

SEQUENCE LISTING

<110> University of Tsukuba

<120> humanized anti-DNAM-1 antibody

<130> SF-3795

<160> 38

<170> PatentIn version 3.5

<210> 1

<211> 7

<212> PRT

<213> Artificial sequence

<220>

<223> HCDR1 of hTKB1,hAKB1-A and hAKB1-B

<400> 1

Ser Gly Tyr Tyr Trp Asn Trp
1 5

<210> 2

<211> 16

<212> PRT

<213> Artificial sequence

<220>

<223> HCDR2 of hTKB1,hAKB1-A and hAKB1-B

<400> 2

Tyr Ile Ser Tyr Asp Gly Ser Asn Asn Tyr Asn Pro Ser Leu Lys Asn
1 5 10 15

<210> 3

<211> 12

<212> PRT

<213> Artificial sequence

<220>

<223> HCDR3 of hTKB1,hAKB1-A and hAKB1-B

<400> 3

Ala Tyr Tyr Gly Asn Tyr Val Gly Tyr Phe Asp Val
 1 5 10

<210> 4
 <211> 11
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 <213> Artificial sequence

<220>
 <223> LCDR1 of hTKB1,hAKB1-A and hAKB1-B

<400> 4

Lys Ala Ser Gln Ser Val Ser Asn Asp Val Ala
 1 5 10

<210> 5
 <211> 7
 <212> PRT
 <213> Artificial sequence

<220>
 <223> LCDR2 of hTKB1,hAKB1-A and hAKB1-B

<400> 5

Tyr Ala Ser Asn Arg Tyr Thr
 1 5

<210> 6
 <211> 9
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 <213> Artificial sequence

<220>
 <223> LCDR3 of hTKB1,hAKB1-A and hAKB1-B

<400> 6

Gln Gln Asp Tyr Ser Ser Pro Leu Thr
 1 5

<210> 7
 <211> 121
 <212> PRT
 <213> Mus musculus

<400> 7

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

Ser Leu Ser Leu Thr Cys Ser Val Thr Gly Tyr Ser Ile Thr Ser Gly
 20 25 30

Tyr Tyr Trp Asn Trp Ile Arg Gln Phe Pro Gly Asn Lys Leu Glu Trp
 35 40 45

Met Gly Tyr Ile Ser Tyr Asp Gly Ser Asn Asn Tyr Asn Pro Ser Leu
 50 55 60

Lys Asn Arg Ile Ser Ile Thr Arg Asp Thr Ser Lys Asn Gln Phe Phe
 65 70 75 80

Leu Lys Leu Asn Ser Val Thr Thr Glu Asp Thr Ala Thr Tyr Tyr Cys
 85 90 95

Ala Arg Ala Tyr Tyr Gly Asn Tyr Val Gly Tyr Phe Asp Val Trp Gly
 100 105 110

Ala Gly Thr Thr Val Thr Val Ser Ser
 115 120

<210> 8

<211> 110

<212> PRT

<213> Mus musculus

<400> 8

Ser Ile Val Met Thr Gln Thr Pro Lys Phe Leu Leu Val Ser Ala Gly
 1 5 10 15

Asp Arg Val Thr Ile Thr Cys Lys Ala Ser Gln Ser Val Ser Asn Asp
 20 25 30

Val Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Lys Leu Leu Ile
 35 40 45

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

Ser Gly Tyr Gly Thr Asp Phe Thr Phe Thr Ile Ser Thr Val Gln Ala
 65 70 75 80

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

Thr Phe Gly Ala Gly Thr Lys Leu Glu Leu Lys Arg Thr Val
 100 105 110

<210> 9
 <211> 121
 <212> PRT
 <213> Artificial sequence

<220>
 <223> heavy chain variable region of hAKB1 VH1

<400> 9

Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
 1 5 10 15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Tyr Ser Ile Thr Ser Gly
 20 25 30

