Figure 1

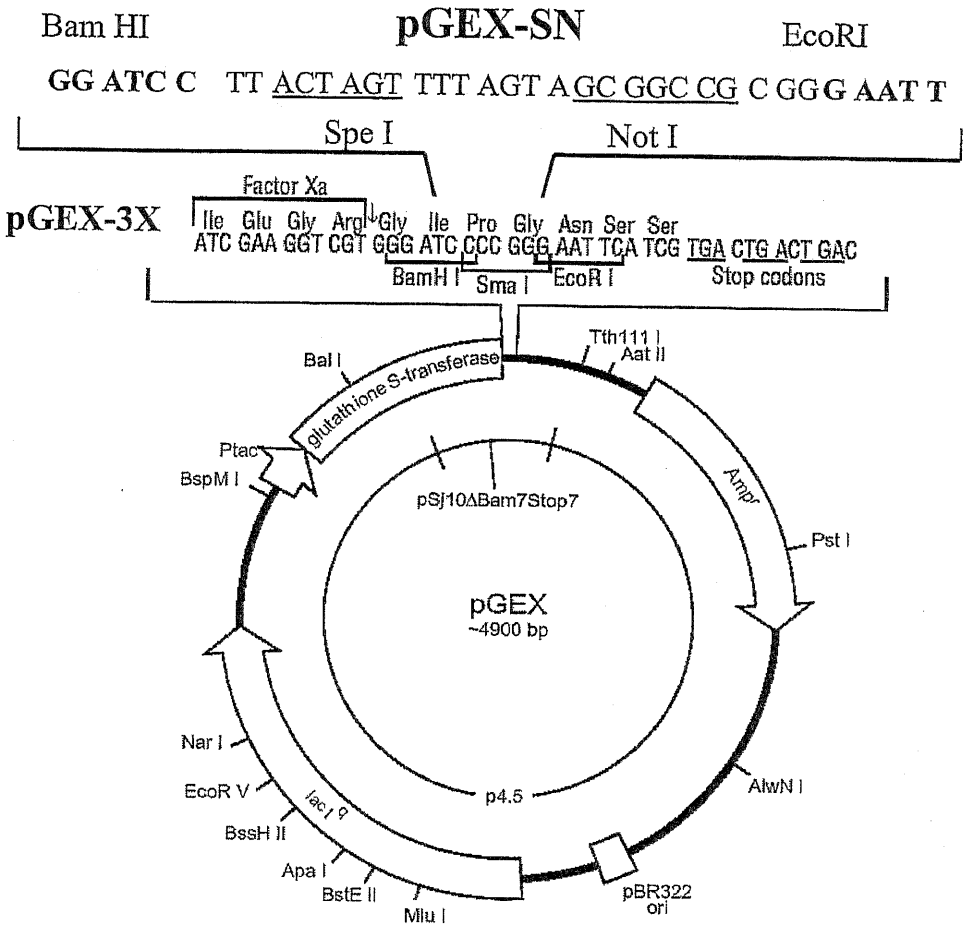

Bam HI
pGEX-SN
EcoRI
GG ATC C TT ACT AGT TTT AGT A GC GGC CG C GG G AAT T
Spe I
Not I
pGEX-3X
Factor Xa
Ile Glu Gly Arg Gly Ile Pro Gly Asn Ser Ser
ATC GAA GGT CGT GGG ATC CCC GGG AAT TCA TCG TGA CTG ACT GAC
BamH I
Sma I
EcoR I
Stop codons
BalI
glutathione S-transferase
Tth111 I
Aat II
Ptac
BspM I
pSJ10ΔBam7Stop7
Ampr
Pst I
pGEX
~4900 bp
Nar I
EcoR V
BssH II
Apa I
BstE II
Mlu I
lacIq
p4.5
AlwN I
pBR322
ori

