asp Pro Glu Ile Ser Leu Ala Asp Tyr Trp Lys
295                 300                 305                 310

tgc act tca tgc aat gaa atg aat ccc ccc ctt cca tca cat tgc aac      1256
Cys Thr Ser Cys Asn Glu Met Asn Pro Pro Leu Pro Ser His Cys Asn
                315                 320                 325

aga tgt tgg gcc ctt cgt gag aat tgg ctt cct gaa gat aaa ggg aaa      1304
Arg Cys Trp Ala Leu Arg Glu Asn Trp Leu Pro Glu Asp Lys Gly Lys
            330                 335                 340

gat aaa ggg gaa atc tct gag aaa gcc aaa ctg gaa aac tca aca caa      1352
Asp Lys Gly Glu Ile Ser Glu Lys Ala Lys Leu Glu Asn Ser Thr Gln
        345                 350                 355

gct gaa gag ggc ttt gat gtt cct gat tgt aaa aaa act ata gtg aat      1400
Ala Glu Glu Gly Phe Asp Val Pro Asp Cys Lys Lys Thr Ile Val Asn
    360                 365                 370

gat tcc aga gag tca tgt gtt gag gaa aat gat gat aaa att aca caa      1448
Asp Ser Arg Glu Ser Cys Val Glu Glu Asn Asp Asp Lys Ile Thr Gln
375                 380                 385                 390

gct tca caa tca caa gaa agt gaa gac tat tct cag cca tca act tct      1496
Ala Ser Gln Ser Gln Glu Ser Glu Asp Tyr Ser Gln Pro Ser Thr Ser
                395                 400                 405

agt agc att att tat agc agc caa gaa gat gtg aaa gag ttt gaa agg      1544
Ser Ser Ile Ile Tyr Ser Ser Gln Glu Asp Val Lys Glu Phe Glu Arg
            410                 415                 420

gaa gaa acc caa gac aaa gaa gag agt gtg gaa tct agt ttg ccc ctt      1592
Glu Glu Thr Gln Asp Lys Glu Glu Ser Val Glu Ser Ser Leu Pro Leu
        425                 430                 435

aat gcc att gaa cct tgt gtg att tgt caa ggt cga cct aaa aat ggt      1640
Asn Ala Ile Glu Pro Cys Val Ile Cys Gln Gly Arg Pro Lys Asn Gly
    440                 445                 450

tgc att gtc cat ggc aaa aca gga cat ctt atg gcc tgc ttt aca tgt      1688
Cys Ile Val His Gly Lys Thr Gly His Leu Met Ala Cys Phe Thr Cys
455                 460                 465                 470

gca aag aag cta aag aaa agg aat aag ccc tgc cca gta tgt aga caa      1736
Ala Lys Lys Leu Lys Lys Arg Asn Lys Pro Cys Pro Val Cys Arg Gln
                475                 480                 485

cca att caa atg att gtg cta act tat ttc ccc tag ttgacctgtc          1782
Pro Ile Gln Met Ile Val Leu Thr Tyr Phe Pro
            490                 495

tataagagaa ttatatattt ctaactatat aaccctagga atttagacaa cctgaaattt    1842

attcacatat atcaaagtga gaaaatgcct caattcacat agatttcttc tctttagtat    1902

aattgaccta ctttggtagt ggaatagtga atacttacta taatttgact tgaatatgta    1962

gctcatcctt tacaccaact cctaatttta aataatttct actctgtctt aaatgagaag    2022

tacttggttt ttttttttct taaatatgta tatgacattt aaatgtaact tattattttt    2082

tttgagaccg agtcttgctc tgttacccag gctggagtgc agtggcgtga tcttggctca    2142

ctgcaagctc tgcctcccgg gttcgcacca ttctcctgcc tcagcctccc aattagcttg    2202
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gcctacagtc atctgccacc acacctggct aatttttttgt acttttagta gagacagggt 2262