Tyr Tyr Trp Asn Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp
 35 40 45

Met Gly Tyr Ile Ser Tyr Asp Gly Ser Asn Asn Tyr Asn Pro Ser Leu
 50 55 60

Lys Asn Arg Val Thr Ile Ser Arg Asp Thr Ser Lys Asn Gln Phe Ser
 65 70 75 80

Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys
 85 90 95

Ala Arg Ala Tyr Tyr Gly Asn Tyr Val Gly Tyr Phe Asp Val Trp Gly
 100 105 110

Gln Gly Thr Thr Val Thr Val Ser Ser
 115 120

<210> 10

<211> 121

<212> PRT

<213> Artificial sequence

<220>

<223> heavy chain variable region of hAKB1 VH2

<400> 10

Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
 1 5 10 15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Tyr Ser Ile Ser Ser Gly
 20 25 30

Tyr Tyr Trp Asn Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp
 35 40 45

Met Gly Tyr Ile Ser Tyr Asp Gly Ser Asn Asn Tyr Asn Pro Ser Leu
 50 55 60

Lys Asn Arg Val Thr Ile Ser Arg Asp Thr Ser Lys Asn Gln Phe Ser
 65 70 75 80

Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys
 85 90 95

Ala Arg Ala Tyr Tyr Gly Asn Tyr Val Gly Tyr Phe Asp Val Trp Gly
 100 105 110

Gln Gly Thr Thr Val Thr Val Ser Ser
 115 120

<210> 11
 <211> 110
 <212> PRT
 <213> Artificial sequence

<220>
 <223> light chain variable region of hAKB1 VL1

<400> 11

Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
 1 5 10 15

Asp Arg Val Thr Ile Thr Cys Lys Ala Ser Gln Ser Val Ser Asn Asp
 20 25 30

Val Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
 35 40 45

Tyr Tyr Ala Ser Asn Arg Tyr Thr Gly Val Pro Ser Arg Phe Ser Gly
 50 55 60

Ser Gly Tyr Gly Thr Asp Phe Thr Phe Thr Ile Ser Ser Leu Gln Pro
 65 70 75 80

Glu Asp Ile Ala Thr Tyr Tyr Cys Gln Gln Asp Tyr Ser Ser Pro Leu
 85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val
 100 105 110

<210> 12
 <211> 110
 <212> PRT
 <213> Artificial sequence

<220>
 <223> light chain variable region of hAKB1 VL2

<400> 12

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

Val Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Tyr Ala Ser Asn Arg Tyr Thr Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Phe Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Ile Ala Thr Tyr Tyr Cys Gln Gln Asp Tyr Ser Ser Pro Leu
85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val
100 105 110

<210> 13

<211> 451

<212> PRT

<213> Artificial sequence

<220>

<223> heavy chain of hAKB1-A without signal peptide

<400> 13

Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1 5 10 15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Tyr Ser Ile Thr Ser Gly
20 25 30

Tyr Tyr Trp Asn Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp
35 40 45

Met Gly Tyr Ile Ser Tyr Asp Gly Ser Asn Asn Tyr Asn Pro Ser Leu
 50 55 60

Lys Asn Arg Val Thr Ile Ser Arg Asp Thr Ser Lys Asn Gln Phe Ser
 65 70 75 80

Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys
 85 90 95

Ala Arg Ala Tyr Tyr Gly Asn Tyr Val Gly Tyr Phe Asp Val Trp Gly
 100 105 110

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

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

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

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
 165 170 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
 180 185 190

Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
 195 200 205

Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys
 210 215 220

Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Ala Ala Gly
 225 230 235 240

Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met
 245 250 255

Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His
 260 265 270

Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val
 275 280 285

His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr
 290 295 300

Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly
 305 310 315 320

Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile
 325 330 335

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

Tyr Thr Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser
 355 360 365

Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu
 370 375 380

Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro
 385 390 395 400

Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val
 405 410 415

Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met
 420 425 430

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

Pro Gly Lys
450

<210> 14
<211> 451
<212> PRT
<213> Artificial sequence

<220>
<223> heavy chain of hAKB1-B without signal peptide

<400> 14

Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1 5 10 15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Tyr Ser Ile Ser Ser Gly
20 25 30