Figure 2

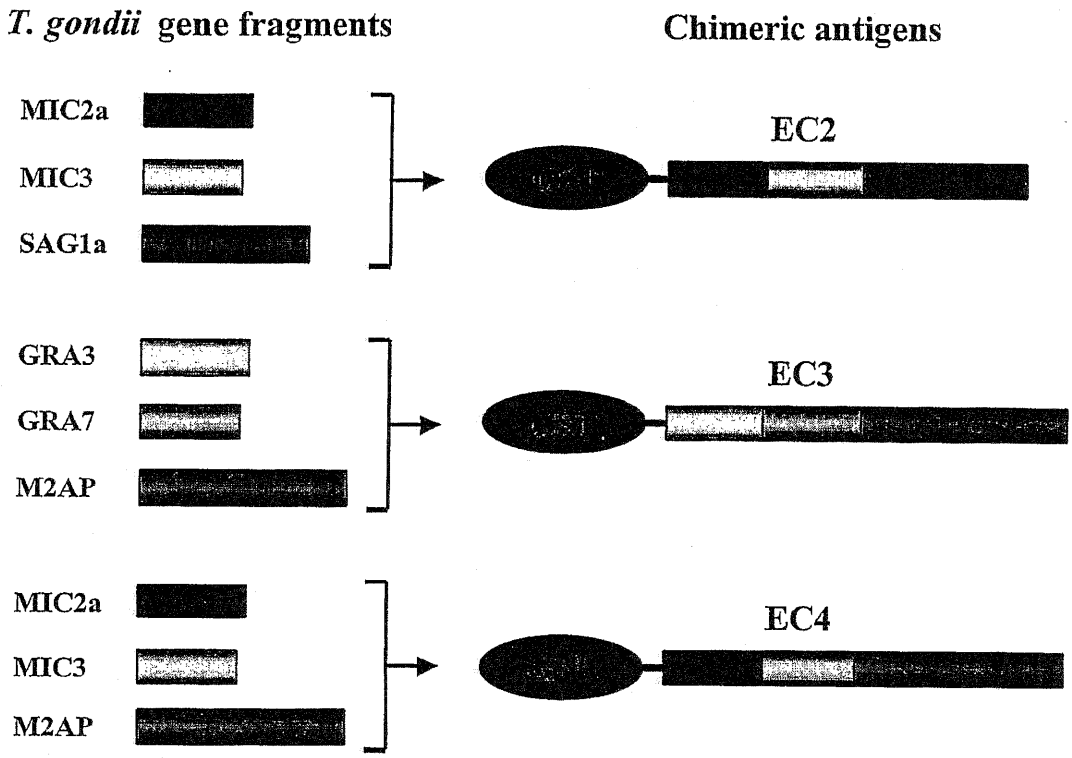

T. gondii gene fragments
Chimeric antigens
MIC2a
MIC3
SAG1a
EC2
GRA3
GRA7
M2AP
EC3
MIC2a
MIC3
M2AP
EC4

Figure 3

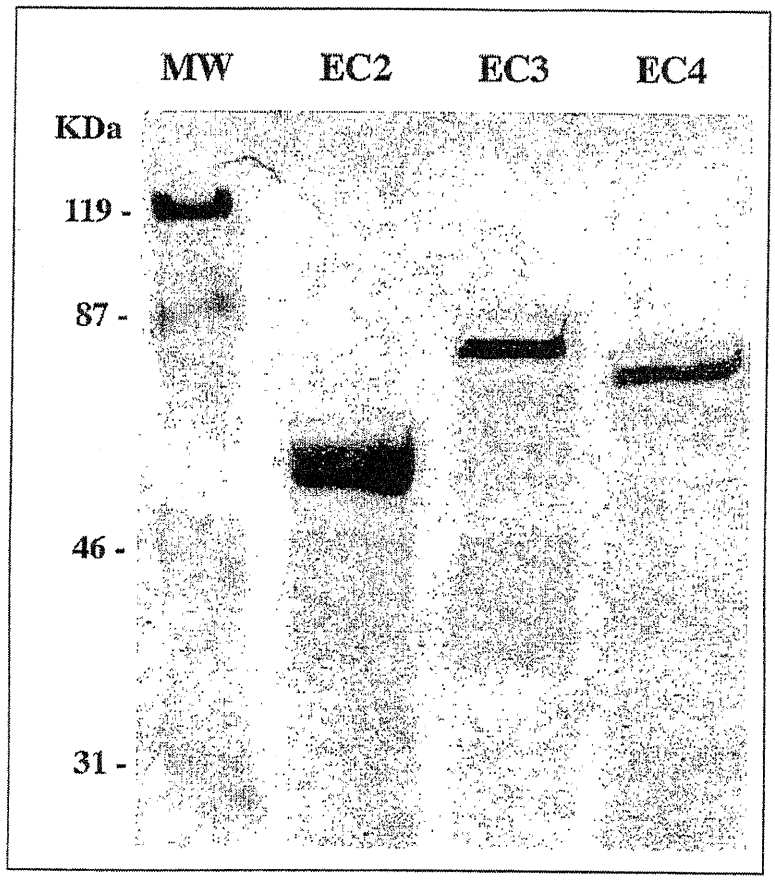
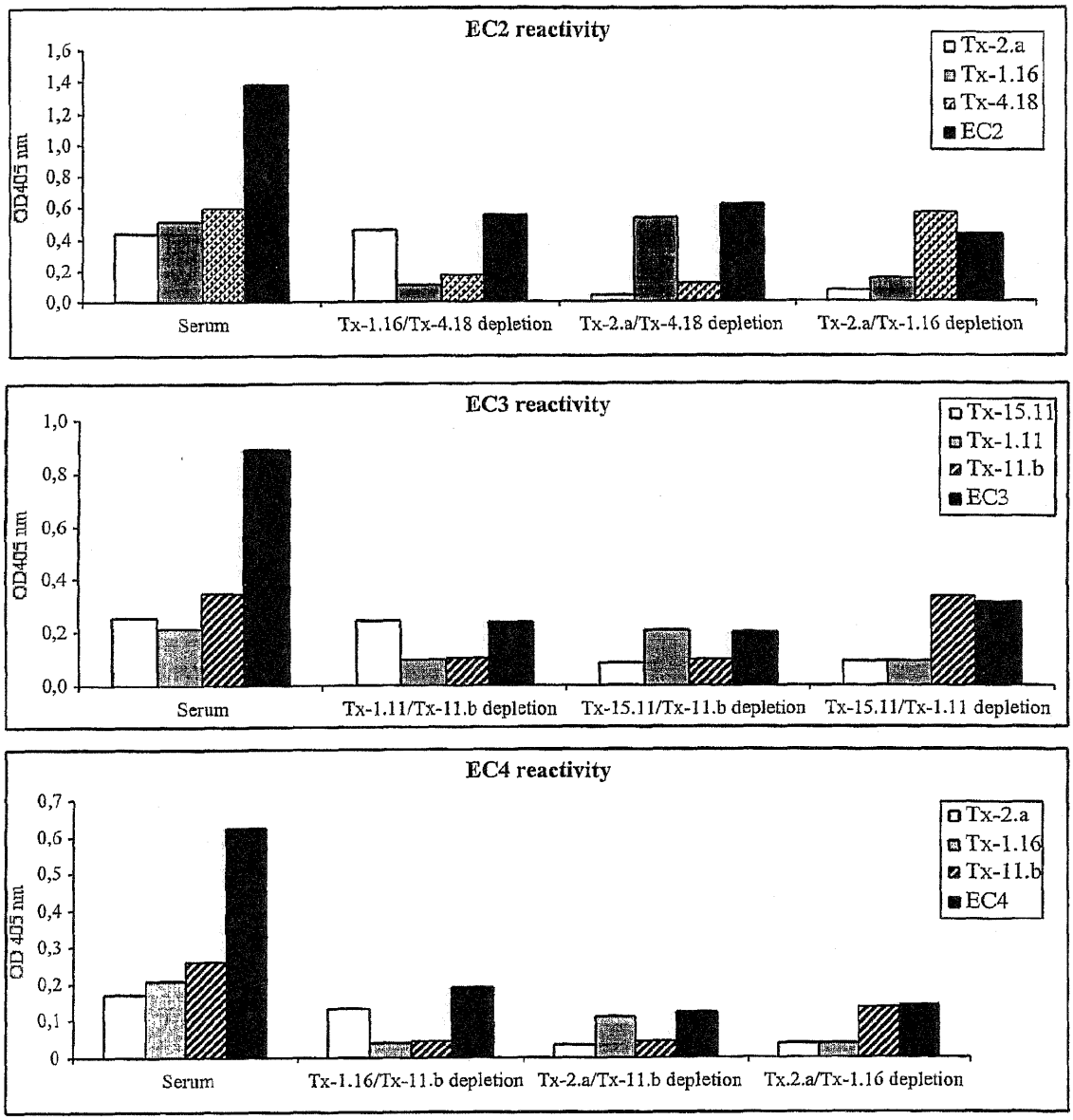


Figure 4


EC2 reactivity
OD405 nm
1,6
1,4
1,2
1,0
0,8
0,6
0,4
0,2
0,0
Tx-2.a
Tx-1.16
Tx-4.18
EC2
Serum
Tx-1.16/Tx-4.18 depletion
Tx-2.a/Tx-4.18 depletion
Tx-2.a/Tx-1.16 depletion
EC3 reactivity
OD405 nm
1,0
0,8
0,6
0,4
0,2
0,0
Tx-15.11
Tx-1.11
Tx-11.b
EC3
Serum
Tx-1.11/Tx-11.b depletion
Tx-15.11/Tx-11.b depletion
Tx-15.11/Tx-1.11 depletion
EC4 reactivity
OD 405 nm
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
Tx-2.a
Tx-1.16
Tx-11.b
EC4
Serum
Tx-1.16/Tx-11.b depletion
Tx-2.a/Tx-11.b depletion
Tx.2.a/Tx-1.16 depletion

SEQUENCE LISTING

<110> Kenton S.r.l.

<120> Chimeric recombinant antigens of Toxoplasma gondii

<130> 501-EP

<160> 42

<170> PatentIn version 3.1

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<213> Toxoplasma gondii

<220>

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1               5                  10                  15

ctt gca gaa cca gtt acg ggt gtg ggg gaa gca gga gtg tcc ccc gtc        96
Leu Ala Glu Pro Val Thr Gly Val Gly Glu Ala Gly Val Ser Pro Val
            20                  25                  30

aac gaa gct ggt gag tca tac agt tct gca act tcg ggt gtc caa gaa       144
Asn Glu Ala Gly Glu Ser Tyr Ser Ser Ala Thr Ser Gly Val Gln Glu
        35                  40                  45

gct acc gcc cca ggt gca gtg ctc ctg gac gca atc gat gcc gag tcg       192
Ala Thr Ala Pro Gly Ala Val Leu Leu Asp Ala Ile Asp Ala Glu Ser
    50                  55                  60

gat aag gtg gac aat cag gcg gag gga ggt gag cgt atg aag aag gtc       240
Asp Lys Val Asp Asn Gln Ala Glu Gly Gly Glu Arg Met Lys Lys Val
65                  70                  75                  80

gaa gag gag ttg tcg tta ttg agg cgg gaa tta tat gat cgc aca gat       288
Glu Glu Glu Leu Ser Leu Leu Arg Arg Glu Leu Tyr Asp Arg Thr Asp
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20 25 30

Asn Glu Ala Gly Glu Ser Tyr Ser Ser Ala Thr Ser Gly Val Gln Glu
35 40 45

Ala Thr Ala Pro Gly Ala Val Leu Leu Asp Ala Ile Asp Ala Glu Ser
50 55 60

Asp Lys Val Asp Asn Gln Ala Glu Gly Gly Glu Arg Met Lys Lys Val
65 70 75 80

Glu Glu Glu Leu Ser Leu Leu Arg Arg Glu Leu Tyr Asp Arg Thr Asp
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Arg Pro Gly