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20 25 30

Leu Val Arg Pro Lys Pro Leu Leu Leu Lys Leu Leu Lys Ser Val Gly
35 40 45

Ala Gln Lys Asp Thr Tyr Thr Met Lys Glu Val Leu Phe Tyr Leu Gly
50 55 60

Gln Tyr Ile Met Thr Lys Arg Leu Tyr Asp Glu Lys Gln Gln His Ile
65 70 75 80

Val Tyr Cys Ser Asn Asp Leu Leu Gly Asp Leu Phe Gly Val Pro Ser
85 90 95

Phe Ser Val Lys Glu His Arg Lys Ile Tyr Thr Met Ile Tyr Arg Asn
100 105 110

Leu Val Val Val Asn Gln Gln Glu Ser Ser Asp Ser Gly Thr Ser Val
115 120 125

Ser Glu Asn Arg Cys His Leu Glu Gly Gly Ser Asp Gln Lys Asp Leu
130 135 140

Val Gln Glu Leu Gln Glu Glu Lys Pro Ser Ser Ser His Leu Val Ser
145 150 155 160

Arg Pro Ser Thr Ser Ser Arg Arg Arg Ala Ile Ser Glu Thr Glu Glu
165 170 175

Asn Ser Asp Glu Leu Ser Gly Glu Arg Gln Arg Lys Arg His Lys Ser
180 185 190

Asp Ser Ile Ser Leu Ser Phe Asp Glu Ser Leu Ala Leu Cys Val Ile
195 200 205

Arg Glu Ile Cys Cys Glu Arg Ser Ser Ser Ser Glu Ser Thr Gly Thr
210 215 220

Pro Ser Asn Pro Asp Leu Asp Ala Gly Val Ser Glu His Ser Gly Asp
225 230 235 240

Trp Leu Asp Gln Asp Ser Val Ser Asp Gln Phe Ser Val Glu Phe Glu
245 250 255

Val Glu Ser Leu Asp Ser Glu Asp Tyr Ser Leu Ser Glu Glu Gly Gln
260 265 270

Glu Leu Ser Asp Glu Asp Asp Glu Val Tyr Gln Val Thr Val Tyr Gln
275 280 285

Ala Gly Glu Ser Asp Thr Asp Ser Phe Glu Glu Asp Pro Glu Ile Ser
290 295 300

Leu Ala Asp Tyr Trp Lys Cys Thr Ser Cys Asn Glu Met Asn Pro Pro
305 310 315 320

Leu Pro Ser His Cys Asn Arg Cys Trp Ala Leu Arg Glu Asn Trp Leu
325 330 335

Pro Glu Asp Lys Gly Lys Asp Lys Gly Glu Ile Ser Glu Lys Ala Lys
340 345 350

Leu Glu Asn Ser Thr Gln Ala Glu Glu Gly Phe Asp Val Pro Asp Cys
355 360 365

Lys Lys Thr Ile Val Asn Asp Ser Arg Glu Ser Cys Val Glu Glu Asn
370 375 380

Asp Asp Lys Ile Thr Gln Ala Ser Gln Ser Gln Glu Ser Glu Asp Tyr
385 390 395 400

Ser Gln Pro Ser Thr Ser Ser Ser Ile Ile Tyr Ser Ser Gln Glu Asp
405 410 415

Val Lys Glu Phe Glu Arg Glu Glu Thr Gln Asp Lys Glu Glu Ser Val
420 425 430

Glu Ser Ser Leu Pro Leu Asn Ala Ile Glu Pro Cys Val Ile Cys Gln
435 440 445

Gly Arg Pro Lys Asn Gly Cys Ile Val His Gly Lys Thr Gly His Leu
450 455 460

Met Ala Cys Phe Thr Cys Ala Lys Lys Leu Lys Lys Arg Asn Lys Pro
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Cys Pro Val Cys Arg Gln Pro Ile Gln Met Ile Val Leu Thr Tyr Phe
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