Tyr Tyr Trp Asn Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp
35 40 45

Met Gly Tyr Ile Ser Tyr Asp Gly Ser Asn Asn Tyr Asn Pro Ser Leu
50 55 60

Lys Asn Arg Val Thr Ile Ser Arg Asp Thr Ser Lys Asn Gln Phe Ser
65 70 75 80

Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Ala Tyr Tyr Gly Asn Tyr Val Gly Tyr Phe Asp Val Trp Gly
100 105 110

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

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

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

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
 165 170 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
 180 185 190

Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
 195 200 205

Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys
 210 215 220

Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Ala Ala Gly
 225 230 235 240

Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met
 245 250 255

Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His
 260 265 270

Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val
 275 280 285

His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr
 290 295 300

Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly
 305 310 315 320

Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile
 325 330 335

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

Tyr Thr Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser
 355 360 365

Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu
 370 375 380

Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro
 385 390 395 400

Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val
 405 410 415

Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met
 420 425 430

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

Pro Gly Lys
 450

<210> 15

<211> 214

<212> PRT

<213> Artificial sequence

<220>

<223> light chain of hAKB1-A and hAKB1-B without signal peptide

<400> 15

Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
 1 5 10 15

Asp Arg Val Thr Ile Thr Cys Lys Ala Ser Gln Ser Val Ser Asn Asp
 20 25 30

Val Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
 35 40 45

Tyr Tyr Ala Ser Asn Arg Tyr Thr Gly Val Pro Ser Arg Phe Ser Gly
 50 55 60

Ser Gly Tyr Gly Thr Asp Phe Thr Phe Thr Ile Ser Ser Leu Gln Pro
 65 70 75 80

Glu Asp Ile Ala Thr Tyr Tyr Cys Gln Gln Asp Tyr Ser Ser Pro Leu
 85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
 100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
 115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
 130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
 145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
 165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
 180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
 195 200 205

Phe Asn Arg Gly Glu Cys
 210

<210> 16

<211> 469

<212> PRT

<213> Artificial sequence

<220>

<223> heavy chain of hAKB1-A with signal peptide

<400> 16

Met Lys Val Leu Ser Leu Leu Tyr Leu Leu Thr Ala Ile Pro Gly Ile
 1 5 10 15

Leu Ser Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro
 20 25 30

Ser Glu Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Tyr Ser Ile Thr
 35 40 45

Ser Gly Tyr Tyr Trp Asn Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu
 50 55 60

Glu Trp Met Gly Tyr Ile Ser Tyr Asp Gly Ser Asn Asn Tyr Asn Pro
 65 70 75 80

Ser Leu Lys Asn Arg Val Thr Ile Ser Arg Asp Thr Ser Lys Asn Gln
 85 90 95

Phe Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr
 100 105 110

Tyr Cys Ala Arg Ala Tyr Tyr Gly Asn Tyr Val Gly Tyr Phe Asp Val
 115 120 125

Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly
 130 135 140

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

Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
 165 170 175

Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
 180 185 190

Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
 195 200 205

Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
 210 215 220

Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys
 225 230 235 240

Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Ala
 245 250 255

Ala Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr
 260 265 270

Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val
 275 280 285

Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val
 290 295 300

Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser
 305 310 315 320

Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu
 325 330 335

Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala
 340 345 350

Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro
 355 360 365

Gln Val Tyr Thr Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln
 370 375 380

Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala
 385 390 395 400

Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr
 405 410 415

Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu
 420 425 430

Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser
 435 440 445

Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser
 450 455 460

Leu Ser Pro Gly Lys
 465

<210> 17
 <211> 469
 <212> PRT
 <213> Artificial sequence

<220>
 <223> heavy chain of hAKB1-B with signal peptide

<400> 17

Met Lys Val Leu Ser Leu Leu Tyr Leu Leu Thr Ala Ile Pro Gly Ile
 1 5 10 15

Leu Ser Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro
 20 25 30

Ser Glu Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Tyr Ser Ile Ser
 35 40 45