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<211> 231

<212> DNA

<213> Toxoplasma gondii

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<221> CDS

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aat tct gac ttt ttc gat ggt caa gca ccc gtt gac agt ctc aga ccg      96
Asn Ser Asp Phe Phe Asp Gly Gln Ala Pro Val Asp Ser Leu Arg Pro
            20                  25                  30

acg aac gcc ggt gtc gac tcg aaa ggg acc gac gat cac ctc acc acc     144
Thr Asn Ala Gly Val Asp Ser Lys Gly Thr Asp Asp His Leu Thr Thr
        35                  40                  45

agc atg gat aag gca tct gta gag agt cag ctt ccg aga aga gag cca     192
Ser Met Asp Lys Ala Ser Val Glu Ser Gln Leu Pro Arg Arg Glu Pro
    50                  55                  60

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<211> 77

<212> PRT

<213> Toxoplasma gondii

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            20                  25                  30

Thr Asn Ala Gly Val Asp Ser Lys Gly Thr Asp Asp His Leu Thr Thr
        35                  40                  45

Ser Met Asp Lys Ala Ser Val Glu Ser Gln Leu Pro Arg Arg Glu Pro
    50                  55                  60

Leu Glu Thr Glu Pro Asp Glu Gln Glu Glu Val His Phe
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<213> Toxoplasma gondii

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Cys Ile Asp Asp Ala Ser His Glu Asn Gly Tyr Thr Cys Glu Cys Pro
20 25 30

aca ggg tac tca cgt gag gtg act tcc aag gcg gag gag tcg tgt gtg 144
Thr Gly Tyr Ser Arg Glu Val Thr Ser Lys Ala Glu Glu Ser Cys Val
35 40 45

gaa gga gtc gaa gtc acg ctg gct gag aaa tgc gag aag gaa ttc ggc 192
Glu Gly Val Glu Val Thr Leu Ala Glu Lys Cys Glu Lys Glu Phe Gly
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<210> 6

<211> 73

<212> PRT

<213> Toxoplasma gondii

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Cys Ile Asp Asp Ala Ser His Glu Asn Gly Tyr Thr Cys Glu Cys Pro
20 25 30

Thr Gly Tyr Ser Arg Glu Val Thr Ser Lys Ala Glu Glu Ser Cys Val
35 40 45

Glu Gly Val Glu Val Thr Leu Ala Glu Lys Cys Glu Lys Glu Phe Gly
50 55 60

Ile Ser Ala Ser Ser Cys Lys Cys Asp
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act ctt ggt cct gtc aag ttg tct gcg gaa gga ccc act aca atg acc        96
Thr Leu Gly Pro Val Lys Leu Ser Ala Glu Gly Pro Thr Thr Met Thr
            20                  25                  30

ctc gtg tgc ggg aaa gat gga gtc aaa gtt cct caa gac aac aat cag       144
Leu Val Cys Gly Lys Asp Gly Val Lys Val Pro Gln Asp Asn Asn Gln
        35                  40                  45

tac tgt tcc ggg acg acg ctg act ggt tgc aac gag aaa tcg ttc aaa       192
Tyr Cys Ser Gly Thr Thr Leu Thr Gly Cys Asn Glu Lys Ser Phe Lys
    50                  55                  60

gat att ttg cca aaa tta act gag aac ccg tgg cag ggt aac gct tcg       240
Asp Ile Leu Pro Lys Leu Thr Glu Asn Pro Trp Gln Gly Asn Ala Ser
65                  70                  75                  80

agt gat aag ggt gcc acg cta acg atc aag aag gaa gca ttt cca gcc       288
Ser Asp Lys Gly Ala Thr Leu Thr Ile Lys Lys Glu Ala Phe Pro Ala
                85                  90                  95

gag tca aaa agc gtc att att gga tgc aca ggg gga tcg cct gag aag       336
Glu Ser Lys Ser Val Ile Ile Gly Cys Thr Gly Gly Ser Pro Glu Lys
            100                 105                 110

cat cac tgt acc gtg aaa ctg gag ttt gcc ggg gct gca ggg tca gca       384
His His Cys Thr Val Lys Leu Glu Phe Ala Gly Ala Ala Gly Ser Ala
        115                 120                 125

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Lys Ser Ala
    130
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<210> 8

<211> 131

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<213> Toxoplasma gondii

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            20                  25                  30
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35 40 45

Tyr Cys Ser Gly Thr Thr Leu Thr Gly Cys Asn Glu Lys Ser Phe Lys
50 55 60

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

Ser Asp Lys Gly Ala Thr Leu Thr Ile Lys Lys Glu Ala Phe Pro Ala
85 90 95

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His His Cys Thr Val Lys Leu Glu Phe Ala Gly Ala Ala Gly Ser Ala
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Lys Ser Ala
130

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<211> 237

<212> DNA

<213> Toxoplasma gondii

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<221> CDS

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gta tcc tgc ggt gac gga agc caa atc agg acg cga act gag gtt tct 96
Val Ser Cys Gly Asp Gly Ser Gln Ile Arg Thr Arg Thr Glu Val Ser
20 25 30

gct ccg caa cct gga aca cca aca tgt ccg gac tgc cct gcg ccc atg 144
Ala Pro Gln Pro Gly Thr Pro Thr Cys Pro Asp Cys Pro Ala Pro Met
35 40 45

gga agg act tgc gtg gaa caa ggc gga ctt gaa gaa atc cgt gaa tgc 192
Gly Arg Thr Cys Val Glu Gln Gly Gly Leu Glu Glu Ile Arg Glu Cys
50 55 60

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65 70 75

<210> 10

<211> 79

<212> PRT

<213> Toxoplasma gondii

<400> 10

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20 25 30

Ala Pro Gln Pro Gly Thr Pro Thr Cys Pro Asp Cys Pro Ala Pro Met
35 40 45

Gly Arg Thr Cys Val Glu Gln Gly Gly Leu Glu Glu Ile Arg Glu Cys
50 55 60

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<211> 678

<212> DNA

<213> Toxoplasma gondii

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<221> CDS

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1 5 10 15

gag gtg cca tgt aac tct gtt cat gtt cag ggg gtg atg acc ccg aat 96
Glu Val Pro Cys Asn Ser Val His Val Gln Gly Val Met Thr Pro Asn
20 25 30