Ser Gly Tyr Tyr Trp Asn Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu
 50 55 60

Glu Trp Met Gly Tyr Ile Ser Tyr Asp Gly Ser Asn Asn Tyr Asn Pro
 65 70 75 80

Ser Leu Lys Asn Arg Val Thr Ile Ser Arg Asp Thr Ser Lys Asn Gln
 85 90 95

Phe Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr
 100 105 110

Tyr Cys Ala Arg Ala Tyr Tyr Gly Asn Tyr Val Gly Tyr Phe Asp Val
 115 120 125

Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly
 130 135 140

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

Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
 165 170 175

Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
 180 185 190

Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
 195 200 205

Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
 210 215 220

Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys
 225 230 235 240

Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Ala
 245 250 255

Ala Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr
 260 265 270

Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val
 275 280 285

Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val
 290 295 300

Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser
 305 310 315 320

Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu
 325 330 335

Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala
 340 345 350

Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro
 355 360 365

Gln Val Tyr Thr Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln
 370 375 380

Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala
 385 390 395 400

Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr
 405 410 415

Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu
 420 425 430

Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser
 435 440 445

Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser
 450 455 460

Leu Ser Pro Gly Lys
 465

<210> 18
 <211> 234
 <212> PRT
 <213> Artificial sequence

<220>
 <223> light chain of hAKB1-A and hAKB1-B with signal peptide
 <400> 18

Met Lys Ser Gln Thr Gln Val Phe Val Phe Leu Leu Leu Cys Val Ser
 1 5 10 15

Gly Ala His Gly Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser
 20 25 30

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

Val Ser Asn Asp Val Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro
 50 55 60

Lys Leu Leu Ile Tyr Tyr Ala Ser Asn Arg Tyr Thr Gly Val Pro Ser
 65 70 75 80

Arg Phe Ser Gly Ser Gly Tyr Gly Thr Asp Phe Thr Phe Thr Ile Ser
 85 90 95

Ser Leu Gln Pro Glu Asp Ile Ala Thr Tyr Tyr Cys Gln Gln Asp Tyr
 100 105 110

Ser Ser Pro Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg
 115 120 125

Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln
 130 135 140

Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr
 145 150 155 160

Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser
 165 170 175

Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr
 180 185 190

Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys
 195 200 205

His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro
 210 215 220

Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
 225 230

<210> 19
 <211> 1410
 <212> DNA
 <213> Artificial sequence

<220>
 <223> coding region of heavy chain of hAKB1-A

<400> 19
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 actgtcagtg gctactccat caccagtggg tattactgga actggatccg gcagcctcca 180
 ggaaaaggac tggaatggat gggctacatc agctacgacg gcagcaataa ctacaacca 240
 agtctcaaga atcgagtcac catcagtcgt gacacatcta agaaccagtt ttccctgaag 300
 ttgagttctg tgactgctgc cgacacagct gtgtattact gtgcaagggc ctactatggg 360
 aactatgtgg gctacttcga tgtctggggc caagggacca ctgtcaccgt ctcctcagcc 420

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aactcaggcg ccctgaccag cggcgtgcac accttccccg ctgtcctaca gtcctcagga      600
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atctgcaacg tgaatcaciaa gcccagcaac accaagggtgg acaagaaaagt tgagcccaaa      720
tcttgtgaca aaactcacac atgcccaccg tgcccagcac ctgaagctgc tggaggaccg      780
tcagtcttcc tcttcccccc aaaacccaag gacaccctca tgatctcccc gaccctgag      840
gtcacatgcg tgggtggtgga cgtgagccac gaagaccctg aggtcaagtt caactggtac      900
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tacaagtgca aggtctccaa caaagccctc ccagcccca tcgagaaaac catctcaaaa     1080
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gtggagtggg agagcaatgg gcagccggag aacaactaca agaccacgcc tcccgtgctg     1260
gactccgacg gctccttctt cctctacagc aagctcaccg tggacaagag caggtggcag     1320
caggggaacg tcttctcatg ctccgtgatg catgaggctc tgcacaacca ctacacgcag     1380
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<210> 20