caa atg gtc aaa gtg act ggt gca gga tgg gat aat ggc gtt ctc gag 144
Gln Met Val Lys Val Thr Gly Ala Gly Trp Asp Asn Gly Val Leu Glu
35 40 45

```
ttc tat gtc acg agg cca acg aag aca ggc ggg gac aca agc cga agc        192
Phe Tyr Val Thr Arg Pro Thr Lys Thr Gly Gly Asp Thr Ser Arg Ser
    50                  55                  60

cat ctt gcg tcg atc atg tgt tat tcc aag gac att gac ggc gtg ccg        240
His Leu Ala Ser Ile Met Cys Tyr Ser Lys Asp Ile Asp Gly Val Pro
65                  70                  75                  80

tca gac aaa gcg gga aag tgc ttt ctg aag aac ttt tct ggt gaa gac        288
Ser Asp Lys Ala Gly Lys Cys Phe Leu Lys Asn Phe Ser Gly Glu Asp
                85                  90                  95

tcg tcg gaa ata gac gaa aaa gaa gta tct cta ccc atc aag agc cac        336
Ser Ser Glu Ile Asp Glu Lys Glu Val Ser Leu Pro Ile Lys Ser His
            100                 105                 110

aac gat gcg ttc atg ttc gtt tgt tct tca aat gat gga tcc gca ctc        384
Asn Asp Ala Phe Met Phe Val Cys Ser Ser Asn Asp Gly Ser Ala Leu
        115                 120                 125

cag tgt gat gtt ttc gcc ctt gat aac acc aac tct agc gac ggg tgg        432
Gln Cys Asp Val Phe Ala Leu Asp Asn Thr Asn Ser Ser Asp Gly Trp
    130                 135                 140

aaa gtg aat acc gtg gat ctt ggc gtc agc gtt agt ccg gat ttg gca        480
Lys Val Asn Thr Val Asp Leu Gly Val Ser Val Ser Pro Asp Leu Ala
145                 150                 155                 160

ttc gga ctc act gca gat ggg gtc aag gtg aag aag ttg tac gca agc        528
Phe Gly Leu Thr Ala Asp Gly Val Lys Val Lys Lys Leu Tyr Ala Ser
                165                 170                 175

agc ggc ctg aca gcg atc aac gac gac cct tcc ttg ggg tgc aag gct        576
Ser Gly Leu Thr Ala Ile Asn Asp Asp Pro Ser Leu Gly Cys Lys Ala
            180                 185                 190

cct ccc cat tct ccg ccg gcc gga gag gaa ccg agt ttg ccg tcg cct        624
Pro Pro His Ser Pro Pro Ala Gly Glu Glu Pro Ser Leu Pro Ser Pro
        195                 200                 205

gaa aac agc ggg tct gca aca cca gcg gaa gaa agt ccg tct gag tct        672
Glu Asn Ser Gly Ser Ala Thr Pro Ala Glu Glu Ser Pro Ser Glu Ser
    210                 215                 220

gaa tct                                                               678
Glu Ser
225
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<210> 12

<211> 226

<212> PRT

<213> Toxoplasma gondii

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1               5                   10                  15

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

Phe Tyr Val Thr Arg Pro Thr Lys Thr Gly Gly Asp Thr Ser Arg Ser
50 55 60

His Leu Ala Ser Ile Met Cys Tyr Ser Lys Asp Ile Asp Gly Val Pro
65 70 75 80

Ser Asp Lys Ala Gly Lys Cys Phe Leu Lys Asn Phe Ser Gly Glu Asp
85 90 95

Ser Ser Glu Ile Asp Glu Lys Glu Val Ser Leu Pro Ile Lys Ser His
100 105 110

Asn Asp Ala Phe Met Phe Val Cys Ser Ser Asn Asp Gly Ser Ala Leu
115 120 125

Gln Cys Asp Val Phe Ala Leu Asp Asn Thr Asn Ser Ser Asp Gly Trp
130 135 140

Lys Val Asn Thr Val Asp Leu Gly Val Ser Val Ser Pro Asp Leu Ala
145 150 155 160

Phe Gly Leu Thr Ala Asp Gly Val Lys Val Lys Lys Leu Tyr Ala Ser
165 170 175

Ser Gly Leu Thr Ala Ile Asn Asp Asp Pro Ser Leu Gly Cys Lys Ala
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<213> Artificial Sequence

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<223> Primer K572

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<210> 26

<211> 39

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<213> Artificial Sequence

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<223> Primer K571

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<213> Artificial Sequence

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<221> CDS

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Ser Pro Cys Ser Val Ser Cys Gly Asp Gly Ser Gln Ile Arg Thr Arg
            20                  25                  30

act gag gtt tct gct ccg caa cct gga aca cca aca tgt ccg gac tgc     144
Thr Glu Val Ser Ala Pro Gln Pro Gly Thr Pro Thr Cys Pro Asp Cys
        35                  40                  45

cct gcg ccc atg gga agg act tgc gtg gaa caa ggc gga ctt gaa gaa     192
Pro Ala Pro Met Gly Arg Thr Cys Val Glu Gln Gly Gly Leu Glu Glu
    50                  55                  60

atc cgt gaa tgc agt gcg ggg gta tgt gct gtt gac gct gga tgt ggc     240
Ile Arg Glu Cys Ser Ala Gly Val Cys Ala Val Asp Ala Gly Cys Gly
65                  70                  75                  80

gtc tgg tct ggt ggc ggt agc agg act gga tgt cat gcc ttc agg gag     288
Val Trp Ser Gly Gly Gly Ser Arg Thr Gly Cys His Ala Phe Arg Glu
                85                  90                  95

aac tgc agc cct ggt aga tgt att gat gac gcc tcg cat gag aat ggc     336
Asn Cys Ser Pro Gly Arg Cys Ile Asp Asp Ala Ser His Glu Asn Gly
            100                 105                 110

tac acc tgc gag tgc ccc aca ggg tac tca cgt gag gtg act tcc aag     384
Tyr Thr Cys Glu Cys Pro Thr Gly Tyr Ser Arg Glu Val Thr Ser Lys
        115                 120                 125

gcg gag gag tcg tgt gtg gaa gga gtc gaa gtc acg ctg gct gag aaa     432
Ala Glu Glu Ser Cys Val Glu Gly Val Glu Val Thr Leu Ala Glu Lys
    130                 135                 140

tgc gag aag gaa ttc ggc atc agc gcg tca tcc tgc aaa tgc gat aac     480
Cys Glu Lys Glu Phe Gly Ile Ser Ala Ser Ser Cys Lys Cys Asp Asn
145                 150                 155                 160

tct ggt ggc ggt agc tcg gtc gtc aat aat gtc gca agg tgc tcc tac     528
Ser Gly Gly Gly Ser Ser Val Val Asn Asn Val Ala Arg Cys Ser Tyr
                165                 170                 175

ggt gca gac agc act ctt ggt cct gtc aag ttg tct gcg gaa gga ccc     576
Gly Ala Asp Ser Thr Leu Gly Pro Val Lys Leu Ser Ala Glu Gly Pro
            180                 185                 190

act aca atg acc ctc gtg tgc ggg aaa gat gga gtc aaa gtt cct caa     624
Thr Thr Met Thr Leu Val Cys Gly Lys Asp Gly Val Lys Val Pro Gln
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gac aac aat cag tac tgt tcc ggg acg acg ctg act ggt tgc aac gag     672
Asp Asn Asn Gln Tyr Cys Ser Gly Thr Thr Leu Thr Gly Cys Asn Glu
    210                 215                 220

aaa tcg ttc aaa gat att ttg cca aaa tta act gag aac ccg tgg cag     720
Lys Ser Phe Lys Asp Ile Leu Pro Lys Leu Thr Glu Asn Pro Trp Gln
225                 230                 235                 240

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Gly Asn Ala Ser Ser Asp Lys Gly Ala Thr Leu Thr Ile Lys Lys Glu
                245                 250                 255

gca ttt cca gcc gag tca aaa agc gtc att att gga tgc aca ggg gga     816
Ala Phe Pro Ala Glu Ser Lys Ser Val Ile Ile Gly Cys Thr Gly Gly
            260                 265                 270

tcg cct gag aag cat cac tgt acc gtg aaa ctg gag ttt gcc ggg gct     864
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275 280 285

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<210> 28

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<212> PRT

<213> Artificial Sequence

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20 25 30

Thr Glu Val Ser Ala Pro Gln Pro Gly Thr Pro Thr Cys Pro Asp Cys
35 40 45

Pro Ala Pro Met Gly Arg Thr Cys Val Glu Gln Gly Gly Leu Glu Glu
50 55 60

Ile Arg Glu Cys Ser Ala Gly Val Cys Ala Val Asp Ala Gly Cys Gly
65 70 75 80

Val Trp Ser Gly Gly Gly Ser Arg Thr Gly Cys His Ala Phe Arg Glu
85 90 95

Asn Cys Ser Pro Gly Arg Cys Ile Asp Asp Ala Ser His Glu Asn Gly
100 105 110

Tyr Thr Cys Glu Cys Pro Thr Gly Tyr Ser Arg Glu Val Thr Ser Lys
115 120 125

Ala Glu Glu Ser Cys Val Glu Gly Val Glu Val Thr Leu Ala Glu Lys
130 135 140

Cys Glu Lys Glu Phe Gly Ile Ser Ala Ser Ser Cys Lys Cys Asp Asn
145 150 155 160

Ser Gly Gly Gly Ser Ser Val Val Asn Asn Val Ala Arg Cys Ser Tyr
165 170 175

Gly Ala Asp Ser Thr Leu Gly Pro Val Lys Leu Ser Ala Glu Gly Pro
180 185 190

Thr Thr Met Thr Leu Val Cys Gly Lys Asp Gly Val Lys Val Pro Gln
195 200 205

Asp Asn Asn Gln Tyr Cys Ser Gly Thr Thr Leu Thr Gly Cys Asn Glu
210 215 220

Lys Ser Phe Lys Asp Ile Leu Pro Lys Leu Thr Glu Asn Pro Trp Gln
225 230 235 240

Gly Asn Ala Ser Ser Asp Lys Gly Ala Thr Leu Thr Ile Lys Lys Glu
245 250 255

Ala Phe Pro Ala Glu Ser Lys Ser Val Ile Ile Gly Cys Thr Gly Gly
260 265 270

Ser Pro Glu Lys His His Cys Thr Val Lys Leu Glu Phe Ala Gly Ala
275 280 285

Ala Gly Ser Ala Lys Ser Ala Ser Gly Arg
290 295

<210> 29

<211> 1258

<212> DNA

<213> Artificial Sequence

<220>

<223> EC3

<220>

<221> CDS

<222> (1)..(1257)

<400> 29

act agt cgg ctg gct gcc ttg gga ggc ctt gcg gat cag cct gaa aat 48
Thr Ser Arg Leu Ala Ala Leu Gly Gly Leu Ala Asp Gln Pro Glu Asn
1 5 10 15

cat cag gct ctt gca gaa cca gtt acg ggt gtg ggg gaa gca gga gtg 96
His Gln Ala Leu Ala Glu Pro Val Thr Gly Val Gly Glu Ala Gly Val
20 25 30

tcc ccc gtc aac gaa gct ggt gag tca tac agt tct gca act tcg ggt 144
Ser Pro Val Asn Glu Ala Gly Glu Ser Tyr Ser Ser Ala Thr Ser Gly

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        35                  40                  45

gtc caa gaa gct acc gcc cca ggt gca gtg ctc ctg gac gca atc gat      192
Val Gln Glu Ala Thr Ala Pro Gly Ala Val Leu Leu Asp Ala Ile Asp
    50                  55                  60

gcc gag tcg gat aag gtg gac aat cag gcg gag gga ggt gag cgt atg      240
Ala Glu Ser Asp Lys Val Asp Asn Gln Ala Glu Gly Gly Glu Arg Met
65                  70                  75                  80

aag aag gtc gaa gag gag ttg tcg tta ttg agg cgg gaa tta tat gat      288
Lys Lys Val Glu Glu Glu Leu Ser Leu Leu Arg Arg Glu Leu Tyr Asp
                85                  90                  95

cgc aca gat cgc cct ggt ttg tct ggt ggc ggt agt gct acc gcg gcc      336
Arg Thr Asp Arg Pro Gly Leu Ser Gly Gly Gly Ser Ala Thr Ala Ala
            100                 105                 110

acc gcg tca gat gac gaa ctg atg agt cga atc cga aat tct gac ttt      384
Thr Ala Ser Asp Asp Glu Leu Met Ser Arg Ile Arg Asn Ser Asp Phe
        115                 120                 125

ttc gat ggt caa gca ccc gtt gac agt ctc aga ccg acg aac gcc ggt      432
Phe Asp Gly Gln Ala Pro Val Asp Ser Leu Arg Pro Thr Asn Ala Gly
    130                 135                 140

gtc gac tcg aaa ggg acc gac gat cac ctc acc acc agc atg gat aag      480
Val Asp Ser Lys Gly Thr Asp Asp His Leu Thr Thr Ser Met Asp Lys
145                 150                 155                 160

gca tct gta gag agt cag ctt ccg aga aga gag cca ttg gag acg gag      528
Ala Ser Val Glu Ser Gln Leu Pro Arg Arg Glu Pro Leu Glu Thr Glu
                165                 170                 175

cca gat gaa caa gaa gaa gtt cat ttc tct ggt ggc ggt agt aac gaa      576
Pro Asp Glu Gln Glu Glu Val His Phe Ser Gly Gly Gly Ser Asn Glu
            180                 185                 190

ccg gtg gcc cta gct cag ctc agc aca ttc ctc gag ctc gtc gag gtg      624
Pro Val Ala Leu Ala Gln Leu Ser Thr Phe Leu Glu Leu Val Glu Val
        195                 200                 205

cca tgt aac tct gtt cat gtt cag ggg gtg atg acc ccg aat caa atg      672
Pro Cys Asn Ser Val His Val Gln Gly Val Met Thr Pro Asn Gln Met
    210                 215                 220

gtc aaa gtg act ggt gca gga tgg gat aat ggc gtt ctc gag ttc tat      720
Val Lys Val Thr Gly Ala Gly Trp Asp Asn Gly Val Leu Glu Phe Tyr
225                 230                 235                 240

gtc acg agg cca acg aag aca ggc ggg gac aca agc cga agc cat ctt      768