<211> 1410

<212> DNA

<213> Artificial sequence

<220>

<223> coding region of heavy chain of hAKB1-B

<400> 20

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atgaaagtgt tgagtctgtt gtacctgttg acagccattc ctggtatcct gtctcaagtt      60
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actgtcagtg gctactccat cagcagtggt tattactgga actggatccg gcagcctcca      180

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ctctactccc tcagcagcgt ggtgaccgtg ccctccagca gcttggggc cagacctac      660
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tcttgtgaca aaactcacac atgcccaccg tgcccagcac ctgaagctgc tggaggaccg      780
tcagtcttcc tcttcccccc aaaacccaag gacaccctca tgatctcccg gaccctgag      840
gtcacatgcg tgggtggtgga cgtgagccac gaagaccctg aggtcaagtt caactggtac      900
gtggacggcg tggagggtgca taatgccaag acaaagccgc gggaggagca gtacaacagc      960
acgtaccgtg tggtcagcgt cctcaccgtc ctgcaccagg actggctgaa tggcaaggag     1020
tacaagtgca aggtctccaa caaagccctc ccagcccca tcgagaaaac catctccaaa     1080
gccaaagggc agccccgaga accacagggtg tacaccctgc ccccatcccg ggatgagctg     1140
accaagaacc aggtcagcct gacctgcctg gtcaaaggct tctatcccag cgacatcgcc     1200
gtggagtggg agagcaatgg gcagccggag aacaactaca agaccacgcc tcccgtgctg     1260
gactccgacg gtccttctt cctctacagc aagctcaccg tggacaagag caggtggcag     1320
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<210> 21

<211> 705

<212> DNA

<213> Artificial sequence

<220>

<223> coding region of light chain of hAKB1-A and hAKB1-B

<400> 21

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atgaagtcac agacccaagt cttcgtgttt ctgctgctct gtgtgtctgg agctcatggg      60
gatattcaga tgaccagag tcccagctcc ctgtctgcat cagtgggaga cagggttacc      120
atcacctgca aggccagtca gagcgtctcc aatgatgtcg cttggtacca acagaagcca      180
gggaaggctc ctaaactgct gatctactat gcatccaatc gctacactgg agtccctagt      240
cgcttcagtg gcagtggata tgggaccgat ttcactttca ccatcagcag tctgcagcct      300
gaagacatcg caacttatta ctgtcagcag gattatagct ctccactcac tttcggagga      360
gggaccaaag tcgagatcaa acgaactgtg gctgcaccat ctgtcttcat cttcccgcc      420
tctgatgagc agttgaaatc tggaactgcc tctgttgtgt gcctgctgaa taacttctat      480
cccagagagg ccaaagtaca gtggaagggtg gataacgccc tccaatcggg taactcccag      540
gagagtgtca cagagcagga cagcaaggac agcacctaca gcctcagcag caccctgacg      600
ctgagcaaag cagactacga gaaacacaaa gtctacgcct gcgaagtcac ccatcagggc      660
ctgagctcgc ccgtcacaaa gagcttcaac aggggagagt gttag                        705

```

<210> 22

<211> 451

<212> PRT

<213> Artificial sequence

<220>

<223> heavy chain of hTKB1 without signal peptide

<400> 22

```

Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1           5           10           15

```

```

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Tyr Ser Ile Ser Ser Gly
20           25           30

```

```

Tyr Tyr Trp Asn Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp
35           40           45

```

Met Gly Tyr Ile Ser Tyr Asp Gly Ser Asn Asn Tyr Asn Pro Ser Leu
 50 55 60

Lys Asn Arg Val Thr Ile Ser Arg Asp Thr Ser Lys Asn Gln Phe Ser
 65 70 75 80

Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys
 85 90 95

Ala Arg Ala Tyr Tyr Gly Asn Tyr Val Gly Tyr Phe Asp Val Trp Gly
 100 105 110

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

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

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

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
 165 170 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
 180 185 190

Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
 195 200 205

Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys
 210 215 220

Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Ala Ala Gly
 225 230 235 240

Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met
 245 250 255

Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His
 260 265 270

Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val
 275 280 285

His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr
 290 295 300

Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly
 305 310 315 320

Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile
 325 330 335

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

Tyr Thr Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser
 355 360 365

Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu
 370 375 380

Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro
 385 390 395 400

Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val
 405 410 415

Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met
 420 425 430

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

Pro Gly Lys
450

<210> 23
<211> 214
<212> PRT
<213> Artificial sequence

<220>
<223> light chain of hTKB1 without signal peptide

<400> 23

Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Lys Ala Ser Gln Ser Val Ser Asn Asp
20 25 30

Val Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Tyr Ala Ser Asn Arg Tyr Thr Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Tyr Gly Thr Asp Phe Thr Phe Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Ile Ala Thr Tyr Tyr Cys Gln Gln Asp Tyr Ser Ser Pro Leu
85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
 145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
 165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
 180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
 195 200 205

Phe Asn Arg Gly Glu Cys
 210

<210> 24
 <211> 470
 <212> PRT
 <213> Artificial sequence

<220>
 <223> heavy chain of hTKB1 with signal peptide

<400> 24

Met Lys His Leu Trp Phe Phe Leu Leu Leu Val Ala Ala Pro Arg Trp
 1 5 10 15

Val Leu Ser Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys
 20 25 30

Pro Ser Glu Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Tyr Ser Ile
 35 40 45

Ser Ser Gly Tyr Tyr Trp Asn Trp Ile Arg Gln Pro Pro Gly Lys Gly
 50 55 60

Leu Glu Trp Met Gly Tyr Ile Ser Tyr Asp Gly Ser Asn Asn Tyr Asn
 65 70 75 80

Pro Ser Leu Lys Asn Arg Val Thr Ile Ser Arg Asp Thr Ser Lys Asn
85 90 95

Gln Phe Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val
100 105 110

Tyr Tyr Cys Ala Arg Ala Tyr Tyr Gly Asn Tyr Val Gly Tyr Phe Asp
115 120 125

Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys
130 135 140

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

Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
165 170 175

Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
180 185 190

Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
195 200 205

Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn
210 215 220

Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro
225 230 235 240

Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu
245 250 255

Ala Ala Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp
260 265 270

Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp
275 280 285

Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly
 290 295 300

Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn
 305 310 315 320

Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp
 325 330 335

Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro
 340 345 350

Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu
 355 360 365

Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn
 370 375 380

Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile
 385 390 395 400

Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr
 405 410 415

Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys
 420 425 430

Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys
 435 440 445

Ser Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu
 450 455 460

Ser Leu Ser Pro Gly Lys
 465 470

<210> 25
 <211> 236
 <212> PRT
 <213> Artificial sequence

<220>
 <223> light chain of hTKB1 with signal peptide

<400> 25

Met Asp Met Arg Val Pro Ala Gln Leu Leu Gly Leu Leu Leu Leu Trp
 1 5 10 15

Leu Arg Gly Ala Arg Cys Asp Ile Gln Met Thr Gln Ser Pro Ser Ser
 20 25 30

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

Gln Ser Val Ser Asn Asp Val Ala Trp Tyr Gln Gln Lys Pro Gly Lys
 50 55 60

Ala Pro Lys Leu Leu Ile Tyr Tyr Ala Ser Asn Arg Tyr Thr Gly Val
 65 70 75 80

Pro Ser Arg Phe Ser Gly Ser Gly Tyr Gly Thr Asp Phe Thr Phe Thr
 85 90 95

Ile Ser Ser Leu Gln Pro Glu Asp Ile Ala Thr Tyr Tyr Cys Gln Gln
 100 105 110

Asp Tyr Ser Ser Pro Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile
 115 120 125

Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
 130 135 140

Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
 145 150 155 160

Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
 165 170 175

Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
 180 185 190

Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
 195 200 205

Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
 210 215 220

Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
 225 230 235

<210> 26
 <211> 1416
 <212> DNA
 <213> Artificial sequence

<220>
 <223> coding region of heavy chain of hTKB1

<400> 26
 atgaaacacc tgtggttctt cctcctcctg gtggcagctc ccagatgggt cctgtcccaa 60
 gttcagctgc aagaatccgg acccggactg gtgaagccct ccgagacttt atctttaact 120
 tgtaccgtga gcggtactc catctcctcc ggctactact ggaactggat tcgtcagcct 180
 cccggcaagg gtttagaatg gatgggctac atctcctacg acggctcaa caactacaac 240
 ccctctttaa agaatcgtgt gaccatctct cgtgacacct ccaagaacca gttctcttta 300
 aagctgtcct ccgtgacagc cgccgatacc gccgtgtact actgcgctcg tgcctactac 360
 ggcaactacg tgggctactt cgacgtgtgg ggccaaggta ccaccgtgac agtctcctcc 420
 gctagcacca agggcccatc ggtcttcccc ctggcaccct cctccaagag cacctctggg 480
 ggcacagcgg ccctgggctg cctgggtcaag gactacttcc ccgaaccggt gacgggtgtcg 540
 tggaactcag gcgcccctgac cagcggcgtg cacaccttcc cggccgtcct acagtcctca 600
 ggactctact ccctcagcag cgtgggtgacc gtgccctcca gcagcttggg caccagacc 660

tacatctgca acgtgaatca caagcccagc aacaccaagg tggacaagaa ggttgagccc	720
aaatcttgtg acaaaaactca cacatgcccc ccgtgcccag cacctgaagc agccggggga	780
ccgtcagtct tcctcttccc cccaaaaccc aaggacaccc tcatgatctc ccggaccct	840