Val Thr Arg Pro Thr Lys Thr Gly Gly Asp Thr Ser Arg Ser His Leu
                245                 250                 255

gcg tcg atc atg tgt tat tcc aag gac att gac ggc gtg ccg tca gac      816
Ala Ser Ile Met Cys Tyr Ser Lys Asp Ile Asp Gly Val Pro Ser Asp
            260                 265                 270

aaa gcg gga aag tgc ttt ctg aag aac ttt tct ggt gaa gac tcg tcg      864
Lys Ala Gly Lys Cys Phe Leu Lys Asn Phe Ser Gly Glu Asp Ser Ser
        275                 280                 285

gaa ata gac gaa aaa gaa gta tct cta ccc atc aag agc cac aac gat      912
Glu Ile Asp Glu Lys Glu Val Ser Leu Pro Ile Lys Ser His Asn Asp
    290                 295                 300

gcg ttc atg ttc gtt tgt tct tca aat gat gga tcc gca ctc cag tgt      960
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Ala Phe Met Phe Val Cys Ser Ser Asn Asp Gly Ser Ala Leu Gln Cys
305 310 315 320

gat gtt ttc gcc ctt gat aac acc aac tct agc gac ggg tgg aaa gtg 1008
Asp Val Phe Ala Leu Asp Asn Thr Asn Ser Ser Asp Gly Trp Lys Val
325 330 335

aat acc gtg gat ctt ggc gtc agc gtt agt ccg gat ttg gca ttc gga 1056
Asn Thr Val Asp Leu Gly Val Ser Val Ser Pro Asp Leu Ala Phe Gly
340 345 350

ctc act gca gat ggg gtc aag gtg aag aag ttg tac gca agc agc ggc 1104
Leu Thr Ala Asp Gly Val Lys Val Lys Lys Leu Tyr Ala Ser Ser Gly
355 360 365

ctg aca gcg atc aac gac gac cct tcc ttg ggg tgc aag gct cct ccc 1152
Leu Thr Ala Ile Asn Asp Asp Pro Ser Leu Gly Cys Lys Ala Pro Pro
370 375 380

cat tct ccg ccg gcc gga gag gaa ccg agt ttg ccg tcg cct gaa aac 1200
His Ser Pro Pro Ala Gly Glu Glu Pro Ser Leu Pro Ser Pro Glu Asn
385 390 395 400

agc ggg tct gca aca cca gcg gaa gaa agt ccg tct gag tct gaa tct 1248
Ser Gly Ser Ala Thr Pro Ala Glu Glu Ser Pro Ser Glu Ser Glu Ser
405 410 415

gcg gcc gcg g 1258
Ala Ala Ala

<210> 30

<211> 419

<212> PRT

<213> Artificial Sequence

<220>

<223> EC3

<400> 30

Thr Ser Arg Leu Ala Ala Leu Gly Gly Leu Ala Asp Gln Pro Glu Asn
1 5 10 15

His Gln Ala Leu Ala Glu Pro Val Thr Gly Val Gly Glu Ala Gly Val
20 25 30

Ser Pro Val Asn Glu Ala Gly Glu Ser Tyr Ser Ser Ala Thr Ser Gly
35 40 45

Val Gln Glu Ala Thr Ala Pro Gly Ala Val Leu Leu Asp Ala Ile Asp
50 55 60

Ala Glu Ser Asp Lys Val Asp Asn Gln Ala Glu Gly Gly Glu Arg Met
65 70 75 80

Lys Lys Val Glu Glu Glu Leu Ser Leu Leu Arg Arg Glu Leu Tyr Asp
85 90 95

Arg Thr Asp Arg Pro Gly Leu Ser Gly Gly Gly Ser Ala Thr Ala Ala
100 105 110

Thr Ala Ser Asp Asp Glu Leu Met Ser Arg Ile Arg Asn Ser Asp Phe
115 120 125

Phe Asp Gly Gln Ala Pro Val Asp Ser Leu Arg Pro Thr Asn Ala Gly
130 135 140

Val Asp Ser Lys Gly Thr Asp Asp His Leu Thr Thr Ser Met Asp Lys
145 150 155 160

Ala Ser Val Glu Ser Gln Leu Pro Arg Arg Glu Pro Leu Glu Thr Glu
165 170 175

Pro Asp Glu Gln Glu Glu Val His Phe Ser Gly Gly Gly Ser Asn Glu
180 185 190

Pro Val Ala Leu Ala Gln Leu Ser Thr Phe Leu Glu Leu Val Glu Val
195 200 205

Pro Cys Asn Ser Val His Val Gln Gly Val Met Thr Pro Asn Gln Met
210 215 220

Val Lys Val Thr Gly Ala Gly Trp Asp Asn Gly Val Leu Glu Phe Tyr
225 230 235 240

Val Thr Arg Pro Thr Lys Thr Gly Gly Asp Thr Ser Arg Ser His Leu
245 250 255

Ala Ser Ile Met Cys Tyr Ser Lys Asp Ile Asp Gly Val Pro Ser Asp
260 265 270

Lys Ala Gly Lys Cys Phe Leu Lys Asn Phe Ser Gly Glu Asp Ser Ser
275 280 285

Glu Ile Asp Glu Lys Glu Val Ser Leu Pro Ile Lys Ser His Asn Asp
290 295 300

Ala Phe Met Phe Val Cys Ser Ser Asn Asp Gly Ser Ala Leu Gln Cys
305 310 315 320

Asp Val Phe Ala Leu Asp Asn Thr Asn Ser Ser Asp Gly Trp Lys Val
325 330 335

Asn Thr Val Asp Leu Gly Val Ser Val Ser Pro Asp Leu Ala Phe Gly

340 345 350

Leu Thr Ala Asp Gly Val Lys Val Lys Lys Leu Tyr Ala Ser Ser Gly
355 360 365

Leu Thr Ala Ile Asn Asp Asp Pro Ser Leu Gly Cys Lys Ala Pro Pro
370 375 380

His Ser Pro Pro Ala Gly Glu Glu Pro Ser Leu Pro Ser Pro Glu Asn
385 390 395 400

Ser Gly Ser Ala Thr Pro Ala Glu Glu Ser Pro Ser Glu Ser Glu Ser
405 410 415

Ala Ala Ala

<210> 31

<211> 1183

<212> DNA

<213> Artificial Sequence

<220>

<223> EC4

<220>

<221> CDS

<222> (1)..(1182)

<400> 31

act agt cgg ctc ccc cag gat gcc att tgc tcg gat tgg tcc gca tgg 48
Thr Ser Arg Leu Pro Gln Asp Ala Ile Cys Ser Asp Trp Ser Ala Trp
1 5 10 15

agc ccc tgc agt gta tcc tgc ggt gac gga agc caa atc agg acg cga 96
Ser Pro Cys Ser Val Ser Cys Gly Asp Gly Ser Gln Ile Arg Thr Arg
20 25 30

act gag gtt tct gct ccg caa cct gga aca cca aca tgt ccg gac tgc 144
Thr Glu Val Ser Ala Pro Gln Pro Gly Thr Pro Thr Cys Pro Asp Cys
35 40 45

ccc gcg ccc atg gga agg act tgc gtg gaa caa ggc gga ctt gaa gaa 192
Pro Ala Pro Met Gly Arg Thr Cys Val Glu Gln Gly Gly Leu Glu Glu
50 55 60

atc cgt gaa tgc agt gcg ggg gta tgt gct gtt gac gct gga tgt ggc 240
Ile Arg Glu Cys Ser Ala Gly Val Cys Ala Val Asp Ala Gly Cys Gly
65 70 75 80

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gtc tgg tct ggt ggc ggt agc agg act gga tgt cat gcc ttc agg gag      288
Val Trp Ser Gly Gly Gly Ser Arg Thr Gly Cys His Ala Phe Arg Glu
                85                  90                  95

aac tgc cgc cct ggt aga tgt att gat gac gcc tcg cat gag aat ggc      336
Asn Cys Arg Pro Gly Arg Cys Ile Asp Asp Ala Ser His Glu Asn Gly
            100                 105                 110

tac acc tgc gag tgc ccc aca tgg tac tca cgt gag gtg act tcc aag      384
Tyr Thr Cys Glu Cys Pro Thr Trp Tyr Ser Arg Glu Val Thr Ser Lys
        115                 120                 125

gcg gag gag tcg tgt gtg gaa gga gtc gaa gtc acg ctg gct gag aaa      432
Ala Glu Glu Ser Cys Val Glu Gly Val Glu Val Thr Leu Ala Glu Lys
    130                 135                 140

tgc gag aag gaa ttc ggc atc agc gcg tcc tcc tgc aaa tgc gat aac      480
Cys Glu Lys Glu Phe Gly Ile Ser Ala Ser Ser Cys Lys Cys Asp Asn
145                 150                 155                 160