gaggtcacat gcgtgggtgt ggacgtgagc cacgaagacc ctgaggtcaa gttcaactgg	900
tacgtggacg gcgtggaggt gcataatgcc aagacaaaagc cgcgggagga gcagtacaac	960
agcacgtacc gtgtgggtcag cgtcctcacc gtcctgcacc aggactggct gaatggcaag	1020
gagtacaagt gcaagggtctc caacaaagcc ctcccagccc ccatcgagaa aaccatctcc	1080
aaagccaaaag ggcagccccg agaaccacag gtgtacaccc tgcccccatc ccgggacgag	1140
ctgaccaaga accagggtcag cctgacctgc ctgggtcaaag gcttctatcc cagcgacatc	1200
gccgtggagt gggagagcaa tgggcagccg gagaacaact acaagaccac gcctcccgtg	1260
ctggactccg acggctcctt cttcctctac agcaagctca ccgtggacaa gagcagggtg	1320
cagcagggga acgtcttctc atgctccgtg atgcatgagg ctctgcacaa ccactacacg	1380
cagaagagcc tctccctgtc tccgggtaaa tgatga	1416

<210> 27

<211> 714

<212> DNA

<213> Artificial sequence

<220>

<223> coding region of light chain of hTKB1

<400> 27

atggacatga ggggtccccg tcagctcctg gggctcctgc tactctggct ccgagggtgcc	60
agatgtgaca tccagatgac ccagtccccct tcctctttta gcgcttccgt gggcgatcgt	120
gtgaccatca cttgtaaggc ctcccagtcc gtgtccaacg acgtggcttg gtaccagcag	180
aagcccgga aggccccca gctgctgac tactacgcct ccaatcgta caccggcgtg	240
ccttctcgtt tttccggctc cggctacggc accgacttca ccttcacat ctctcttta	300
cagcccagg acatcgccac ctactactgc cagcaagatt actcctcccc tctgaccttt	360
ggcggcggca ccaagggtga gatcaagcgt acgggtggctg caccatctgt cttcatcttc	420

ccgccatctg atgagcagtt gaaatctgga actgcctctg ttgtgtgcct gctgaataac 480
 ttctatccca gagaggccaa agtacagtgg aagggtggata acgccctcca atcgggtaac 540
 tcccaggaga gtgtcacaga gcaggacagc aaggacagca cctacagcct cagcagcacc 600
 ctgacgctga gcaaagcaga ctacgagaaa cacaaagtct acgcctgcga agtcacccat 660
 cagggcctga gctcgcccggt cacaaagagc ttcaacaggg gagagtgttg atga 714

<210> 28
 <211> 18
 <212> PRT
 <213> Artificial sequence

<220>
 <223> signal peptide of heavy chain of hAKB1-A

<400> 28

Met Lys Val Leu Ser Leu Leu Tyr Leu Leu Thr Ala Ile Pro Gly Ile
 1 5 10 15

Leu Ser

<210> 29
 <211> 18
 <212> PRT
 <213> Artificial sequence

<220>
 <223> signal peptide of heavy chain of hAKB1-B

<400> 29

Met Lys Val Leu Ser Leu Leu Tyr Leu Leu Thr Ala Ile Pro Gly Ile
 1 5 10 15

Leu Ser

<210> 30
 <211> 20

<212> PRT
 <213> Artificial sequence

<220>
 <223> signal peptide of light chain of hAKB1-A and hAKB1-B

<400> 30

Met	Lys	Ser	Gln	Thr	Gln	Val	Phe	Val	Phe	Leu	Leu	Leu	Cys	Val	Ser
1				5				10					15		

Gly	Ala	His	Gly
			20

<210> 31
 <211> 19
 <212> PRT
 <213> Artificial sequence

<220>
 <223> signal peptide of heavy chain of hTKB1

<400> 31

Met	Lys	His	Leu	Trp	Phe	Phe	Leu	Leu	Leu	Val	Ala	Ala	Pro	Arg	Trp
1			5				10						15		

Val	Leu	Ser
-----	-----	-----

<210> 32
 <211> 22
 <212> PRT
 <213> Artificial sequence

<220>
 <223> signal peptide of light chain of hTKB1

<400> 32

Met	Asp	Met	Arg	Val	Pro	Ala	Gln	Leu	Leu	Gly	Leu	Leu	Leu	Leu	Trp
1				5				10					15		

Leu	Arg	Gly	Ala	Arg	Cys
					20

<210> 33
 <211> 21
 <212> DNA
 <213> Artificial sequence

<220>
 <223> Gapdh forward primer

<400> 33
 cttcaccacc atggagaagg c 21

<210> 34
 <211> 21
 <212> DNA
 <213> Artificial sequence

<220>
 <223> Gapdh reverse primer

<400> 34
 ggcatggact gtggatcatga g 21

<210> 35
 <211> 22
 <212> DNA
 <213> Artificial sequence

<220>
 <223> Ifng forward primer

<400> 35
 accagagcat ccaaaagagt gt 22

<210> 36
 <211> 20
 <212> DNA
 <213> Artificial sequence

<220>
 <223> Ifng reverse primer

<400> 36
 ttagctgctg gcgacagttc 20

<210> 37
<211> 21
<212> DNA
<213> Artificial sequence

<220>
<223> Tnfa forward primer

<400> 37
cagcctcttc tccttcctga t 21

<210> 38
<211> 20
<212> DNA
<213> Artificial sequence

<220>
<223> Tnfa reverse primer

<400> 38
gccagagggc tgattagaga 20