tct ggt ggc ggt agt aac gaa ccg gtg gcc cta gct cag ctc agc aca      528
Ser Gly Gly Gly Ser Asn Glu Pro Val Ala Leu Ala Gln Leu Ser Thr
                165                 170                 175

ttc ctc gag ctc gtc gag gtg cca tgt aac tct gtt cat gtt cag ggg      576
Phe Leu Glu Leu Val Glu Val Pro Cys Asn Ser Val His Val Gln Gly
            180                 185                 190

gtg atg acc ccg aat caa atg gtc aaa gtg act ggt gca gga tgg gat      624
Val Met Thr Pro Asn Gln Met Val Lys Val Thr Gly Ala Gly Trp Asp
        195                 200                 205

aat ggc gtt ctc gag ttc tat gtc acg agg cca acg aag aca ggc ggg      672
Asn Gly Val Leu Glu Phe Tyr Val Thr Arg Pro Thr Lys Thr Gly Gly
    210                 215                 220

gac aca agc cga agc cac ctt gcg tcg atc atg tgt tat tcc aag gac      720
Asp Thr Ser Arg Ser His Leu Ala Ser Ile Met Cys Tyr Ser Lys Asp
225                 230                 235                 240

att gac ggc gtg ccg tca gac aaa gcg gga aag tgc ttt ttg aag aac      768
Ile Asp Gly Val Pro Ser Asp Lys Ala Gly Lys Cys Phe Leu Lys Asn
                245                 250                 255

ttt tct ggt gaa gac tcg tcg gaa ata gac gaa aaa gaa gta tct cta      816
Phe Ser Gly Glu Asp Ser Ser Glu Ile Asp Glu Lys Glu Val Ser Leu
            260                 265                 270

ccc atc aag agc cac aac gat gcg ttc atg ttc gtt tgt tct tca aat      864
Pro Ile Lys Ser His Asn Asp Ala Phe Met Phe Val Cys Ser Ser Asn
        275                 280                 285

gat gga tcc gca ctc cag tgt gat gtt ttc gcc ctt gat aac acc aac      912
Asp Gly Ser Ala Leu Gln Cys Asp Val Phe Ala Leu Asp Asn Thr Asn
    290                 295                 300

tct agc gac ggg tgg aaa gtg aat acc gtg gat ctt gac gtc agc gtt      960
Ser Ser Asp Gly Trp Lys Val Asn Thr Val Asp Leu Asp Val Ser Val
305                 310                 315                 320

agt ccg gat ttg gca ttc gga ctc act gca gat ggg gtc aag gtg aag     1008
Ser Pro Asp Leu Ala Phe Gly Leu Thr Ala Asp Gly Val Lys Val Lys
                325                 330                 335

aag ttg tac gca agc agc ggc ctg aca gcg atc aac gac gac cct tcc     1056
Lys Leu Tyr Ala Ser Ser Gly Leu Thr Ala Ile Asn Asp Asp Pro Ser
            340                 345                 350
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ttg ggg tgc aag gct cct ccc cat tct ccg ccg gcc gga gag gaa ccg      1104
Leu Gly Cys Lys Ala Pro Pro His Ser Pro Pro Ala Gly Glu Glu Pro
        355                 360                 365

agt ttg ccg tcg cct gaa aac agc ggg tct gca aca cca gcg gaa gaa      1152
Ser Leu Pro Ser Pro Glu Asn Ser Gly Ser Ala Thr Pro Ala Glu Glu
    370                 375                 380

agt ccg tct gag tct gaa tct gcg gcc gcg g                           1183
Ser Pro Ser Glu Ser Glu Ser Ala Ala Ala
385                 390
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<210> 32

<211> 394

<212> PRT

<213> Artificial Sequence

<220>

<223> EC4

<400> 32

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Thr Ser Arg Leu Pro Gln Asp Ala Ile Cys Ser Asp Trp Ser Ala Trp
1               5                   10                  15

Ser Pro Cys Ser Val Ser Cys Gly Asp Gly Ser Gln Ile Arg Thr Arg
            20                  25                  30

Thr Glu Val Ser Ala Pro Gln Pro Gly Thr Pro Thr Cys Pro Asp Cys
        35                  40                  45

Pro Ala Pro Met Gly Arg Thr Cys Val Glu Gln Gly Gly Leu Glu Glu
    50                  55                  60

Ile Arg Glu Cys Ser Ala Gly Val Cys Ala Val Asp Ala Gly Cys Gly
65                  70                  75                  80

Val Trp Ser Gly Gly Gly Ser Arg Thr Gly Cys His Ala Phe Arg Glu
                85                  90                  95

Asn Cys Arg Pro Gly Arg Cys Ile Asp Asp Ala Ser His Glu Asn Gly
            100                 105                 110

Tyr Thr Cys Glu Cys Pro Thr Trp Tyr Ser Arg Glu Val Thr Ser Lys
        115                 120                 125

Ala Glu Glu Ser Cys Val Glu Gly Val Glu Val Thr Leu Ala Glu Lys
    130                 135                 140

Cys Glu Lys Glu Phe Gly Ile Ser Ala Ser Ser Cys Lys Cys Asp Asn
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145 150 155 160

Ser Gly Gly Gly Ser Asn Glu Pro Val Ala Leu Ala Gln Leu Ser Thr
165 170 175

Phe Leu Glu Leu Val Glu Val Pro Cys Asn Ser Val His Val Gln Gly
180 185 190

Val Met Thr Pro Asn Gln Met Val Lys Val Thr Gly Ala Gly Trp Asp
195 200 205

Asn Gly Val Leu Glu Phe Tyr Val Thr Arg Pro Thr Lys Thr Gly Gly
210 215 220

Asp Thr Ser Arg Ser His Leu Ala Ser Ile Met Cys Tyr Ser Lys Asp
225 230 235 240

Ile Asp Gly Val Pro Ser Asp Lys Ala Gly Lys Cys Phe Leu Lys Asn
245 250 255

Phe Ser Gly Glu Asp Ser Ser Glu Ile Asp Glu Lys Glu Val Ser Leu
260 265 270

Pro Ile Lys Ser His Asn Asp Ala Phe Met Phe Val Cys Ser Ser Asn
275 280 285

Asp Gly Ser Ala Leu Gln Cys Asp Val Phe Ala Leu Asp Asn Thr Asn
290 295 300

Ser Ser Asp Gly Trp Lys Val Asn Thr Val Asp Leu Asp Val Ser Val
305 310 315 320

Ser Pro Asp Leu Ala Phe Gly Leu Thr Ala Asp Gly Val Lys Val Lys
325 330 335

Lys Leu Tyr Ala Ser Ser Gly Leu Thr Ala Ile Asn Asp Asp Pro Ser
340 345 350

Leu Gly Cys Lys Ala Pro Pro His Ser Pro Pro Ala Gly Glu Glu Pro
355 360 365

Ser Leu Pro Ser Pro Glu Asn Ser Gly Ser Ala Thr Pro Ala Glu Glu
370 375 380

Ser Pro Ser Glu Ser Glu Ser Ala Ala Ala
385 390

<210> 33

<211> 115

<212> PRT

<213> Toxoplasma gondii

<400> 33

Ser Gly Gly Thr Gly Gln Gly Leu Gly Ile Gly Glu Ser Val Asp Leu
1 5 10 15

Glu Met Met Gly Asn Thr Tyr Arg Val Glu Arg Pro Thr Gly Asn Pro
20 25 30

Asp Leu Leu Lys Ile Ala Ile Lys Ala Ser Asp Gly Ser Tyr Ser Glu
35 40 45

Val Gly Asn Val Asn Val Glu Glu Val Ile Asp Thr Met Lys Ser Met
50 55 60

Gln Arg Asp Glu Asp Ile Phe Leu Arg Ala Leu Asn Lys Gly Glu Thr
65 70 75 80

Val Glu Glu Ala Ile Glu Asp Val Ala Gln Ala Glu Gly Leu Asn Ser
85 90 95

Glu Gln Thr Leu Gln Leu Glu Asp Ala Val Ser Ala Val Ala Ser Trp
100 105 110

Gln Asp Glu
115

<210> 34

<211> 53

<212> PRT

<213> Toxoplasma gondii

<400> 34

Tyr Ser Ser Pro Arg Ile Val Val Leu Ile Arg Tyr Cys Phe Phe Ser
1 5 10 15

Thr Tyr Arg Leu Thr Met Phe Ala Val Lys His Cys Leu Leu Trp Ala
20 25 30

Val Gly Ala Leu Val Asn Val Ser Val Arg Ala Ala Glu Phe Ser Gly
35 40 45

Trp Asn Gln Gly Pro
50

<210> 35

<211> 35

<212> PRT

<213> Toxoplasma gondii

<400> 35

Glu Asn Pro Val Arg Pro Pro Pro Pro Gly Phe His Pro Ser Val Ile
1 5 10 15

Pro Asn Pro Pro Tyr Pro Leu Gly Thr Pro Ala Gly Met Pro Gln Pro
20 25 30

Glu Val Pro
35

<210> 36

<211> 90

<212> PRT

<213> Toxoplasma gondii

<400> 36

Ala Pro Thr Gln Ser Glu Met Lys Glu Phe Gln Glu Glu Ile Lys Glu
1 5 10 15

Gly Val Glu Glu Thr Lys His Glu Asp Asp Pro Glu Met Thr Arg Leu
20 25 30

Met Val Thr Glu Lys Gln Glu Ser Lys Asn Phe Ser Lys Met Ala Lys
35 40 45

Ser Gln Ser Phe Ser Thr Arg Ile Glu Glu Leu Gly Gly Ser Ile Ser
50 55 60

Phe Leu Thr Glu Thr Gly Val Thr Met Ile Glu Leu Pro Lys Thr Val
65 70 75 80

Ser Glu His Asp Met Asp Gln Leu Leu His
85 90

<210> 37

<211> 149

<212> PRT

<213> Toxoplasma gondii

<400> 37

Val Met Ala Ser Asp Pro Pro Leu Val Ala Asn Gln Trp Thr Cys Pro
1 5 10 15

Asp Lys Lys Ser Thr Ala Ala Val Ile Leu Thr Pro Thr Glu Asn His
20 25 30

Phe Thr Leu Lys Cys Pro Lys Thr Ala Leu Thr Glu Pro Pro Thr Leu
35 40 45

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

Cys Thr Ser Lys Ala Val Thr Leu Ser Ser Leu Ile Pro Glu Ala Glu
65 70 75 80

Asp Ser Trp Trp Thr Gly Asp Ser Ala Ser Leu Asp Thr Ala Gly Ile
85 90 95

Lys Leu Thr Val Pro Ile Glu Lys Phe Pro Val Thr Thr Gln Thr Phe
100 105 110

Trp Gly Cys Ile Lys Gly Asp Asp Ala Gln Ser Cys Met Val Thr Val
115 120 125

Thr Val Gln Ala Arg Ala Ser Ser Trp Asn Asn Val Ala Arg Cys Ser
130 135 140

Tyr Gly Ala Asp Ser
145

<210> 38

<211> 98

<212> PRT

<213> Toxoplasma gondii

<400> 38

Gly Leu Ser Gln Arg Val Pro Glu Leu Pro Glu Val Glu Pro Phe Asp
1 5 10 15

Glu Val Gly Thr Gly Ala Arg Arg Ser Gly Ser Ile Ala Thr Leu Leu
20 25 30

Pro Gln Asp Ala Val Leu Tyr Glu Asn Ser Glu Asp Val Ala Val Pro

35 40 45

Ser Asp Ser Ala Ser Thr Pro Ser Tyr Phe His Val Glu Ser Pro Ser
50 55 60

Ala Ser Val Glu Ala Ala Thr Gly Ala Val Gly Glu Val Val Pro Asp
65 70 75 80

Cys Glu Glu Gln Gln Glu Gln Gly Asp Thr Thr Leu Ser Asp His Asp
85 90 95

Phe His

<210> 39

<211> 135

<212> PRT

<213> Toxoplasma gondii

<400> 39

Leu Asn Pro Ile Asp Asp Met Leu Phe Glu Thr Ala Leu Thr Ala Asn
1 5 10 15

Glu Met Met Glu Asp Ile Thr Trp Arg Pro Arg Val Asp Val Glu Phe
20 25 30

Asp Ser Lys Lys Lys Glu Met Ile Ile Leu Ala Asp Leu Pro Gly Leu
35 40 45

Gln Lys Asp Asp Val Thr Ile Glu Val Asp Asn Gly Ala Ile Val Ile
50 55 60

Lys Gly Glu Lys Thr Ser Lys Glu Ala Glu Lys Val Asp Asp Gly Lys
65 70 75 80

Thr Lys Asn Ile Leu Thr Glu Arg Val Ser Gly Tyr Phe Ala Arg Arg
85 90 95

Phe Gln Leu Pro Ser Asn Tyr Lys Pro Asp Gly Ile Ser Ala Ala Met
100 105 110

Asp Asn Gly Val Leu Arg Val Thr Ile Lys Val Glu Asp Ser Gly Gly
115 120 125

Ala Lys Gln Gln Ile Ser Val
130 135

<210> 40

<211> 144

<212> PRT

<213> Toxoplasma gondii

<400> 40

Pro Cys Pro Ile Asn Ala Thr Cys Gly Gln Phe Glu Glu Trp Ser Thr
1 5 10 15

Cys Ser Val Ser Cys Gly Gly Gly Leu Lys Thr Arg Ser Arg Asn Pro
20 25 30

Trp Asn Glu Asp Gln Gln His Gly Gly Leu Ser Cys Glu Gln Gln His
35 40 45

Pro Gly Gly Arg Thr Glu Thr Val Thr Cys Asn Pro Gln Ala Cys Pro
50 55 60

Val Asp Glu Arg Pro Gly Glu Trp Ala Glu Trp Gly Glu Cys Ser Val
65 70 75 80

Thr Cys Gly Asp Gly Val Arg Glu Arg Arg Arg Gly Lys Ser Leu Val
85 90 95

Glu Ala Lys Phe Gly Gly Arg Thr Ile Asp Gln Gln Asn Glu Ala Leu
100 105 110

Pro Glu Asp Leu Lys Ile Lys Asn Val Glu Tyr Glu Pro Cys Ser Tyr
115 120 125

Pro Ala Cys Gly Ala Ser Cys Thr Tyr Val Trp Ser Asp Trp Asn Lys
130 135 140

<210> 41

<211> 194

<212> PRT

<213> Toxoplasma gondii

<400> 41

Leu Arg Gly Tyr Arg Phe Gly Val Trp Lys Lys Gly Arg Cys Leu Asp
1 5 10 15

Tyr Thr Glu Leu Thr Asp Thr Val Ile Glu Arg Val Glu Ser Lys Ala

20 25 30

Gln Cys Trp Val Lys Thr Phe Glu Asn Asp Gly Val Ala Ser Asp Gln
35 40 45

Pro His Thr Tyr Pro Leu Thr Ser Gln Ala Ser Trp Asn Asp Trp Trp
50 55 60

Pro Leu His Gln Ser Asp Gln Pro His Ser Gly Gly Val Gly Arg Asn
65 70 75 80

Tyr Gly Phe Tyr Tyr Val Asp Thr Thr Gly Glu Gly Lys Cys Ala Leu
85 90 95

Ser Asp Gln Val Pro Asp Cys Leu Val Ser Asp Ser Ala Ala Val Ser
100 105 110

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

Pro Ser Asn Pro Ser Val Thr Pro Pro Thr Pro Glu Thr Ala Leu Gln
130 135 140

Cys Thr Ala Asp Lys Phe Pro Asp Ser Phe Gly Ala Cys Asp Val Gln
145 150 155 160

Ala Cys Lys Arg Gln Lys Thr Ser Cys Val Gly Gly Gln Ile Gln Ser
165 170 175

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

Thr Ala

<210> 42

<211> 169

<212> PRT

<213> Toxoplasma gondii

<400> 42

Ser Ala Asn Val Thr Ser Ser Glu Pro Ala Lys Leu Asp Leu Ser Cys
1 5 10 15

Ala His Ser Asp Asn Lys Gly Ser Arg Ala Pro Thr Ile Gly Glu Pro
20 25 30

Val Pro Asp Val Ser Leu Glu Gln Cys Ala Ala Gln Cys Lys Ala Val
35 40 45

Asp Gly Cys Thr His Phe Thr Tyr Asn Asp Asp Ser Lys Met Cys His
50 55 60

Val Lys Glu Gly Lys Pro Asp Leu Tyr Asp Leu Thr Gly Gly Lys Thr
65 70 75 80

Ala Pro Arg Ser Cys Asp Arg Ser Cys Phe Glu Gln His Val Ser Tyr
85 90 95

Glu Gly Ala Pro Asp Val Met Thr Ala Met Val Thr Ser Gln Ser Ala
100 105 110

Asp Cys Gln Ala Ala Cys Ala Ala Asp Pro Ser Cys Glu Ile Phe Thr
115 120 125

Tyr Asn Glu His Asp Gln Lys Cys Thr Phe Lys Gly Arg Gly Phe Ser
130 135 140

Ala Phe Lys Glu Arg Gly Val Leu Gly Val Thr Ser Gly Pro Lys Gln
145 150 155 160

Phe Cys Asp Glu Gly Gly Lys Leu Thr
165

23